

# SATELLITE evolution ASIA

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## Changing the world with Big Data

**Plus**  
Q&A Marlink Maritime  
Q&A ND SATCOM  
Gearing up for a 5G future  
News gathering goes mobile





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25W to 50W



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150W to 250W



CASCADE

300W to 500W



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800W to 1kW



SUMMIT

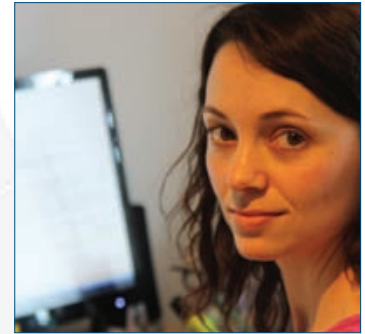
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**Amy Saunders**  
Editor

## Networking in the face of adversity

2020 is shaping up to be a huge year for the satellite sector; already, we've seen big announcements across the board, in everything from on-orbit satellite servicing and deep space communications through to inflight connectivity firsts and maritime services.

The year is set to be especially promising for the small satellite sphere, with many of the new constellations reaching fruition; SpaceX alone is due to launch some 1,500 satellites for its Starlink constellation this year, while OneWeb is also ramping up its launch schedule, having successfully orbited 34 new satellites in February. Wondering what will the effects be on the wider space segment? Check out SIG's article on page 18 for the latest thoughts.

Many of the small satellites coming into play this year are working to bridge the digital divide by delivering high speed Internet connectivity in remote and rural locations, including SpaceX and OneWeb. Other high-speed broadband delivery satellite constellations in the works, discussed on page 8, include O3b's next generation mPOWER series, as well as Telesat, Facebook and Amazon.

Indeed, satellite technology itself is racing ahead, with the high throughput satellites (HTS) we all know and love going even larger: Very high throughput satellites (VHTS) such as Inmarsat's GX5 can deliver even more capacity than ever before, although the long-term effects of this and the other upcoming VHTS are expected to further negatively impact on capacity pricing.

With the threat of COVID-19 surging across the world, ubiquitous, reliable satellite communications are required now more than ever in order to keep people connected during periods of isolation. Remote working is going to see a huge boom in the coming months, enabling certain industries to stay afloat, however, there are tough times ahead for many others. ■

**"Many of the small satellites coming into play this year are working to bridge the digital divide....."**



Photo courtesy of Shutterstock

**Editor**  
Amy Saunders  
amy.saunders@dsairpublications.com

**News & Social media Editor**  
Laurence Russell  
laurence@dsairpublications.com

**Marketing and Business Development**  
Belinda Bradford  
belinda@dsairpublications.com

**Sales Director**  
Jill Durfee  
jill.durfee@dsairpublications.com

**Sales Manager**  
Sam Baird  
sam@whitehillmedia.com

**Circulation Manager**  
Elizabeth George

**Publisher**  
Richard Hooper  
richard@dsairpublications.com

**Managing Director**  
David Shortland  
david@dsairpublications.com

**Satellite  
evolution Asia**

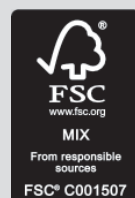
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**DS Air Publications**  
1 Langhurstwood Road  
Horsham  
West Sussex, RH12 4QD  
United Kingdom  
T: +44 1403 273973  
F: +44 1403 273972  
Email: admin@satellite-evolution.com  
www.satellite-evolution.com

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Never before in history has as much data been collected as it is today. There are literally billions of sensors spread across the world, on land, at sea, in the air, and in space, recording anything and everything; data as diverse as traffic patterns, weather formations, remote machine applications on oil rigs and in agriculture, stock room supplies, medicine consumption patterns, etc.

The amount of data being collected has seen a new era of Big Data come into being, one which companies and governments the world over are grappling to understand and manage.



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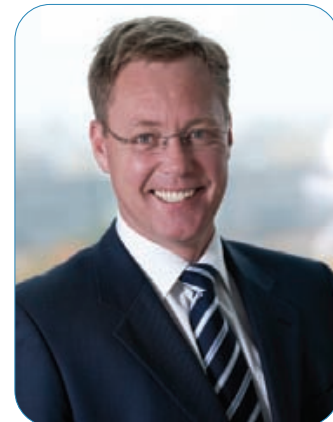
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### **Kacific1 Broadband services commence across Asia-Pacific**

Kacific1, Kacific Broadband Satellites Group's first communications satellite, has entered commercial service and is ready to support customers across Asia-Pacific.

Designed and manufactured by Boeing, Kacific1 is a high-throughput, ka-band satellite which successfully launched on 16 December 2019 from Cape Canaveral, Florida. The payload and bus platform have been thoroughly tested and all 56 spot beams are now operating with full capability from the 150E orbital position.

"From the early design and through the construction phases, we knew that Kacific1 would provide the Asia-Pacific region with cost-effective technology to transform lives and businesses with the best broadband available to remote areas. Now with the in-orbit tests completed, we can realize this huge potential," said Bob Perpall, Chief Technology Officer, Kacific.

"In the two months since launch, we've rolled out over a hundred trial sites across Asia-Pacific and are extremely pleased with the technology's performance. When we put up the initial carriers and saw the performance we were getting on that first terminal, we knew then that we had something wonderful to offer people."

Kacific engineers are upskilling local engineers in the installation and maintenance of the satellite ground technology. The rapid rollout will continue in coming months connecting both new end users and those being transferred from the provisional Ku-band network to Kacific1's Ka-band services. ■

### **Intelsat selects SpaceX to launch Intelsat 40e Satellite**

Intelsat has selected SpaceX as its launch partner for Intelsat 40e (IS-40e). The launch is planned for 2022 on SpaceX's American-built Falcon 9 launch vehicle.

"We look forward to working with SpaceX to launch Intelsat 40e in 2022," said Intelsat Chief Services Officer Mike DeMarco. "IS-40e will join the Intelsat Epic high-throughput satellite fleet and integrated IntelsatOne ground network to provide our customers with the managed hybrid-connectivity they need in today's ever-changing world."

"We are honoured Intelsat, one of the world's premier satellite operators, has selected a flight-proven Falcon 9 to deliver its next geostationary communications satellite to orbit," said SpaceX Vice President of Commercial Sales Tom Ochinero.

Intelsat 40e is an advanced geostationary satellite that will provide Intelsat's government and enterprise customers across North and Central America with high throughput, "coast-to-coast" services. The satellite's capabilities will support the growing number of customers that depend on Intelsat's managed services and solutions to easily integrate satellite into their overall networking and communications strategies. Intelsat announced in February that Maxar Technologies will manufacture IS-40e.

This is the second launch for Intelsat and SpaceX. In 2017, SpaceX launched Intelsat 35e, a satellite currently providing high-throughput coverage for Intelsat customers in portions of North and South America, Europe and Africa. ■

### **PCBL selects ATEME for downlinking of television content throughout the Pacific**

ATEME, the leader in video delivery solutions for Broadcast, Cable TV, DTH, IPTV and OTT, has provided Kyrion DR5000 Integrated Receiver Decoders (IRDs) to Pacific Cooperation Broadcasting Limited (PCBL), a New Zealand Government initiative that supports Pacific free-to-air broadcasters through the delivery of New Zealand-originated content for rebroadcast, and the provision of training to encourage the production of local content.



*Photo courtesy of SpaceX*





PCBL opted for 52 DR5000 IRDs for its easy setup; fast signal lock; and industry leading RF robustness. A future-proof solution, the ATEME IRDs provide support for HEVC, in addition to 10-bit 4:2:2, SD, HD, UHD, MPEG2 and H264 to be installed into the 25 downlink locations. The Kyron solution provides PCBL and its regional partners - which covers approximately 20 percent of the Earth's surface - with unmatched reliability and video quality.

Professionalism, ease of use, and reliability both in terms of the product itself and ATEME's ability to deliver according to the project's tight schedule were key factors in PCBL's decision making. ATEME is recognised worldwide as a trusted long-term partner who can assist customers like PCBL in the implementation of its current and future vision.

"Some of our clients are in remote parts of the world, including Kiribati, Solomon Islands, The Kingdom of Tonga, and Niue. Support and service are obviously hard to come by quickly in these places, so the DR5000's robustness and user-friendly operation were key to our decision," said Natasha Meleisea, Chief Executive of PBCL. "With many of our broadcast partners spread across the Pacific, being able to roll out the decoders and configure them on site via USB proved to be another huge advantage. The ease of configuration, coupled with the skill of the onsite team, saw our fastest installation completed within 15 minutes."

"ATEME was always confident in meeting PCBL's exacting timelines and technical requirements," said Will Munkara-Kerr, Country Manager for ATEME Australia and New Zealand. "We are delighted to have been a part of PCBL's ambitious vision, and now that the initial phases have been successfully deployed, we are looking forward to continuing our close relationship as that vision expands." ■

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*Want to supply content for consideration?  
Contact the Editor: amy.saunders@dsairpublications.com*

### Intellian's next-generation tri-band maritime antenna earns type approval from SES

Intellian, globally renowned as a pioneering force in the design and manufacture of mobile satellite communication systems, has achieved further success with the news that its recently launched 2.4m v240MT Gen-II antenna has achieved type approval from SES, the leader in global content connectivity solutions.

Intellian's v240MT Gen-I was the world's first 2.4m tri-band and multi-orbit antenna, winning Via Satellite's inaugural Satellite Technology of the Year Award in 2019. The v240MT Gen-II delivers enhanced performance across C, Ku and Ka bands, providing customers with access to higher throughput and offering improved network efficiency to the operator. These advances were proven in partnership with SES, with the new system producing exceptional results during testing and sea trials.

In addition to the enhanced performance of the v240MT Gen-II, the new model offers greater flexibility and more features than ever before. Paired with the innovative new Intelligent Mediator solution, customers are now able to manage up to eight antennas simultaneously. This allows for seamless connectivity and the ability to maximize performance and throughput from the systems on board. Customers and partners also benefit from the capability to



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manage and control systems both on-board and remotely, allowing for cost savings through monitoring and maintenance.

"As SES operates the industry's only multi-orbit satellite fleet, with a GEO and MEO constellation, we believe that the v240MT Gen-II antenna system, with its tri-band and multi-orbit flexibility, constitutes a perfect fit," says Eric Sung, CEO of Intellian. "Both companies are focused on delivering innovative solutions to customers in terms of performance, reliability, flexibility and all-round user experience. It's exciting to know that we are forging a new path for maritime satellite communications with our valued partners."

### **COMSAT named 2020 Independent Teleport Operator of the Year by the World Teleport Association**

COMSAT has been named Independent Teleport Operator of the Year by the World Teleport Association (WTA), during its 25th annual Teleport Awards for Excellence event. The WTA presents the award to a teleport business whose achievements have been deemed exceptional by industry members from across the globe, and selected COMSAT as the winner from a field of 35 nominations.

COMSAT was honoured to receive the award for the first time in its rich history in the sector, which has been built on a legacy of providing teleport services to complex networks connected to multiple terrestrial fibre pathways for over 50 years. Its ground infrastructure, state-of-the-art technology and onsite 24/7/365 network operations centres supporting extensive geographic redundancy was also acknowledged. In addition, the company's continuous investment in development of its Tier 4 certified teleports located on the east and west coast of the USA added weight to the judges' decision. Upon completion, the current phase of expansion will augment COMSAT's already extensive redundancy and expand its transmission pathway capacity for existing and new satellite companies launching an increasing number of satellites into various orbits. The expansion also enhances COMSAT's cybersecurity infrastructure across all services.

Presenting the award to David Greenhill, COMSAT CEO, Louis Zacharilla, Director of Development, WTA, also singled out the contribution COMSAT makes to saving lives by keeping global emergency services connected, even in the most challenging environments.

"Objective recognition of our hard work and investment from members of an organization as prestigious as the World Teleport Association, especially in such a competitive marketplace, is incredibly satisfying for us. We work diligently to ensure that COMSAT stands out from the crowd by delivering the most advanced, reliable, interconnected global network and ground facilities available internationally. When our next phase of expansion is complete COMSAT will support more satellite constellation providers than any other terrestrial network and this award demonstrates how important that is for the industry," said Greenhill.

### **WORK Microwave DVB-S2 solutions power earth observation data reception in Antarctica**

WORK Microwave announced that a leading geospatial analytics company is using its DVB-S2 IP Receiver SDD-IP to receive earth observation data from Antarctica. Utilizing WORK Microwave's DVB-S2 receiver, the company can achieve high throughput and outstanding signal reception performance.

WORK Microwave's DVB-S2 receiver is a robust platform for receiving IP and Ethernet data over DVB-S2 satellite connections. Supporting a flexible range of output formats, the receiver is perfect for a variety of space missions. Today, WORK Microwave's DVB-S2/S2X IP Receiver SDD-IP and AR-60 have been widely deployed across all continents from Svalbard, Norway, to Antarctica for earth observation and other data-critical applications.

"WORK Microwave is actively engaged in both traditional and emerging satellite markets. More and more, we're seeing LEO, MEO, 5G, and EO satellites in use, and we're excited to support those platforms and pave the way to the next-generation space era," said Joerg Rockstroh, Director of Digital Products at WORK Microwave. "Through earth observation we can deliver a fundamentally better picture of our planet, and reliable signal reception is critical to making that happen."

### **Fourth successful launch in 2020 for Arianespace**

Flight ST28, was the 28th Soyuz mission carried out by Arianespace and Starsem from Baikonur Cosmodrome in Kazakhstan. Performed on Saturday, March 21 at 10:06 p.m. local time at Baikonur Cosmodrome (17:06 UTC), Flight ST28 orbited 34 new OneWeb satellites – bringing the total in orbit to 74.

"I am very proud of the teams at Arianespace, Starsem and their partners here in Baikonur and also in French Guiana for having performed four successful launches within a 10-week period, including two on behalf of OneWeb," said Stéphane Israël, Chief Executive Officer of Arianespace.

The first 40 satellites in the OneWeb constellation were orbited by Arianespace in two missions: the first six in February 2019 from the Guiana Space Center in Kourou, French Guiana; and the next 34 in February 2020 from Baikonur Cosmodrome.

Satellite operator OneWeb aims to deliver high-speed internet through a next-generation satellite constellation that will be able to provide connectivity to everyone, everywhere. OneWeb's system will be comprised of an initial 650 satellites and will provide global coverage in 2021.

The satellite prime contractor is OneWeb Satellites, a joint venture between OneWeb and Airbus Defence and Space. The satellites are built in Florida, USA and Toulouse, France on dedicated assembly lines.



Photo courtesy of COMSAT



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## High-speed goes small

The Internet has changed life as we know it, with a massive array of possibilities enabled. We can speak with friends across the world in real-time, run our businesses, shop for groceries, or catch the latest episode of ‘insert current TV show I’m too behind the times to be aware of’ on our mobile phone while cuddling up in bed. We take this connectivity for granted, paying very little attention to the incredible fibre or satellite technology behind it, despite the fact that this can only be described as Very Big Business.

**Amy Saunders, Editor, Satellite Evolution Group**

**For those of us who grew up without any kind of** Internet at all – I remember how exciting it was when my parents got our first dial-up connectivity back in my early teen years – the advent of high-speed broadband into homes across the developed world was a complete game-changer on so many levels. As this new level of connectivity became widespread, innovative online companies launched amazing new applications that broadened horizons irreversibly for consumers, businesses and government:

- Staying in touch: The Internet has enabled families and friends to stay in touch over unfathomable distances, via email, Skype, social media, etc, at the click of a button.
- e-marketplaces: The advent of online shopping means that we can now order almost anything (or actually anything if you delve into the Dark Web) to be delivered direct to our door. Groceries, clothes, technology, home decor, etc. can all be with you as soon as same day! For instance, today I’m expecting potting compost, a moss pole and a pack of child-proof drawer locks.
- Small (and large) businesses: Closely entwined with online shopping, entrepreneurs have grasped hold of opportunities to launch their own online businesses at very low cost, providing a flexible and independent alternative to the standard 9-5. Meanwhile, established businesses both small and large are increasingly enabling home working for employees, which is often cheaper and more efficient in labour terms and favoured by many staff.
- Online banking: For those with mobility issues or under time constraints, or simply with better things to do, online banking has become a fantastic use of the Internet, saving time for both customers and the banks themselves.
- e-health: Healthcare capabilities have really opened up in the connected era; from online GP appointments, requesting and ordering medications online, delivering diagnosis and treatment digitally to remote and rural areas, or indeed consulting with experts in niche areas of medicine, healthcare is well on its way to become a sleek, well-oiled machine.
- e-learning: Students can take up new disciplines, ranging





from distance university courses, to how to knit, from the comfort of their own homes. For those in rural locations with few teachers and facilities, remote learning has provided never-before seen opportunities.

- Media consumption: OTT services such as Netflix and Hulu have boomed since high-speed broadband became commonplace, enabling live, on-demand streaming of a massive variety of content. In addition, books and magazines can be bought and consumed digitally on a device of your choosing.

The massive array of services currently delivered online has completely revolutionised the way many of us live our lives. Take a look at the above list and see how many areas you personally make use of to get an idea of the scale of things today. Everyone working in the connectivity sector – from capacity operators, service providers to equipment manufacturers and installers – is well aware of just how important the Internet is to modern life. Moreover, while providers compete to win a bigger share of the market in the western world with faster speeds and lower costs, there still remain some three billion people completely unconnected, offering up massive business opportunities.

### Delivery methods

Today, home and businesses are provided with high-speed Internet connectivity via fibre or via satellite. Fibre connectivity has historically been the cheaper option as capacity was much less expensive than satellite – a quick check for my

home reveals prices ranging from UK£14.50 (11Mb speeds) to UK£52.00 (63Mb speeds) for fibre, whereas satellite isn't even recommended due to so many good fibre options being available – however, times are changing. Overcapacity and increasing competition in the satellite sector means that raw capacity prices are falling, making satellite a genuine competitor for fibre in many areas.

Of course, there exist many areas around the globe where satellite connectivity is the only option; in rural and remote regions, island nations, and much of the US, where the laying of fibre is price-prohibitive or even impossible. In addition, satellite connectivity also provides certain advantages over fibre, including the in-built resilience against natural or man-made disasters that damage terrestrial fibre infrastructure. Many businesses across the world have in place a contract with a satellite service provider for back-up connectivity in case of Earthquake or similar, while utilising fibre for day-to-day activities.

While fibre is a pretty stable connectivity method – existing cables are repaired and upgraded, new cables are run to new areas, but nothing ground-breaking changes to the best of my knowledge – the same cannot be said for satellite. Connectivity that has been historically delivered via large telecommunications satellites in GEO, and later large throughput satellites (HTS) in GEO, is fast becoming outdated in some peoples' eyes, as a huge number of small satellite constellations in MEO and LEO, currently in the planning, build-out or deployment stages, enter stage left. Indeed, while HTS satellites designed to deliver high-speed Internet





connectivity are still being launched into GEO; AMOS-17 in August 2019; Intelsat 39 in August 2019; Inmarsat's GX5 in November 2019; JCSAT-18/Kacific1 in December 2019; Eutelsat's KONNECT in January 2020; the big news this decade is in the more scalable, flexible small satellite constellations.

### LEO (and MEO) vs GEO

The big supporters of the next-generation constellations of small satellites cite a great many advantages of small satellites orbiting in LEO and MEO over large satellites in GEO. For one, the manufacturing costs are vastly reduced as a large number of identical small satellites can be produced much more efficiently than one large unique satellite. Launch costs are also lower per satellite thanks to the vastly reduced weight. Time to orbit is reduced, as manufacturing time is much lower, and the small satellites can form part of a rideshare with long-ago planned large satellites. For the connectivity service itself, small satellites orbiting in LEO or MEO offer up vastly reduced latencies thanks to the much lower orbits; we're talking about differences of 35,000km compared with 160-2,000km, which make a big difference to transmission times, when signals can only travel as fast as the speed of light! On the flip side, small satellites have vastly reduced lifespans of 1-5 years compared with 15-20 years for large telecommunications satellites, requiring much higher refresh rates and many more launches. However, this does allow for more frequent technology upgrades, whereas the larger long-lived satellites have the potential to become outdated.

Small satellite constellations, designed to deliver global, ubiquitous broadband connectivity are all the rage right now. Designers of these constellations boast that with the right number of satellites in the right orbits, they can truly deliver high-speed broadband connectivity anywhere in the world.

At the time of going to press, O3b Networks remains the only operator with a fully-commercially-functioning constellation of small satellites delivering connectivity around the world. The company completed its first-generation MEO satellite network in April 2019 with the launch of the last four of its 20 small satellites, with which it is targeting 'the other 3 billion' (hence the name) of people currently underserved by broadband. O3b is already working on its O3b mPOWER constellation, which will be based on seven 'super-powered' MEO satellites, with more than 30,000 dynamic, electronically generated fully-shapeable and steerable beams that can be shifted and switched in real time. Delivering multiple Terabits of throughput, the fleet is scheduled for launch next year and is scalable to multiple terabits of throughput globally, providing coverage to an area of nearly 400 million square kilometres. A total of 22 O3b mPOWER satellites have been approved by the FCC.

Meanwhile, making the headlines is OneWeb Satellites, which launched the first six of its 882 LEO satellite constellation back in February 2019. In recent years, the company has created several assembly-line style manufacturing facilities in the US and France, which will enable the production of satellites fast enough to meet the ambitious 'one launch every 21 days.' OneWeb has focused heavily on the creation of affordable satellites in order to provide affordable high-speed connectivity for users worldwide. 2020 is a major year for OneWeb, one in which it plans to ramp up its launches, with 34 achieved in February alone.

Also making waves (as always) is SpaceX, which is making huge strides towards its Starlink constellation, ultimately planned to comprise some 12,000 small satellites utilizing inter-satellite links and operating in Ka and Ku-bands. While the main application of the Starlink constellation is the delivery of low-cost high-speed Internet connectivity, it's also possible that some of the satellites will be sold for military, scientific or exploratory services. The company kicked off 2020 with the January launch of 60 Starlink satellites, followed closely by another 60 in February, bringing the current Starlink constellation total to 240 (or 242 including the demonstrator satellites launched in 2018) including the 2019 launches. This latest launch makes SpaceX the owner of the largest commercial fleet in orbit, with as many as 21 more missions planned this year alone.

### Now, we move on to the planners

Telesat is gearing up for a not too distant satellite constellation launch with a 300-strong small satellite constellation in LEO expected to deliver high-speed Internet across the globe. The company has already achieved highly successful prototype satellite tests in orbit and has won a lucrative partnership with the Government of Canada – expected to generate CAD\$1.2 billion for Telesat over 10 years, and an additional CAD\$85 million contribution through the Government's Strategic Innovation Fund.

Facebook and Amazon have also jumped on the bandwagon; Facebook with its Athena constellation of small satellites designed to provide broadband Internet connectivity, particularly to rural regions; and Amazon with a planned 3,236 small satellite constellation in LEO, also designed for broadband Internet connectivity. Amazon's Kuiper Systems will call for three layers of satellites, 784 at 590km, 1,156 at 630km and 1,296 at 610km.

### A mixed future

Despite the above discussed (and other) small satellite constellations targeting high-speed Internet connectivity in the works, the larger HTS servicing today's broadband connectivity market is going nowhere fast. Such satellites have proved themselves invaluable for many years now, delivering effective, high-quality services for millions of consumers, businesses, enterprises and governments. Demand for these services is on the rise, particularly in the air and maritime mobility sectors, helping pave the way for future HTS in GEO as well as the new wave of small satellite constellations. ■



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Never before in history has as much data been collected as it is today. There are literally billions of sensors spread across the world, on land, at sea, in the air, and in space, recording anything and everything; data as diverse as traffic patterns, weather formations, remote machine applications on oil rigs and in agriculture, stock room supplies, medicine consumption patterns, etc. The amount of data being collected has seen a new era of Big Data come into being, one which companies and governments the world over are grappling to understand and manage.

**The year is 2020, and Big Data** has become big business. But what exactly does that mean?

We can take that to mean that Big Data is simply data that is too big for most commonly used software tools to capture, manage and process within a reasonable time period. The actual quantities we're talking about seem a little vaguer; in 2012, Big Data referred to a few dozen terabytes, but today, it means many exabytes. Indeed, the amount of data being collected today is truly staggering.

- **Volume:** The quantity of generated and stored data, which determines its value.
- **Variety:** The type and nature of the data, which may be text, images, video or audio.

- Today, Big Data is everywhere. It has become deeply intertwined with machine learning and artificial intelligence, which are expected to be a key enabler of the processing and analysis of data too massive for current processing streams. And while it may sound a lot like inexplicable business jargon – designed to confuse us normal folk about whether or not we're talking about data for data's sake – is expected by many to be key to a whole host of new technologies, services and applications, as well as the continued evolution of the services and industries we know today.

This new Big Data era is opening up some impressive opportunities for companies across the board. According to NSR's *'Big Data Analytics via Satellite, 3<sup>rd</sup> Edition'* report,





there exists a cumulative market opportunity of US\$18.4 billion in the next 10 years for satellite-based Big Data analytics. The fastest growing vertical market, the services sector, is expected to help drive the market, in addition to traditionally strong Big Data markets, including energy, transportation, civil government and military.

"The services vertical mainly consists of financial institutions involved in the securitization of commodities and hedge funds, where large risks are at play. While it took up only about seven percent of the market share as of 2018, it is expected to rapidly grow through the next decade to reach nearly US\$640 million (20 percent market share) in revenue opportunity by 2028," said NSR analyst Shivaprakash Muruganandham. The majority of this growth is attributed to the proliferation of Earth observation analytics. "Investment firms looking to gain a competitive edge on the market have driven the use of satellite data across the board: From the counting of cars in parking lots and oil barrels to derived vegetation metrics for crop yield and carbon stocks."

Indeed, Big Data analytics has the potential to really shake up a whole host of markets in the near future - let's take a look at some of the exciting real-world projects going on right now.

### Data-driven farms

At the end of 2019, the USDA's Agricultural Research Service partnered with Microsoft and Esri to take the next step towards the data-driven farms of the future. The Data Innovations project incorporates the Internet of Things (IoT) and other technologies to help provide farmers and researchers with real-time data on farm conditions.

The USDA has deployed sensors, drones and IoT-enabled farm equipment for a public-private pilot programme called Farmbeats at a 7,000-acre farm at its Beltsville Area Research

Center. The data then gets beamed up to the cloud, where an AI algorithm provides data visualization to farmers and researchers. The pilot could be revolutionary for USDA researchers, who currently record data points in field books before entering them into a central database.

"We're collecting a lot of data manually and that's killing how much research we can actually get done," said Michael Buser, USDA ARS National Program Leader for Engineering. "We want to go through with this Data Innovations effort to reduce the number of data touches that we have. And by reducing those data touches, we can basically free up the time of our scientists and our technicians."

The project is expected to produce better data, and to help farms around the country operate more efficiently, sustainably, and profitably. While there are many variables that impact farming conditions, tracking key metrics such as disease, insect levels, weeds, water and nutrient dynamics, can help provide farmers with better, actionable information. Moreover, while this single farm pilot project will prove useful, the real value is expected to stem later down the line, when a big-picture view is enabled by tracking the same data from a planned 200 farms across the country. Going beyond the simple recording and analysis of data, through predictive analytics, Microsoft's AI algorithms can in fact combine satellite and sensor information to train a model that can predict metrics for field areas where there are no sensors in place.

### Greenhouse gas monitoring

Last year, Descartes Labs announced the development of a methane-detection model designed to help monitor harmful emissions as a means of implementing New Mexico's strategic mitigation policy. Descartes Labs' Data Refinery will utilise Big Data from satellites and other public and private



*A highboy tractor equipped with sensors passes through a field at the USDA research farm in Beltsville. Photo courtesy of Microsoft*



sources to create modelling and mapping capabilities for the detection of methane.

The Permian Basin, spanning more than 86,000 square miles across Southeastern New Mexico and West Texas, is the highest producing oilfield in the world, and will be the first area that is mapped before the project goes state-wide. Large-scale monitoring of methane is expected to help oil and gas companies improve their management of emissions and guide state inspectors to potential problem areas on an almost real-time basis. It will also help the state meet the environmental benchmark to reduce greenhouse gas emissions by 45 percent between 2005 and 2030. Indeed, methane is a potent greenhouse gas believed to trap 28 times more atmospheric heat than carbon dioxide over 100 years. However, there has been a historical lack of reliable tools for tracking methane detection.

"For New Mexico to reach its methane reduction goals, it's critical to first understand the problem. The Descartes Labs Data Refinery can pull data from satellites, planes, drones, and ground sensors so that inspectors will be able to pinpoint sources and alert well owners to the problem. This is what it looks like when data informs policy," said Mark Johnson, CEO at Descartes Labs.

### Protecting the skies

In the summer of 2019, the Canadian Government's contracting arm, Canadian Commercial Corporation (CCC), announced plans to sponsor a new satellite system to provide commercially available data about space to meet growing concerns over debris. NorthStar Earth and Space will utilise Big Data analytics to assess the situation in orbit.

Today, there are around 60,000 pieces of space debris in orbit around the Earth, far more than the number of active satellites in play. With the NewSpace economy valued at an estimated US\$1 trillion each year, demand for real-time,

accurate information on the space environment is high. Private investors for the project include Telesystem Space Inc. of Montreal and the Space Alliance of Europe, formed by Telespazio and Thales Alenia Space, a joint partnership formed by France's Thales and Italy's Leonardo.

The proposed small satellite constellation would be launched in 2021, featuring a combination of infrared, hyperspectral and optical sensors to assess the Earth's ecosystems and orbit. The system would also utilize Big Data analytics and AI to find the meaning of the vast amount of data and precisely predict potential collisions with debris and other objects in space.

### Big future

All of the available market reports indicate that Big Data is going to be huge going forwards. Of course, once we take a look at the impressive applications and try to get a scope of the seemingly endless possibilities, it seems an obvious conclusion to draw. Enhanced efficiencies, superior predictions and cost savings are all benefits which we should soon begin to reap as Big Data analytics becomes more widely applied across the markets.

However, the big turning point will come when AI and machine learning is advanced enough and affordable enough to really turn things around. Until then, we have massive quantities of data being collected and stored, but inadequately processed and analysed. Indeed, this data is actually hindering many companies today; it takes more than just the right tools to analyse the quantities of data we're seeing now – many businesses lack the knowledge base to conduct a meaningful analysis and are becoming bogged down. That's hardly surprising given the quantities of data we're talking about.

Big Data is a big opportunity for some, a hindrance for others, and a challenge for all. ■



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Comms-on-the-move. Photo courtesy of ND SATCOM



## Flexible and reliable support

ND SATCOM is a German satellite communications developer and system integrator specialising in large, complex projects featuring software and hardware development and customisability. They're known to their partners and customers for providing flexible, reliable support for their products and systems. We spoke to Sales Director Bernd Lehr to discuss their recent successes.

*Laurence Russell, News and Social Media Editor, Satellite Evolution Group*

**Question:** You've made it onto a series of prestigious lists recently including Silicon Valley Review's 50 Best Workplaces and CIO Applications magazine's top 10 Best Space Tech Solutions Providers. What is ND SATCOM doing so well to get this kind of gleaming recognition?

**Bernd Lehr:** Well that's quite easy. The way that we work and develop is by having our people act internationally, having our engineers, mechanics and technicians installing and running our systems worldwide, which is very exciting.

Then, when they come back, they have first-hand experience from our customers and partners to share with us. This is valuable data such as feedback, new requirements, or work preferences, which then directly influences the development of our new technology.

This means our employees frequently enjoy having a hand in our entire chain of production, from planning to developing, and finally implementing the technology. Not only satisfying on a personal level, this is an excellent way of serving customer demand, since the engineers on the ground who are directly aware of the requirements of the region are the same people spearheading the conceptualisation of our new solutions.

We're primarily based at Lake Constance, which is an idyllic urban centre at the foot of the Alps, and a paradise for tourism where you can ski and sail. People come from all over the world to be there, and it's all right outside our door. It's no surprise our staff are overjoyed to be a part of our company.

**Question:** How does your SKYWAN technology, which was nominated for

**Via Satellite's 2018 Satellite Technology of the Year Award, deliver such a world-class standard?**

**Bernd Lehr:** SKYWAN 5G has been an especially interesting technology because it's a hubless system, which makes it far cheaper than its competitors and contemporaries. It's also remarkably easy to create a backup master system, which is critical for disaster relief communications on the move, where operating with a plan B is absolutely imperative.

We also use a multi-frequency TDMA modem that can reassume a link after an interruption extremely quickly, in under a second, which is unprecedented in this market. I don't know of any modem that can work that fast.

It's a mesh topology modem that provides rooftop-to-rooftop connectivity. It's these sorts of innovative features, some of them quite minute and





*Bernd Lehr, Sales Director, ND SATCOM*

bespoke, which are greatly appreciated by our defence, government and broadcast customers.

**Question: What are you delivering in the arena of satcom on the move?**

**Bernd Lehr:** We have sold 10 SOTM vehicles to SABC in South Africa. These are trucks we've equipped to transmit video, voice, and data to gather and share news at the drop of a hat. We've seen some incredible feedback there because our system offers such a variety of modern solutions so accessibly. All the features provided are already connected together, you simply turn it on, and you have everything at your disposal.

**Question: When it comes to delivering technology to a competitive market, what is more important to establishing a strong edge? Outperforming competitors or providing technical and situational differentiation?**

**Bernd Lehr:** I believe one doesn't

necessarily exclude the other. We're invested in providing reliable technologies foremost. We're not interested in fighting or contending in the regions we're catering to.

We're far more interested in nurturing longstanding relationships with our customers and partners, maintaining a standard of dependability with them while endeavouring to understand their needs and goals longitudinally. That means we can focus on perfecting bespoke solutions to help them succeed, where a standard, specific product from an impersonal vendor might not deliver.

Our edge comes from the degree of cooperation we offer our customers and partners to actually ensure they grow and thrive, rather than simply sell a product and move on.

**Question: You recently rebranded a lot of your marketing material. How important is it for global companies to continue making a dynamic impression through their branding?**

**Bernd Lehr:** In the last couple of years, ND SATCOM's approach to exercising its brand was fairly limited. We're a very innovative company invested at staying at the cutting edge of what our consumers require, and for a while that dynamic element of our work ethic wasn't quite communicated by the way we used our branding.

We've entered a new era now, with a greater degree of conciseness in how we present ourselves. We've now overhauled the way we express our brand across the board, with a fresh new energy, and I'm looking forward to seeing how our customers and partners across the industry will respond to that.

**Question: What's your outlook on the modern broadcast environment?**

**Bernd Lehr:** We've been seeing developments in satcom-on-the-move



*Photo courtesy of ND SATCOM*

technology with phased array antennas and low Earth orbit (LEO) satellites, which we're keen to be a part of implementing.

Across regions, we're seeing different developments. For example, there's a preference in the southern hemisphere for larger antennas or phase-combined HBA systems, while the northern hemisphere leans toward smaller antennas, high power amplifiers, and more units.

We need to adjust our strategy depending on where we target, so we're very interested in staying ahead of the curve to identify these types of trends.

We're currently increasing our sales force across Asia and Africa so we can meet their increasing requirements. We see these regions as fantastic growth opportunities where we can steadily chip away at the digital divide. ■





Photo courtesy of SIG

## Lessons from GEO: Smallsats and low Earth orbit

With increasingly large numbers of small satellite constellations being brought to fruition, space traffic management, debris and orbit allocations are becoming more vital than ever before. Valuable lessons can be learned from GEO which may smooth the way for the upcoming LEO constellations.

*Helen Weedon, Managing Director, Satcoms Innovation Group*

**Smallsat mega constellations in low Earth orbit (LEO)** have been a widely discussed topic for some time. In recent years, LEO operators have been highlighting the benefits of mega constellations and smallsats and we're starting to see users look towards LEO to provide low cost connectivity. Tackling industry pain points such as cost and latency, mega constellations are set to make a huge impact on satellite communications. However, we are seeing industry professionals raising questions on the technical aspect of launching a huge number of smallsats into orbit. The space environment is finite; how do space users share it amicably? Could over-crowding in LEO have an impact on other orbits? What impact will this increased usage have on RF systems at the ground segment?

### **The technical challenges behind the numbers**

At an operational level we know that managing LEO is the critical consideration. Use of space has steadily increased over the decades and this gradual growth has created

technical challenges to service delivery. Over the years, insufficient space governance has steadily increased the issue of space debris, with many operators launching satellites with little thought as to what would happen at their end of life. The numbers highlight the magnitude of the issue; of the 9,600 satellites launched into orbit, approximately 5,500 remain in space with only 2,300 still in active use. Over the years, policies have been introduced setting de-orbiting guidelines which many operators have adhered to in order to manage the space environment. Recent years have seen GEO operators work together to prevent and mitigate the impacts of space debris on satcom services; there has become an important understanding that operators must cooperate in orbit in order to be able to deliver high-quality services to satellite users.

Looking to the future, LEO is set to hugely increase the numbers of satellites in orbit, and in an incredibly short space of time. The lessons learnt by the industry in recent years shouldn't be ignored – working in isolation is likely to cause





Helen Weedon, Managing Director, Satcoms Innovation Group



severe issues when it comes to managing LEO. Collision avoidance, both of other satellites and debris, is hugely important in managing the space environment. Space Traffic Management is key in keeping all orbital planes operationally safe. Without strict and enforceable legislation, there runs a risk of those designing, launching and operating large constellations creating bigger issues within this shared environment. Furthermore, we're seeing technology, production and automation progressing at an incredibly quick rate and it is therefore more important to regulate and impose standards on the quality and accuracy of the equipment being

put into orbit. A LEO smallsat has an orbital period of between 84 and 127 minutes and there will be time when the satellite cannot be seen. It is crucial to have strategies and policies in place to safely manage satellites within LEO in order to avoid both costly financial and operational incidents.

When examining challenges within the new satellite landscape, it's difficult to avoid discussing spectrum. Spectrum is a highly debated topic, with the long-lasting 5G and C-band debate continuing. As a finite resource, spectrum is an important consideration when assessing how the industry needs to adapt to incorporate LEO mega constellations. Although frequency bands have been allocated, have the designs and operation of transmission plans and interference mitigation been fully thought through to ensure all parts of the space environment are safe? And will these vary from country to country, depending on availability and limitations imposed by regulatory bodies? Spectrum and RF transmission needs are truly important considerations when striving to understand the shape of the LEO environment.

### Managing RF and the ground segment

This leads on to questions surrounding the ground aspect of LEO. Managing RF incidents has been a longstanding issue within satcom. It's critical that all satellite operators consider the ground station when deploying satellite fleets. In recent years, many operators and teleports have invested heavily in preventing transmission issues caused by poor equipment and poor setup at ground level. With RFI having devastating effects on satellite services, we must consider the impact of the plethora of ground stations needed to operate a LEO constellation in order to prevent further issues. The incorrect design or use of RF often impacts numerous services, regardless of which orbit the signal has originated from.

The LEO ground station will have different requirements to those that we see in GEO. Agile antenna tracking, switching and redundancy for both telemetry and services is going to be critical in processing transmissions to and from LEO due to the speed and proximity of the satellites. With price being

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a driving factor for many LEO customers, it will be important to deliver high-quality ground segments at a lower cost. Maintaining a low-cost solution is at the core of these decisions, however we know that this must not mean that lower-quality equipment is utilised. In-depth understanding and planning allow the industry to prepare high-quality and cost-effective solutions. Additionally, it allows us to process LEO requirements whilst anticipating the impact this could have on wider services in other orbits. Will LEO impact on MEO and GEO?

### Where will LEO sit in the new connectivity ecosystem?

Taking a bigger look at satcom, we're seeing the dynamics of the industry changing. 5G is set to have a huge impact on connectivity and many professionals are envisaging this to have a direct impact on how satcoms deliver services. Telecommunication companies will need to utilise other communications systems in order to deliver the wide-ranging and wide-reaching service that 5G is expected to be. LEO has the potential to be utilised within 5G to deliver connectivity to a geographically broad audience, including comms on the move, and we're seeing many LEO operators including 5G modulation formats within their networks to enable this delivery. Working alongside telcos could open huge opportunities within satellite connectivity industries; 5G is very nearly here and consumers are already enjoying its benefits, so why compete?

Communications industries need to be looking at connectivity as an overarching service, removing barriers between industries. There's undoubtedly an increasing demand for comms on the move, with consumers wanting seamless connectivity, regardless of where they are. Currently, someone who is travelling by air must access airline Internet services – why can't we be striving to deliver in-air connectivity as part of their mobile data plan? Communications industries connect cells; by working in isolation, telcos and satellite companies can only service certain corners of connectivity. By creating solutions which bridge the gaps between both industries, for example, by utilising the layers of connectivity that satellites offer from LEO to GEO, consumers will benefit from a more streamlined approach.

Of course, delivering these technologies will be operationally challenging, however we have some great tools which could be developed to create these solutions. Intelligent solutions, which could utilise tech such as the cloud and AI, could identify the satcom service best suited to the customer's

requirement (regardless of the orbit) and deliver the service for the telco provider.

### Using industry experience to prepare ourselves for LEO

LEO is set to enhance the communications services that satellite can offer. We know that, historically, satellite has had a reputation for being costly and that it's not always been suitable for all types of connectivity due to its latency. LEO mega constellations are set to tackle these issues and deliver fresh services to new customers, potentially rebranding how satcom is seen across the world. However, unquestionably there are technical and operational considerations which must be thought through prior to launching a huge number of satellites into orbit.

The satellite industry has the advantage of being a well-established industry; we as professionals have seen the operational challenges of working alongside competitors in an increasingly busier environment. Challenges are found in-orbit and at the ground; in recent years we have seen operators work together to preserve the reputation of the industry by prioritising the quality of services, as opposed to cutting costs in order to maximise profits. Ultimately, without striving to a mutual objective of delivering high-quality services to customers, the industry runs the risk of discrediting its reliability. From the lessons learnt at GEO, we can see the issues we need to be tackling in order to deliver operational solutions allowing LEO constellations to succeed.

We know that the space environment will become busier in order to deliver the benefits of LEO, however, we must see that correct governance is introduced to provide the correct level of policy and guidance for the environment. Space Traffic Management is more important than ever before as the space environment gets busier. Alongside the obvious need to manage the physical placement and replacement of satellites in LEO, there is also a need to address the spectrum requirements and the resulting needs of the ground segment. A successful service is dependent on the successful uplinking and downlinking of RF signals and, therefore, this stage of the process must not be ignored. Looking at the larger picture, LEO is certainly opening the door to some brilliant opportunities for the satellite industry as a whole; it provides a different set of benefits to the satcom ecosystem which will be invaluable when looking at the industry as an interconnected entity. With new technologies such as 5G coming to the fore, LEO mega constellations can strengthen the satcom industry's ability to enhance and deliver high-quality and wide-ranging connectivity to all consumers. ■



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Bridgelink bridge. Photo courtesy of Marlink



## Digitalisation takes hold in maritime

Marlink is a world-leading provider of managed connectivity and IT solutions for maritime and enterprise customers ranging from global on-demand MSS services to regional, multi-regional and global Ku-band, C-band and HTS-ready maritime VSAT systems. Tore Morten, President of Marlink Maritime, outlines their recent successes and explains what's next for the company.

*Amy Saunders, Editor, Satellite Evolution Group*

**Question: 2019 was a pretty busy year for Marlink, in which a slew of new partnerships and achievements were celebrated while the company honed its suite of services. What were some of your favourite highlights from last year?**

**Tore Morten:** Marlink enjoyed a successful 2019 which put us in a strong position for 2020 and beyond. The year started with our being confirmed as the world's leading maritime provider of satellite communications and end-to-end managed VSAT connectivity, according to a report from Valour Consultancy and later confirmed by the Comsys report.

We also renewed and expanded our partnership with Intelsat to provide broadband services to maritime vessels around the world in a multi-year agreement to deliver additional throughput via multiple layers of space-based coverage.

Developments like these demonstrate the momentum that Marlink is bringing to the digitalisation of the shipping industry. Ensuring that shipowners and operators have access to reliable and flexible always-on connectivity is essential to this process which promises to bring huge benefits in terms of safety and efficiency.

**Question: In your experience, what are some of the most urgent demands in the world of maritime communications, and what steps has Marlink made to meet them?**

**Tore Morten:** We see an urgent demand for connectivity and new services evolving as digitalisation takes hold in the maritime industry. At times this has been a slow process, but the trend is strengthening and accelerating for a number of reasons.

It's no secret that data is transforming maritime operations and

businesses. It enables ships and fleets to run more efficiently, use less fuel and reduce greenhouse gas emissions. This has driven a huge increase in the demand for bandwidth and massively changed usage patterns. Our customers want to transfer more and more diverse data to shore control centres, they want to operate within user-friendly managed portals, and they want to ensure that their data is always secure.

For both efficiency and compliance, shipowners need simplified data collection; systems that can remotely connect bridge and engine room data with communications infrastructure to give them access to a vessel data dashboard on a vessel-by-vessel basis.

To meet these demands, our business has evolved. Today we are supporting our customers to not only connect their vessels and crew globally, but to secure their networks, offer





*Tore Morten, President of Marlink Maritime*

solutions and technologies to help them manage their data and IT Networks, and apply innovations to enable reductions in both CAPEX and OPEX.

Companies are becoming more profitable using data in a smart way, but we can also see the potential for more efficiencies and importantly, new ways

to reduce the impact of shipping on the environment.

**Question: Marlink provides its own VSAT system connected to third party platforms. What are the advantages to using proprietary hardware like this?**

**Tore Morten:** Firstly, it's important to understand that Marlink is technology and frequency agnostic. The advantage that we deliver to our clients is that we are completely independent from any satellite operator or hardware manufacturer. It's always the customer's choice which hardware and service they prefer to specify and of course we will advise them if there are particular combinations that best fit their needs.

As an integrator we bridge the gap between the technology and the user by creating optimised networks and solutions for every individual customer in every market vertical we serve.

We use the standards employed by the industry's leading hardware manufacturers, based on open systems, with the ability to combine applications, services and solutions into a platform

that is technology agnostic and that can respond to changing needs.

In the maritime environment, those needs run to fully managed VSAT services, L-band backup and increasingly hybrid services that enable switching to LTE connections or even WiFi in port. We have a new agreement in place for global roaming with a major operator that we will share more details about very soon.

**Question: What are some examples of the kinds of value-added services Marlink provides to support smarter vessel operations and cyber security?**

**Tore Morten:** Shipowners are looking for technology that can support genuine fuel savings, reduced emissions and better vessel performance, both for regulatory compliance and an improved bottom line - and that includes security as a standard feature.

BridgeLink from Marlink addresses compatibility, interface and ownership challenges by providing an open platform for unifying collection of data from onboard equipment and sensors with network infrastructure and satellite IP connectivity, so that data from any system can be accessed, collected, shared and displayed in a single interface at sea or ashore.

Providing access to data from Operational Technology (OT) such as radar, automation, power and propulsion systems, BridgeLink enables Marlink customers to use scalable remote ship management and smart maintenance systems to further enhance and improve vessel efficiency using secure data collection for specialised analysis and applications.

Fully customisable to fit any specific technical needs, BridgeLink creates the link between onboard systems and sensors and how critical data they generate is used to optimise operations and remain compliant with international regulations.

Clearly, the growth of digitalisation brings a challenge in terms of security of onboard technology and communications, with the cyber risk widely known, if not always well understood.

Last year Marlink expanded its range of cyber security solutions, with the launch of Cyber Detection, a unique and intelligent threat detection solution for the maritime industry and part of our fully integrated Cyber Guard portfolio.

This latest addition to the portfolio



*Photo courtesy of Marlink*



monitors all outbound and inbound network traffic around the clock and enables customers to view threats affecting their vessels through an intuitive, web-based dashboard. In addition, customers may also set-up notifications on critical threats which can be monitored by email and/or SMS.

Marlink has also introduced ILink, a suite designed to provide remote IT management and intervention and 24/7 monitoring of the onboard IT environment, increasing the level of compliance with upcoming regulations such as IMO2021 and TSMA Version 3 cyber security requirements. ILink also provides deep transparency via an IT-specific advanced online dashboard, which includes continuously updated PC and server status information.

Crucially, it can also relieve Marlink customers of the time-consuming task of updating onboard networks and applications. Automated updates can reduce the time to secure, i.e., thousands of onboard PCs on a fleet of more than 100 vessels to a few days, while manual updates are known to be problematic and can take several months for a similar number of PCs. More than 1,100 ships are already saving time and money on IT updates using Marlink's IT automated update services.

**Question: One of Marlink's maritime branches, Telemar, recently released the BridgeLink smart maintenance service, which provides pro-active support and reduce downtime, netting higher efficiency for Bridge Electronics systems. Could you run us through some of its features?**

**Tore Morten:** The BridgeLink Smart Maintenance Application from Telemar is the next layer of added value to the BridgeLink platform, created to drive greater efficiency and savings via Marlink bandwidth.

The Smart Maintenance App provides a unique support service based on giving support service technicians remote access to the Operational Technology (OT) systems onboard ship, enabling them to diagnose issues with shipboard equipment wherever they are in the world.

With active support from the Smart Maintenance App, shipowners can reduce potential down-time and increase efficiency of their bridge electronics hardware and associated software. By expanding the scope of

equipment remotely accessible via the BridgeLink Smart Maintenance App, Telemar can perform more repairs remotely and increase first-time fixes for a more efficient service when its field engineers visit customer vessels.

As well as creating a benefit for shipowners by streamlining trouble shooting wherever they operate, Telemar experts can use the data collected to optimise asset lifecycles and deliver further efficiencies.

The BridgeLink Smart Maintenance App can optionally be used for performance analysis and to collect data for site surveys, helping to further reduce the engineering time required for firmware/software installations and upgrades.

By leveraging remote support technology, Marlink and Telemar are contributing to reduced time, travel and ultimately carbon footprint for shipping companies. The Telemar Smart Maintenance team consists of certified and trained Field Service Engineers able to start in depth investigations of problems with GMDSS equipment, radar and ECDIS, satellite communications systems, Voyage Data Recorders, quickly and from shore.

**Question: Marlink has also recently produced the Marlink FX Portal, a communications management platform for Marlink Fleet Xpress users to access network and service information in real-time. How does data like that drive a competitive edge for your users?**

**Tore Morten:** The Marlink FX Portal was introduced with the aim of increasing transparency for IT and operations personnel, enabling them to monitor, support and maintain FX networks with greater efficiency. The online portal is a unique development that can share the network data vital to service quality, availability and efficiency onboard. It can be remotely accessed from any location, giving our FX customers deeper control and awareness of service status.

Enabled by Marlink's onboard communications management system for the FX service, called XChange FX, the online portal that follows with the system, allows customers to access previously unavailable network and service information in real-time. It delivers easy to understand bandwidth performance and traffic statistics, as well as live information on whether the Ka-band FX or L-band FleetBroadband

is being used. The portal can be accessed by crew from onboard ship and by vessel superintendents onshore, with a simple display indicating which service the ship is using. As well as being useful in supporting remote access and troubleshooting, users can see the amount of time spent on the backup and decide how best to allocate budget resources.

In addition to the FX voice calling option, Marlink also offers FX users a unique low-cost voice calling service, giving shipowners a wider option of voice services. Combined with the XChange platform, shipowners have a seamless system optimised for enterprise and crew use.

**Question: How does Marlink plan to innovate in the maritime sphere this year and in the years to come?**

**Tore Morten:** More and more ship owners are taking digitalisation seriously which has a positive impact for them and the wider industry. Digitalisation brings a genuine business case for investment in broadband communications to achieve more efficient operations and reduced environmental impact, so there is a 'push' for us to continue refining and improving our services

Digitalisation can contribute to ships and fleets to running more efficiently, using less fuel and reducing greenhouse gas emissions. This has driven a huge increase in the demand for bandwidth and massively changed usage patterns.

Our customers want to transfer more and more diverse data to shore control centres, they want to operate within online cloud-based portals, and they want to ensure that their data is always secure.

Our focus in 2020 and beyond is to continue to support this digitalisation drive with applications and software that enable owners to get the best out of their vessel data and their communications systems. Regulation remains a big part of that, whether reporting emissions data or other environmental performance, or being confident in meeting the IMO's new standards for cyber security.

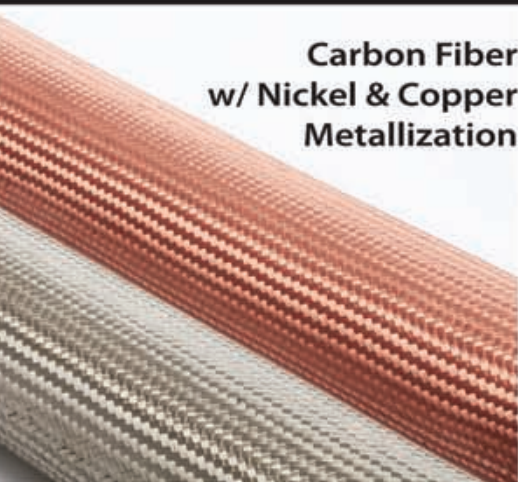
And finally, to make all this happen we will continue to develop the most complete maritime network in the industry, to ensure that our clients benefit from quality and cost-effectiveness that our expertise and scale brings to the market. ■



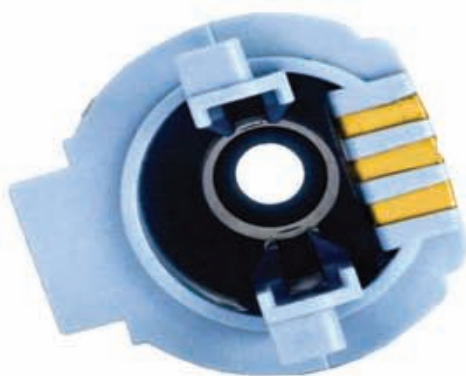
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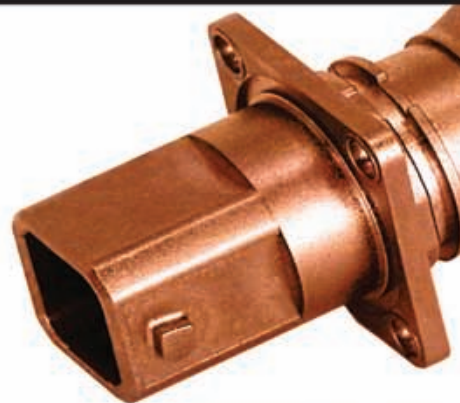
## Making Plastics Perform



Carbon Fiber  
w/ Nickel & Copper  
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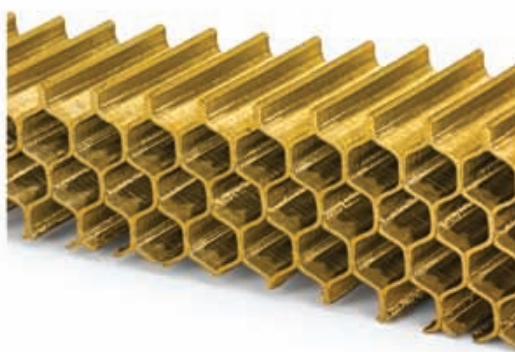
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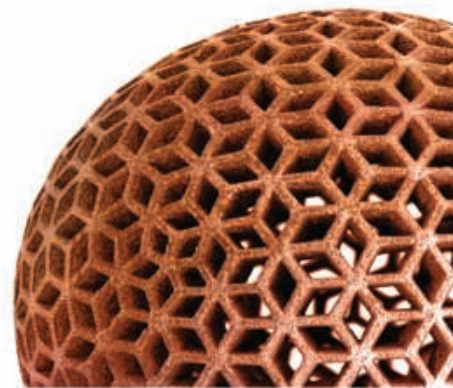
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# News gathering goes mobile

Satellite news gathering (SNG), traditionally enabled by Outside Broadcast (OB) trucks, has a long and extremely successful history of utilising satellite to transmit events, either minutes after happening or even live, from the ends of the Earth to the comfort of your own home. Recent years have seen a shift away from traditional SNG methods, like OB trucks and their teams, towards single, ultra-mobile journalists and their smartphones.

**Amy Saunders, Editor, Satellite Evolution Group**

**Satellite news gathering (SNG) has almost 50** years of history behind it, having been used way back in the 1970s, and famously demonstrated in 1982 during England's war with Argentina over the Falkland Islands. Today, it's commonplace to see outside broadcast (OB) trucks at major news, sporting or music events, where content is partially produced and transmitted.

SNG completely revolutionised the broadcasting of news in its heyday, meaning that people all around the world could stay up to date with breaking news, disaster zones, and live streams of music and sports events, with video direct from the source, making the viewer feel better-informed and more involved than ever before. What once took days to reach global awareness, now takes minutes, thanks to the global reach of SNG. OB trucks have seen a bit of a drop-off in recent years as satellite technology has advanced, meaning that all the equipment required for SNG can now fit handily into a carry-on backpack, instead of requiring a full vehicle. The footage is beamed, via satellite, direct to a control room, where it is processed and broadcast.

While maintaining superiority in news gathering techniques around the globe, SNG is nevertheless facing an uncertain future as a new wave of mobile journalism (MoJo) to those in the know) takes hold.

## MoJo goes global

In oh so many tech areas - think computers, phones, games consoles, portable music, etc. at the consumer front, or antennas, amplifiers, satellites, within our industry - there has always been a trend towards shrinkage. Indeed, size, weight and power (SWaP) have been reduced at the same time as capabilities have grown.

This is also true in the SNG sector, where there has been a significant shift from OB truck-dominated SNG towards backpack-sized single-reporter kits that enable greater agility in tough-to-reach areas, greater efficiency, and reduced costs. More recently, as smartphone capabilities have massively increased, and the recording of HD and even 4K video content has become enabled in a device that fits (just about) in a back pocket, a swathe of new reporters, particularly in the





younger generations, have switched over to what is being described as mobile journalism (MoJo). Not only is this new era of SNG - and it is SNG, since the video content still needs to be transmitted back to the control room via satellite - allowing greater efficiencies than ever before, it also coincides with a shift in consumer patterns, away from traditional news sources such as hard copy newspapers, direct to home (DTH) news broadcasts, or online news outlets. Consumers, especially young adults, are increasingly staying up to date on the world via apps and social media, and video is playing a bigger role than ever before.

Traditional SNG, with OB trucks, are fast becoming outdated; production costs are high, processing can be slow, and the workflow is poorly suited for producing video for web consumption. Consumers want the latest news yesterday i.e. fast, on-demand, and often live. They also want to be able to view it on a variety of different screen sizes. Indeed, the high cost of production by traditional methods is deemed by some as unsustainable, particularly in a time when broadcasters are losing advertising revenue to YouTube and social media channels. MoJo has many benefits over traditional SNG methods; it's faster to go from shooting to broadcasting, more efficient in processing and equipment costs, and the kit is significantly lighter - there's a big different in moving from bulky cameras and processing equipment to a device small enough to fit in a pocket. It's also been found that, interviewees are less likely to be intimidated by smaller hand-held equipment such as mobile phones than traditional TV crews, and thus are more likely to agree to spontaneous interviews.

Traditional news outlets all over the world are getting in on the action, training new journalists in MoJo, in order to more quickly and cost-effectively report on fast-moving stories. MoJo has become a must-have for major news outlets, who are at risk of reporting old news when compared with rivals utilising streamlined systems.

### BBC dips toe into MoJo waters

The BBC is cautiously testing the water with MoJo, carefully selecting the situations in which a more intimate approach is beneficial to the viewer.

In July 2019, the BBC's Political Editor, Laura Kuenssberg, interviewed Prime Minister Theresa May shortly before her exit from office. Kuenssberg utilised footage from two standard broadcast cameras in the exclusive interview, but also video taken by smartphone.

"It was a deliberate attempt to make the video as accessible as possible," Jonathan Paterson, Editor, Digital Video, BBC News, told *Journalism.co.uk*. "There was more human interest than detailed policy developments, and that's a good starting point for us in a social video."

However, Paterson has also warned that content producers should not get too 'carried away' with MoJo. For many viewers, particularly in the older generations, quality trumps quantity, and a more formal approach is often better suited to news reporting. "It's very important we have experienced eyes behind the lens. There are significant savings to be observed by doing mobile journalism, but ultimately the audience demands quality. We have to make every effort to ensure the quality is as high as possible," said Paterson.

The Editor reported that there are a great many trained operators from the BBC going into the field with just an iPhone and its rig, delivering more MoJo for cross-platform use, than the wider public yet realises.

### Freeing the press with MoJo

A recent project out of Sudan has seen hundreds of people learn key MoJo skills in order to get their voices heard. Ranked 175<sup>th</sup> out of 180 in the Thomson Foundation's 2019 World Press Freedom Index, Sudan has notoriously limited press freedom, which the foundation is keen to change.

"Our vision that everyone should have the right to an honest and factual account of what is really happening in the world is of paramount importance in combating fake news and hate speech," wrote Lord Tom Chandos, chairman, Thomson Foundation in its annual review.

The Sudan Media Capacity Building Project, run by the Thomson Foundation in partnership with the British Council and funded by the British Embassy, has benefited more than 700 people, covering skills such as web publishing, radio,

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TV and print platforms, as well as MoJo. As a result of the programme, local reporters utilised their Smartphones to capture and relay footage of uprisings to Twitter and other social media, catching the attention of the world. Three of the participants also went on to creating their own journalism workshops to pass on their skills.

"The project was successful because it worked with, but not for, the authorities. We were very careful not to train journalists to confront unnecessarily," said Helen Scott, Editorial Associate at the Thomson Foundation. "We had an editorial board which gave us guidance and we have been the only organisation which has been working with the media in Sudan in such a sustained way. We trained in the international pillars of journalism – fairness, balance, multiple sources, and talking to 'real people' not just accepting official handouts."

The programme has proven invaluable for widening awareness on pressing community matters such as health, environment and education. However, Sudanese journalists continue to face arrests and arbitrary detention by the National Intelligence and Security Service, resulting in extremely few professional journalists and a shortage of objective and relevant reporting throughout the country. The country's press is also plagued by poor management of outlets and varied levels in everything from expertise to credibility.

The Thomson Foundation, however, remains positive on the country's outlook with the conclusion of the programme. "They know the stories; the people and they have an enormous will to be able to report at last on their country. Some journalists who have been in exile because they had been banned by the security forces returned this week," said Scott. "We are hopeful that, with the will of the people for self-determination, there will be a new media environment in which freedom of expression will, at last, be possible. At Thomson Foundation, we're looking forward to playing our part in continuing to support the media in the future."

In other news, the Thomson Foundation recently announced the winners of its Middle East and African-centric Journalism Now Team Challenge, which saw teams set up a media brand online and through social media to win a one-week UK media study tour. MoJo was in heavy use among the more than 600 competing teams, with the winning Team, Youth Media, utilising Instagram and Facebook to share stories about disabled rights.

"In many countries, when students are learning about journalism, they're learning through very theoretical and academic courses, so they don't get cutting-edge insights or chance to practice. The competition was fundamentally a way of giving people the situation where they have to engage with digital tools," said Hosam El Nagar, Director of Learning and Innovation at the Thomson Foundation. "You can do everything with just a smartphone and we're encouraging people to use the tools that they have available and to show them [how] to use them to produce content to a high standard."

### Bad news made better with memes

Meanwhile, in a bid to address its declining and aging viewership, TV2 Østjylland, one of the Denmark's eight regional stations under TV2, has shifted its news reporting onto alternative platforms, including Facebook and Instagram, and utilising memes. The memes (images with humour) utilise images or video of famous people or popular culture to spread news items among younger viewers.

One example of using memes to spread news is TV2

**"The programme has proven invaluable for widening awareness on pressing community matters such as health, environment and education."**

Østjylland's dissemination of the story in which Aarhus University had to inform 200 students that they had failed to graduate after a misinterpretation of the academic rules. The TV station utilised a moment from pop culture, when Steve Harvey crowned the wrong Miss Universe back in 2015, with the tag: 'There's been a mistake.'

Across the world, large proportions of older generations assert that young people have little or no interest in the news, current events, or the world around them. This belief has been widely discredited, with those more in the know attesting that younger people are simply consuming the news in different formats.

TV2 Østjylland certainly believes this to be the case: "Young Danes are absolutely into journalism. The problem is that traditional media are reluctant to publish stories on modern platforms where young people prefer to consume content, using appropriate language. It's our problem, not young people's problem," said Head of News Louise Pettersen, who also asserts that it's important that Danish language media be produced so that the country's younger generations are not consuming all their news online in English. "We are financed by Danes for all Danes, so it's important for us to be relevant to all target groups. Our traditional TV audience is getting older and smaller so if we want to keep our relevance in ten years' time, we have to make the effort to reach a younger audience now."

While TV2 Østjylland originally faced criticism and mocking - you can certainly imagine the unkind words around 'pandering to millennials' that such a move would cause in the UK - the initiative is seen as a natural evolution of news dissemination among younger audiences. "We couldn't take the traditional narrative and just put that onto Instagram or Facebook. We had to define a new way of communicating with a younger audience," said Pettersen. "The memes have helped us slowly change our narrative on TV. It's not been a revolution, but we do use graphics more than before."

### The future of MoJo

MoJo is undoubtedly here to stay. The ability to reach wider audiences, faster, with more cost-effectively produced content, is always going to be a win-win for existing and emerging news organisations across the globe. New apps to aid in the production of MoJo content, such as Canva, Snapseed, Storyboard, PicPlayPost, Stop Motion Studio and ThingLink, among literally hundreds of others, are popping up at an alarming rate to ease the shift away from traditional SNG to a more modern, streamlined approach.

Traditional news outlets need not fear yet, for there are still plenty of households where news is consumed in the traditional manner - newspapers and broadcast TV - however, by adapting to the latest evolution in SNG now, they can certainly smooth the way ahead in the coming years.

Satellite will of course continue to play a key role in this new era of news gathering. Even with some footage being transmitted wirelessly over 4G or 5G networks, satellite invariably plays a role somewhere in the chain in the support of those networks. So, it's good news on the horizon for operators as well!





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# The New Shape of Solid State



Photo courtesy of Isotropic Networks

# Gearing up for a 5G future

The 5G revolution is upon us, and everyone from service providers to terrestrial network operators, satellite owners and teleports are getting in on the action. The new ultralow latency connectivity is expected to usher in a new world of machine-to-machine communications and Internet of Things applications, with great opportunities for teleports across the globe.

**Hank Zbierski, Chief Catalyst and Co-Founder, Isotropic Networks**

**The advent of 5G is upon us and it promises so** much from blazing-fast mobile broadband speeds, exponentially higher efficiencies, massive scalability, and significantly lower cost for mobile and fixed networks, along with ultralow latency to enable new applications like massive machine-to-machine communications (M2M) and the Internet of things (IoT). It will offer a unified network infrastructure where all access technologies – wired, wireless, terrestrial and satellite – work in sync. Known as the 'Network of Networks,' it offers a golden opportunity for satellite to play an integral role within the mainstream telecom network and it is being included from the start.

5G's future impact on satellite has been called a revolution. Experts say it will dramatically affect how satellite networks integrate into the terrestrial network. Unlike past standards, where VSAT equipment had to catch up and integrate with mobile/cellular network standards, 5G is being standardized

to enable full interoperability with satellite from the outset.

### Why satellite?

The 3GPP is working to integrate current and future satellite constellation types into the 5G standard architecture so that a seamless service and traffic flow can be created for many new types of services. 3GPP members and the industry have recognized the key advantages that satellite communications can bring to mobile networks. Satellite enables:

- **Wide area coverage/ubiquity** - The ability to reach anywhere on the globe wirelessly, beyond the reach of terrestrial infrastructure;
- **Mobility** - Anywhere connections to moving platforms (e.g., aircraft, trains, ships, vehicles, unmanned aerial vehicles); and
- **One to many/multicast** - Efficient simultaneous, wide area data broadcast to dispersed sites for live transmission or local/edge caching.

### Isotropic: Big plans for 5G

Set on the idyllic banks of Lake Geneva, Wisconsin, one of the very best locations in the US for satellite transmission, the Isotropic Earth station comprises nine antennas, 21 acres and its headquarters. The company has a personal interest in a facility in Europe and has recently ordered three new hubs from ST Engineering iDirect. The company is also set to be co-located in other facilities to allow global coverage from one location with a global Network Management System, with every hub controlled from Lake Geneva. Isotropic will cover North and South America, Europe and Africa and the Middle East out of a European facility in Poland and will also co-locate in a facility for Asia-Pacific coverage.

Isotropic shares the industry view that satellite networks can help service providers maximize 5G and that satellite networks will require increased network visibility, bandwidth management, and optimization to integrate with 5G - satellite networks will need to plug and 'play nicely' in a 5G world.

Satellites can affordably extend connectivity to 5G base stations (gNB) and even user devices beyond the reach of terrestrial networks, for example, into remote, rural, low-density locations. Not only this, but satellites can provide broadband connectivity to aircraft, vessels, rail, and vehicles outside of cell range and support cellular roaming services for subscribers or devices on mobile platforms. Satellites can efficiently multicast livestream broadband media and cacheable apps and content to distributed 5G edge nodes. As a result, they can reduce connectivity requirements for backhaul connections to base stations and improve end-user service quality.

Satellite networks can also provide backup capacity and mobile/transportable 5G cells for emergencies and disaster recovery connectivity when terrestrial networks are down - for example, due to cable cuts or natural disaster.

For low bit rate IoT networks with latency-insensitive applications, VSATs can efficiently concentrate local traffic in remote locations or moving platforms for connectivity to the network.

Finally, the ability to offload low-priority traffic, or multicastable content, from backhaul networks (enterprise or cell) can help preserve precious spectrum on the main network or provide overflow capacity for peak periods.

Satellite networks multicast livestreams and big data efficiently to distributed edge servers on a 5G network. This





*Hank Zbierski, Chief Catalyst and Co-Founder, Isotropic Networks*

can free up precious spectrum between cell nodes and/or backhaul capacity so that other, more latency-sensitive types of traffic can run between the gNB and core network (CN) over terrestrial connectivity.

In addition to reducing backhaul load, by providing a cache at the base station close to the edge, user latency can be reduced when compared with requiring content to be pulled from the cloud. As 4K video streaming services - and smartphones with 4K screens - become more widespread, this caching capability along with multicast could become important to delivering improved user Quality of Experience (QoE).

5G networks that use millimetre wave frequencies will require more base stations per square kilometre of coverage compared with LTE and 3G. The higher base station count increases the number of terrestrial backhaul points that will need to be added to the network. Satellite multicast networks are extremely bandwidth efficient for multipoint networks, adding zero incremental bandwidth cost as the number of sites scales up.

Isotropic is testing and rolling out early stage 5G applications building on the company's 4G/LTE experience and is working with clients (carriers, MNOs, maritime, and mobile communications networks) and partners to address 5G opportunities.

### **Datadragon: Revolutionary bandwidth management for 5G**

In addition, Isotropic has also introduced its solution, Datadragon, to the market. Datadragon is a bandwidth management and service platform from Isotropic that enables never-before-possible levels of application-level transparency, optimization, and personalization across any single or hybrid network. Through its proprietary bandwidth monitoring platform, Isotropic's clients can now provide their customers or end users with real-time visibility into their Internet usage so they can proactively analyze and address everything from service requests to billing issues.

Datadragon's patented algorithm, paired with state-of-the-art AI technology, offers detailed insights into day-to-day user activities and gives our clients the ability to optimize and prioritize bandwidth allocation according to their end users' needs.

The goal of Datadragon is to provide clients with a deep understanding of their bandwidth usage patterns and user trends as well as with tools to help them more efficiently

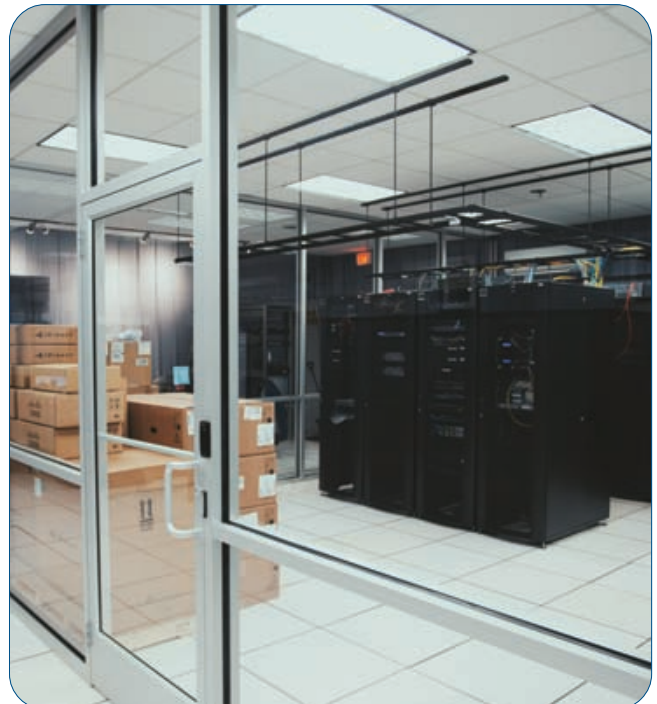
deliver high quality of service and better user experience. Strategic insights into end-user bandwidth usage can provide opportunities to create new revenue streams and increase network profitability.

Key features of Datadragon include the following:

- **Transparency:** Datadragon creates a hardware-agnostic platform that gives network managers and end users a real-time picture of bandwidth utilization at the application level across any single, multi-use, or hybrid network.
- **Visibility:** Datadragon's proprietary algorithm provides detailed insights into end users' real-time usage. This creates opportunities to proactively troubleshoot performance issues more efficiently.
- **Optimization:** Datadragon gives network managers the ability to understand and allocate the appropriate levels of access to bandwidth, creating opportunities for upselling and increased sales.
- **Frictionless:** Datadragon gives network managers the power to deliver bandwidth on demand. Satellite remote access is as simple to provision as a terrestrial connection.
- **Personalization:** By leveraging analytics and AI in Datadragon, operators can now customize their data plans to match end users' specific needs.

### **Prepared for the 5G Future**

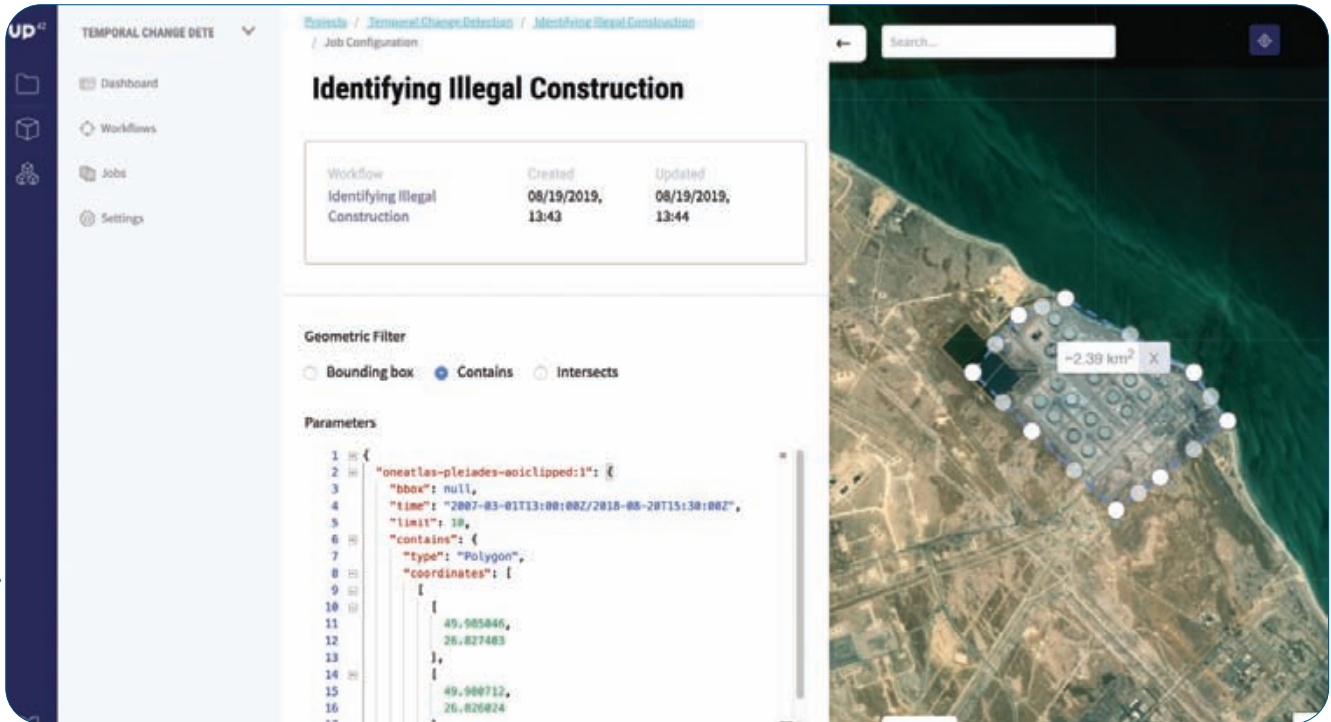
Times are changing fast, and it is critical that the industry is ready for these changes and able to adapt and thrive. Satellite offers so many unique features that it must become an integral part of the delivery jigsaw for 5G networks. Innovation such as Datadragon will be fundamental in ensuring a smooth transition to 5G for customers, giving them more control over their networks. There is still a lot of work to do in terms of working out how integration will be completed, but this will be a core focus for the entire industry – and there will be a plethora of opportunities to seize upon. ■



*Photo courtesy of Isotropic Networks*



Photo courtesy of UP42



## Geospatial data

UP42, a subsidiary of Airbus Defence, is a developer platform and marketplace which aims to simplify the way businesses can derive insights from geospatial data at scale. The company launched in early 2019, gaining a lot of traction with a diverse portfolio of companies, and has gone from strength to strength. Sean Wiid, UP42's CPO, opines on what they've done right, and what he expects to see from the company as it finds its feet.

*Laurence Russell, News and Social Media Editor, Satellite Evolution Group*

**Question: UP42 only launched in 2019 so you're still relatively new to the scene; could you introduce us to the company?**

**Sean Wiid:** We are a Berlin-based start-up with currently 35 employees from 20 nationalities. The name UP42 is a playful combination of two ideas. "UP" refers to the fact that much of our data comes from airborne platforms including satellites, planes and drones. "42" is a reference to the Hitchhiker's Guide to the Galaxy, where 42 turns out to be the answer to the Ultimate Question of Life, the Universe and Everything. So, we aim to provide the answers to all questions using data collected from above us.

UP42 was founded by Airbus Defence and Space because they realized that there is a large untapped market potential for geospatial data and analytics. They saw that there were

many commercial and technical barriers in place that prevented most companies from being able to efficiently work with this kind of data at scale.

Airbus enlisted the help of BCG Digital Ventures to incubate the company. We launched UP42 and our closed beta in May 2019 after about six months of research, prototype development, collaboration with key partners and ramping up the core team. The beta label came off in September when we announced full commercial availability.

UP42 aims to solve three main customer pain points: Access to data, access to algorithms and analytics, and access to an efficient compute environment to process the data at scale.

We reach out to data providers across the industry, and work to integrate their data into our platform.

This makes it easy for customers to access a wide variety of data sources, including satellite data, aerial imagery, AIS, weather, elevation models and more. We started with Airbus Pleiades, SPOT and WorldDEM data, but we aim to be a neutral marketplace and therefore open to everyone. So far, we have around 20 data sources on the platform, including open data sources such as ESA's Copernicus program, LANDSAT and MODIS.

We also help developers and analytics companies to publish their algorithms on our marketplace. These algorithms range from simple data preparation steps all the way through to high-value analytics such as NDVI and machine learning-based object detection and classification.

This means that, by using our UI, you can build a workflow that takes satellite data from Airbus and push it





Sean Wiid, UP42's CPO

through an Orbital Insight car detection algorithm in a few clicks without needing to write any code. Using our API, you can run this same workflow over 100s of AOs in parallel without needing to think about how to scale the infrastructure.

In general, there is no minimum order and customers pay for only what they use. We collect revenue from our customers and share it with our partners according to exactly how much of their data or processing blocks was used in each workflow.

What we do is unique in the market not only in terms of our building block approach, but also in terms of the usage-based revenue share model. Six months after commercial launch, we are seeing good traction both on the partner and on the customer side. We started generating revenue already during our beta phase. So far, we have around 20 data blocks and over 50 processing and machine learning algorithms on the marketplace. We have closed 25+ partnerships and have over 3,000 sign-ups.

**Question: That sounds like a very strong start; what's your company's strategy going forward?**

**Sean Wiid:** Yes, it's a strong start, and we are proud of what we have achieved so far. But we are very aware that we are only at the beginning of our journey.

As with any platform and marketplace, our strategic imperative is to grow our ecosystem of partners and customers to the point where network effects and economies of scale start to kick in. Of course, this will take some time. In the meantime, we have two main

priorities to help move us in the right direction.

Firstly, we are focusing on increasing both the number and diversity of data providers on our platform and making it easier for people to find and use the data they need. This is critical to attracting new algorithm partners and customers to the platform.

Secondly, we are focusing on maturing the business enablers of our platform to make it easier for us to handle more partners and more customers at scale. For example, providing shared company accounts and strengthening our billing platform capabilities.

In parallel to these main priorities, we continue to push on bringing on new algorithms, improving the developer experience and ramping up our sales and marketing activities. We have a lot of work to do!

**Question: What industries stand to benefit from geospatial data and satellite imagery?**

**Sean Wiid:** I think the easier question to answer is which industries don't benefit from geospatial data and satellite imagery?

There are many studies that have been conducted over the last few years that show how the overall impact of geospatial data and services on the economy, on society and on the environment far outweighs the size of the geospatial market itself. One study estimated that geospatial technology improves revenues and costs by at least five percent in sectors contributing approximately 75 percent to the global GDP. That is staggering. Imagine what

could happen if we truly made it easier for everyone to take advantage of this technology?

In fact, this universal relevance of geospatial technology and its overall impact to society is at the core of our company mission and also what has kept me personally engaged in this industry for over 20 years.

More concretely: At UP42 we currently see the most interest from companies that want to monitor infrastructure, including oil & gas pipelines, railway networks and electricity grids. We also have customers who are using our platform for precision agriculture, insurance and environmental monitoring. The main advantage in using satellite imagery and machine learning is to be able to regularly extract insights over huge areas to support decision making at a scale that would be impossible or prohibitively expensive to do manually.

**Question: Among the applications of your platform, you list your ability to monitor forestry, arctic ice and offshore turbine batteries. With investment in environmental technology growing, do you anticipate a significant portion of your resources going to optimising these services?**

**Sean Wiid:** We're definitely passionate about environmental topics. Many of the data sources we have or will be onboarding are optimized for use cases such as air quality monitoring and forest fire detection. For example, we have recently added Sentinel 5P, which is specifically geared toward measuring a wide variety of air quality metrics such as methane levels globally on a daily basis.

What we find very encouraging is the number of large corporations who are starting to use satellite imagery and analytics to drive environmental and sustainability topics, for example deforestation monitoring for sustainable supply chains. This is important, as it increases the possibility for companies such as UP42 to be healthy businesses while also benefiting society as a whole.

**Question: Your platform's architecture appears to have been designed with accessibility in mind. We've several other satellite technology developers prioritising the accessibility of their products and services. Do you agree there is a trend of making satellite applica-**



**tions more accessible, and if so, why do you think that's started appearing now?**

**Sean Wiid:** I would agree that this is certainly a trend, and a fairly inevitable one at that.

Firstly, it's about what developers want. Over the last several years there has been a massive shift in general towards APIs and platforms. I often hear APIs described as the glue that holds ecosystems together. Being able to tap into stable, well-documented APIs to get access to data or a service is a far more efficient way to build digital products. It has also put developers into a key decision-making role in the buying chain and as a result having a strong developer experience is a critical success factor. We have customers that use us primarily because of our developer experience.

Secondly, with so many new constellations and data sources coming online, and the sheer volume of data being collected each day, it no longer makes sense to deliver data in any way other than on-demand via APIs. For many companies, finding exactly the right data at the right time is more important than having a full copy of all the data to work with on their own infrastructure. As the industry starts to push past the traditional large government and defence contracts, it makes more and more sense to focus on removing friction for the middle and long tail.

Finally, it's about the audience. If we as an industry want to address a broader market, we need to hide more

of the complexity of satellite imagery, remote sensing science, data processing and machine learning behind easy to use services. Otherwise, it's too hard for many to get started.

Nevertheless, I think we still only at the beginning and as an industry still have quite a way to go to make the technology truly accessible.

**Question: What do you expect to see from the geospatial market in 2020 and beyond?**

**Sean Wiid:** It's really interesting to imagine what's about to happen in this market. I'd like to compare it to the period where Google Maps entered the mainstream.

Fifteen or twenty years ago, people would get directions by writing them down with paper and pen. The first wrong turn you'd make trying to navigate that way would render you utterly lost. You'd be left pulling out the map from your glove compartment and staring at it for a half hour trying to work out where you were before even working out where to go next.

Then Google beta-ed an interesting application that did those things for you, and perhaps within a year, it had eclipsed all other methods of navigation to become something many people simply couldn't navigate without. Suddenly we knew where we were, where we were going, when we were going to get there, and what the traffic would be like.

It changed our lives, but in a startlingly organic way. It went from an app no one had heard of, to an

irreplaceable pillar of 21<sup>st</sup> century life, ingrained into our muscle memory. Like it was a puzzle piece that fit so neatly into our lives, it almost felt like it was always a part of us. It went on to be connected to most other apps, and almost every business with a physical address. It became the means by which people found places. It became a very fundamental commercial platform everyone had to be on.

We've seen these sorts of movements before. It's just what happens when you open up a very advanced technology to the venture community. As we open up this industry to use even more powerful geospatial data, we're not just talking about map information. We're talking about state-of-the-art imagery with 30-50cm resolution and complex machine learning analytics. When innovators turn all those tools into apps, we may well see more watershed moments like Google Maps popping up through the rest of the early 21<sup>st</sup> century.

We see ourselves as a part of this market evolution. Moving forward we'll be integrating many, many more diverse data sources and algorithms on the platform, further increasing its capability. At the same time, we'll be working to keep that increasingly varied experience simple and accessible.

I would love to encourage people to give UP42 a shot. We offer free credits to get you started, and we're very open to hear any and all feedback about your needs. Whatever you're trying to achieve in the geospatial sector, let us help to get you there. ■



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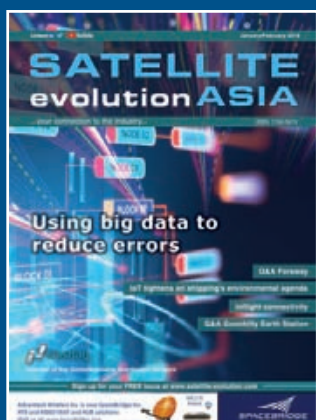


Stay tuned to learn more about our new FLY AWAY terminal launching soon!

**Making Missions Possible**



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## COMING SOON...

Enjoyed this issue of Satellite Evolution Asia? Well hold on to your hats, because there is much more to come!

Coming up in Satellite Evolution Asia - May/June:

- News
- LEO/MEO
- Modems
- Inflight communications
- NewSpace: What does it mean?
- Oil&Gas Sector

If your focus is the global satellite industry - look no further! The Satellite Evolution Group, a division of DS Air Limited, is one of the leading print and digital marketing platforms for the industry. For over fifteen years we have served the global satellite market with information key to this evolving sector.

The portfolio including Satellite Evolution Asia, Satellite Evolution EMEA, NewSpace International, and Global Military Communications covers the entire spectrum of the industry from launch, ground segment and networks to space.



# Introducing a Portfolio of New SATCOM TWTAs & SSPAs

**NEW!**

## GaN SSPAs & BUCs

- Higher Power
- 16W to 250W
- Smaller Packages
- X-, Ku- & Ka-Band



**NEW!**

## World's 1st 650W Ka-Band TWT

- 650W Peak Power
- 215W Linear Power
- Antenna Mount
- Liquid Cooled Option



**NEW!**

## mmWave SATCOM Amplifiers

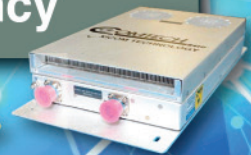
- V-Band: 250W
- Q-Band: 120W, 140W & 180W
- Gateway Solutions
- In Production



**NEW!**

## Airborne Global Connectivity

- 50W Ku-Band
- 20W Ka-Band
- SSPAs & BUCs
- ARINC 791 & DO-160
- High-Efficiency



[www.xicomtech.com](http://www.xicomtech.com)

3550 Bassett Street • Santa Clara, CA 95054 USA  
Phone: +1-408-213-3000 • e-mail: [sales@xicomtech.com](mailto:sales@xicomtech.com)





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[sales@stn.eu](mailto:sales@stn.eu)



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