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COVID-19: Space segment impacts

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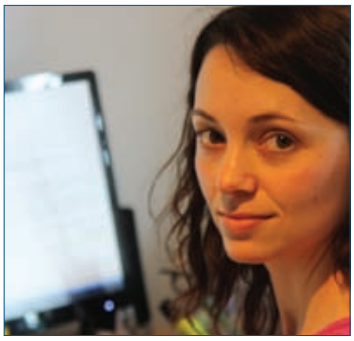

Amy Saunders
Editor

Troubling times

It's been quite an historic time of late. We're now six months into the coronavirus pandemic, and the world is still reeling from its impact on our daily lives.

The world's working population has been divided into never-before-seen subsections: Frontline workers, including care workers, people in the food supply chain, essential service providers and delivery businesses are under mounting pressure to keep going despite the considerable risks; non-essential workers who are required to work from home, many juggling full-time childcare for small children or dependent relatives with no relief; and the furloughed, those placed on leave at 80-100 percent of their wages (depending on how generous their employer feels), who are either deemed unessential or whose businesses cannot operate remotely, and who may have no job to go back to after the virus retreats.

> "It is a difficult time for everybody, and all of us have troubles that are unique to ourselves."

It is a difficult time for everybody, and all of us have troubles that are unique to ourselves. We at Satellite Evolution are in a fortunate position that we can continue our work from home – where some of us mostly work from anyway – and continue to engage with our industry colleagues by voice, video, or email. We will continue to strive towards delivering relevant, excellent content to our readers, while helping our friends and colleagues with innovative new opportunities and ideas to stay ahead during the outbreak.

In this issue - which would usually have been the ConnecTechAsia 2020 issue (now postponed to Satellite Evolution Asia July/August) - we look at the impact of COVID-19 on the satellite sector and those who work within it. Many companies are making big contributions towards helping the battle against this deadly new foe. We've also explored the upcoming new wave of very high throughput satellites (VHTS), a new trend that will see global capacity boom. Meanwhile, we have in-depth interviews with Comtech EF Data, Walton De-Ice, Intellian and NiAT. In addition, GTMaritime has outlined a recent case study in connectivity, while ETL opines on all things teleport.

Hopefully, the coronavirus will soon pass and some level of normality resume for us all without causing too much irreparable damage. In the meantime, we hope you enjoy this issue. Feel free to reach out if there's any way we might be able to help you or your company! ■

Photo courtesy of GTMaritime

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 Group

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DS Air Limited
Boxer Retreat, 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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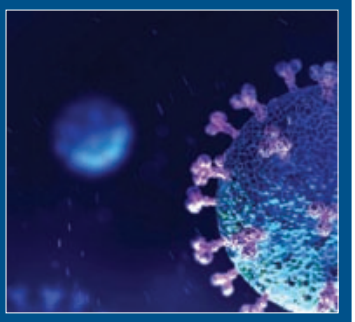
COVID-19: Space segment impacts

It's only been a few months since the first mumblings about a novel coronavirus reached us from the Far East – with many opining that it would never reach us, and later as it did, that it was merely a mild flu. Things have since kicked into overdrive, with many counties going into lockdown of one sort or another. The short, medium, and long-term impacts on the space segment, or any other for that matter, are yet to be understood.



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Stay tuned to learn more about our new Multi-Band FlyAway Terminal ***MFT 1500*** launching soon!

Making Missions Possible

AsiaSat keeps the world connected as linear TV viewing witnesses upsurge amid COVID-19 lockdown

Recent media reports have revealed shifts in consumers' viewing behaviours as COVID-19 situation evolves with individuals and families spending more time at home, which noted a spike in linear TV viewing, in terms of penetration and time spent across multiple markets and all generations.

News channels and programmes have seen a surge in viewership as news updates and government announcements on new regulations and the pandemic development become profoundly important to the public. During this period of uncertainty, satellite continues to be a reliable and cost effective means for content delivery, serving audiences nationally and abroad with critical and timely news and information.

As Asia's leading provider of broadcast platforms, AsiaSat strives to meet consumers' evolving demand for content and viewing quality. Among the 550 TV and radio channels originated from more than 30 countries and regions in 30 languages delivered by the AsiaSat fleet, more than 80 are news channels, with 60 percent of them in local languages targeting local markets as well as expatriates and travellers who want to stay abreast of the happenings in their home countries.

Over the past year, the number of HDTV channels increased across AsiaSat's core video satellites AsiaSat 5 and AsiaSat 7, as well as its new video hotbird AsiaSat 9 at 122°E. These HDTV channels have included the Asian Action Channel, CTI Asia, ET Mall, PILI TV, Trace Sport Stars, Trace Urban, TVB Xing He and tvN Movies on AsiaSat 9, and a selection of WarnerMedia's bouquet of regional HD channels on AsiaSat 7 including CNN, Cartoon Network, Boomerang and Warner TV, raising the share of HDTV services to 30 percent across the AsiaSat fleet.

"At AsiaSat, while committed to protecting the safety and health of our employees during this difficult period, we will continue supporting our customers to deliver high-quality and uninterrupted services to their audience even as demand for TV content surges unpredictably. With our growing HDTV services and wide-ranging news and entertainment programming, we are delighted to demonstrate satellite's ability to multicast high resolution content, particularly over a vast geographical area and with a growing population of receive antennas, which is more resilient in coping with unexpected soaring demand for services than streaming TV services that were required to lower streaming quality at times of network congestion," said Ina Lui, Senior Vice President, Commercial, Business Development and Strategy of AsiaSat. ■

Photo courtesy of Shutterstock

Kacific commits satellite service to help remote medical clinics combat COVID-19 across Asia-Pacific

As recent epidemics have shown, rural and remote communities, although isolated, are particularly vulnerable during an epidemic, once community transmission takes effect.

To help governments during Covid-19, Kacific Broadband Satellites Group is offering over 1,000 small satellite dishes, at no cost, and make them available to healthcare departments throughout Asia-Pacific, so they can rapidly connect rural and remote medical clinics to high-speed internet.

Internet connectivity will assist better tracking of developing clusters of infection in communities. It will also allow faster and more efficient response of medical staff in smaller towns and rural locations as they tackle the Covid-19 virus.

Connected clinics give remote medical staff access to up-to-date information, the ability to arrange medical supplies and transport, and the opportunity to work alongside city-based specialists. It gives them confidence and support to treat their patients in a difficult time. It also gives governments the ability to decentralize their healthcare by leveraging as much as possible their entire network of clinics rather than only relying only on their central hospitals.

Connecting clinics contribute to the wider health system through sharing information and ensuring that patients, no matter where they live, can access appropriate medical treatment and factual information.

We can rapidly deploy our Very Small Aperture Terminals (VSATs) and quickly connect them to the internet, fast-tracking connectivity in a time where a rapid response is needed. Kacific will collaborate with local service partners or government task forces to ensure services are delivered optimally.

Kacific also extends exclusively to healthcare departments during the Covid-19 crisis, special bandwidth packages at US$1.7/Gbyte or less, depending on local regulations.

Although bandwidth will be prioritized and offered at lower cost for healthcare, communities and other facilities around these 1,000 and more health facilities would also benefit as more bandwidth can be pushed through those satellite dishes.

Kacific invites Ministries of Health, medical communities or NGO active in healthcare within the coverage range of Kacific1 and not already in discussions with Kacific, to make contact.

With these efforts, Kacific hopes to play its part in the fight against Covid-19 and urges everyone to stay safe and healthy. ■

Intellian's v85NX antenna system gains Telenor Satellite Thor 7 type approval

Intellian is delighted to announce that its v85NX antenna has earned type approval for Telenor Satellite's Thor 7 Ka-band service, following successful sea trials. Significantly the v85NX – which is the first 85cm antenna to be certified on the Thor 7 network – will benefit from the same airtime pricing

as 1m antennas. As service provision for smaller antennas is usually more expensive owing to their lower gain, this recognizes the outstanding performance of the v85NX and makes it a competitive choice for customers looking for a compact design with low capital and operational expenditure.

Offering up to 25 simultaneously active spot beams, the Thor 7 service is designed to provide optimal HTS Ka-band VSAT connectivity across Europe, covering busy shipping lanes in the North Sea, Norwegian Sea, Barents Sea, Baltic Sea and Mediterranean Sea. Jan Hetland, Director, Data Service Division at Telenor Satellite, said: "We're delighted to welcome Intellian's v85NX antenna to our leading Thor 7 service. A satellite service providing high-powered performance for maritime applications requires premium hardware, and Intellian's NX Series systems have a range of attributes which position them at the forefront of antenna technology, reflecting Telenor Satellite's forward-looking service provision. We look forward to working together in delivering outstanding global communications to our loyal customers."

The RF design of NX Series antennas outperforms rival products, resulting in unmatched data rates. A major advantage is that dual antennas – often employed to avoid the satellite being obstructed by vessel superstructure – may be easily configured thanks to the mediator built into the ACU. Before, a separate mediator unit was required. The antennas can be easily converted between Ku and Ka-band by swapping out the center-mounted RF assembly and feed, and there is also a range of BUC options – 5W and 10W for Ka-band and from 8W to 25W for Ku-band – which are interchangeable with no need to rebalance the system following their installation.

Eric Sung, Intellian CEO, commented: "This certification from Telenor Satellite, and the competitive price bracket in which Telenor has placed the v85NX, underlines the performance and versatility of our NX Series antennas. New customers can purchase a v85NX antenna pre-configured for Ka-band off the shelf, while users who already own a v85NX antenna on a Ku-band network can easily convert it to Ka-band operation for use with Thor 7. We are delighted to join with Telenor in facilitating flexible, high-speed communications across Europe."

NX Series antennas are shipped pre-slung to facilitate installation, and the use of modular components common to the entire antenna range has cut the number of spare parts required by up to 40 percent. This in turn simplifies maintenance, enhances reliability and brings about further cost savings for end users. ■

Photo courtesy of Intellian

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G-Core Labs opens a new point of presence of hosting and CDN in Singapore

G-Core Labs, the international provider of cloud and edge solutions, continues to develop the Asian segment of its global infrastructure and opens a point of presence in Singapore. The location offers customers secured dedicated and virtual servers, as well as services for the fast delivery of content with an average response time of 30ms (according to Citrix independent analytical system).

"Being a recognized world economic center, Singapore is actively developing internet infrastructure and communication networks: more than 93 percent of 5,8 million residents here regularly go online, and in terms of speed of fixed and mobile internet, the city-state takes the 1st and 2nd places in the world respectively [note – approx. 191Mbps and 61Mbps]. Singaporeans actively watch videos, communicate in social networks, buy online, including food, electronics and beauty products. The new G-Core Labs location will be in demand both in Singapore itself and in neighbouring China, as well as among Asian, European and American companies seeking to work effectively in the local and regional markets," said Andre Reitenbach, G-Core Labs Managing Director.

The hosting and CDN point will be in demand among telecommunication and broadcasting companies, mass media, streaming services, developers and publishers of video games, online retail, cloud service providers, the banking sector and other companies.

G-Core Labs servers are located in a certified Tier III class data center. The company provides 5 TB of traffic for free for each dedicated server.

The functionality of the automatic installation of the most popular operating systems (OS) (Windows and Unix), installed when ordering the server, is provided in company's dedicated and virtual servers. It significantly saves time for system deployment. You can also connect your own ISO image and install the necessary OS yourself. All G-Core Labs servers are protected from DDoS attacks using G-Core Labs unique technology for intelligent filtering of network traffic.

The dedicated servers of the company provide constant free access to their IPMI (note - abbr. from the intelligent platform management interface), which allows to quickly solve any issue with hosting in a remote format even in case of a emergency situation.

G-Core Labs virtual server is based on KVM virtualization technology, which guarantees high and uninterrupted

performance and is equipped with fast SSD disks. You can get acquainted with the configuration options of dedicated and virtual servers by the link.

G-Core Labs CDN supports all necessary protocols, including HTTP/2 (by default), SSL and IPv6, and also provides flexible system configuration options: access through the API, opportunities to pre-load heavy files, to clear cache completely or selectively, to set and manage cache storing time, cache return, inheriting caching parameters, to ignore request parameters and cookies etc.

The global architecture of G-Core Labs content delivery network, located on 5 continents, was created by experts on high-load systems. Today, it includes 100+ points of presence located in more than 65 cities around the world, has 5000+ peering partners, 300+ cash servers and the total network capacity is 10+ Tbit/sec. ■

ST Engineering appoints new director, Ms. May Ng

Singapore Technologies Engineering Ltd (ST Engineering) today announced the appointment of Ng Bee Bee, May as an independent non-executive Director of the Company with effect from 1 June 2020.

Ms May Ng, 52 is currently the Chief Executive Officer of Pan-United Corporation Ltd (Pan-United), the largest local ready-mixed concrete and cement supplier that supplies to major infrastructure projects like Changi Airport Terminal 5 and LTA MRT lines and private developments like Guoco Towers. She was previously the Executive Director from January 2004 to February 2011.

Ms Ng sits on the boards of several subsidiaries in the Pan-United group. She is also the Chairman of Mercatus Co-operative Ltd and a director of NTUC Enterprise Co-operative Ltd. Ms Ng holds a Bachelor of Arts (Honours) degree from the University of Western Ontario, Canada. The Board of Directors welcomes Ms May Ng to the Board and look forward to her contributions. ■

Optus launches new Optus Family plan as research reveals Australian families are looking to stay safe online

Research from Optus reveals that in this digital age, 83 percent of Australian parents are interested about learning how they can best protect their child's internet safety and security with almost half of Australian parents (45 percent) not having existing measures in place to protect their children online. As part of a national survey conducted by Optus, over 1,000 Australian parents were asked about their children's internet and technology usage and their concerns about protecting their families online.

Based on these findings, Optus has developed a solution for Australian parents - the Optus Family Plan.

Matt Williams, Managing Director Marketing & Revenue at Optus said: "More than ever before, families rely on technology to stay connected. It's no secret that children are very active online, whether it be for social, gaming or education purposes and it's crucial parents are equipped with the best possible solutions to keep their families safe online."

"At Optus we are stepping up to the challenge with an affordable family plan. With 67 percent of Australian parents believing that companies like ours could be doing more to support them when it comes to protecting their children online, we feel like there is no better time to be launching these plans."

Mr Williams said as families nationwide are now spending the majority of their time at home, there is naturally an even greater reliance on them staying connected via their devices, which in turn creates additional pressure for parents. ■

Ten fantastic years

Network Integrity Assurance Technologies Sdn Bhd (NiAT) is a satellite communications services company based in Negara Brunei Darussalam. Delivering key products and services to a wide range of local industries, this year NiAT celebrates ten fantastic years of operations. Niat CEO, Lim Ming Soon, discusses the company's past and future endeavours.

Amy Saunders, Editor, Satellite Evolution Group

Question: Can you tell us about NiAT's background?
Lim Ming Soon: Network Integrity Assurance Technologies Sdn Bhd (NiAT) is a satellite communications service provider in Brunei Darussalam which was registered on 26th May 2010. We provide both fully licensed Very Small Aperture Terminals (VSAT) and satellite mobility services plus airtime packages tailor made to the client's needs and demands.

NiAT was initially established to support the growing demands within the satellite communications market in Brunei Darussalam, catering to those in the emergency response field, military, Internet broadband, enterprise, and data transmission. As a service provider for VSAT services and also partners of international satellite communication brands like Inmarsat and Iridium, NiAT is able to effectively close the gap in accessing remote and rural area telecommunications, enabling all to access information and knowledge, regardless of geographical location making satellite communications more accessible to the market in Brunei Darussalam, may it be private enterprise, government sectors or the general public.

NiAT also released NIAT OBSERVE in 2019, a geospatial web-based application that allows users to access and explore the latest high-resolution satellite and aerial earth imagery. OBSERVE is not only a satellite imagery service, it is currently being molded into a platform that can also provide data visualization, spatial analysis, an Information dissemination system, operations planning system and most importantly a platform that can analyze big data and also churn our specific reporting as per the client's main needs. OBSERVE is meant to be a dynamic application because of the different requirements from a range of different clients.

Question: What can you tell us about your team?
Lim Ming Soon: As of 2020 our headcount is at 20 people. We run on very lean and efficient resources, and we pride ourselves on being a 100 percent local company. We hire local, we train them to be best in the field according to their job roles and ensure that everyone is up to speed in terms of business innovation and also technical knowledge. With an average age of 30 years old, the NiAT team is highly enthusiastic, energetic, and always excited to learn new things.

Question: How would you describe your company and its business?
Lim Ming Soon: NiAT is the first licensed satellite communication service provider in Brunei Darussalam, we started off offering VSAT and mobility satellite terminals and airtime to government and enterprise customers in the early days of operation. Over the years, through the strengths of our technical team and knowledge sharing with partners, we diversified our portfolio into IT technical services, equipment management, rental services and also tailor-made remote communications and energy solutions. The nature of our solutions and the way it is set up is to be fully customizable to fit the client's needs and with that approach we have built the business based on a very close relationship with our customers and stakeholders. The main objective is to first understand the problem the client is having then offer a solution to ease that burden and also at the same time trying to increase its workflow efficiency.

Lim Ming Soon, CEO, NiAT

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Question: What challenges do your services and products solve?

Lim Ming Soon: Initially our main solutions are catering to the unserved/ underserved market segment in Brunei, delivering connectivity solutions where there isn't any terrestrial or cellular coverage. In addition to that, we also cater to emergency response and disaster recovery situations due to its independent and highly portable features.

NiAT is currently servicing a number of operational vessels/rigs operating within the oil and gas industry in Brunei Darussalam. NiAT gives the vessel owners/clients the ease and security of a local VSAT service provider handling their communications from end to end and also an insurance if anything was to fail. NiAT is always prepared with backup communication systems and also spares for any equipment failure on vessels. NiAT is always ready to maintain its 99.95 percent SLA promised to customers.

Question: Who are your clients?

Lim Ming Soon: Our primary clients are in Oil and Gas Industry, Oil & Gas Exploration, Defence Sector, Rig Maintenance Vessels, Fishing Industry, Enterprises and Corporate.

To name a few companies, Brunei Shell Petroleum, Ministry of Defence Brunei, Total E&P, RigNet International, University of Brunei Darussalam, Websatmedia Pte Ltd & other various government/ private agencies in Brunei Darussalam.

Question: What are the biggest challenges you face with your product/service offering?

Lim Ming Soon: Just like most countries around the world, we are always working hard on loosening the regulatory burdens implemented on the end-user of our service as it is currently the leading reason customers are refusing to take our services. This approach is, however, beginning to bear positive results. With the collective efforts that NiAT and Brunei's regulators have put in, we are starting to see changes in fee's borne by the clients and also newer updated rules established to accommodate the ever-changing development in the VSAT/ communications industry.

The second positive outcome of this knowledge sharing is it produces a tighter enforcement of unlicensed activities that is also happening in Brunei waters. With regulators now having a better understanding on how the VSAT industry works and who the main service providers are, this means we are able to control and monitor any unlicensed activities happening in our waters.

Question: You are celebrating your ten-year anniversary this year. How do you see the next ten years developing (service and company wise)? What are the challenges for the future that you might encounter as you grow?

Lim Ming Soon: Over the past 10 years, we have worked very hard to establish market foothold, explore new opportunities, developing our people and building clientele's trust and confidence.

Our continuous perseverance and endless enthusiasm have brought us to where we are today. We have achieved a series of historic milestones, from product innovation to market recognition, from market penetration to business diversifications, and eventually attaining profitability.

However, this is only the beginning, and it is going to be an exciting time ahead with a window of opportunities in varies sectors across all industries to address demands and expectations. The Pandemic has certainly shaped the ways of how we do business and how we operate.

Reliable and resilient connectivity is the key, and the most integral part of our business continuity, hence, the expectations of the clienteles has also shifted to high notes. To accommodate and deliver higher expectation, and to address market opportunities, continuous investment, training, and development is inevitable. Being in the niche market, coupled with the nature of our small market size, return of investment will be a challenge. Nevertheless, we remain positive, and we believe as a team, we can strive again to bring the company to new heights. ■

Photo courtesy of NiAT


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Satellite staying competitive by adapting to a changing market

Times are interesting for the satellite sector, with more change arguably occurring in the last five years than ever before in history. Technological advancements are seeing new pressures being placed on ground segment providers, with some satellite segments rapidly outpacing others.

Andrew Bond, Sales & Marketing Director, ETL Systems

Constant change is taking place across the satellite market, with growing customer demand on services increasing the amount of data being handled by the satellite sector every day. The pressure to compete with competitor technologies is rife, as consumers expect a high-quality service offered at a low enough price. This expectation requires those in the satellite sector to consolidate margins by increasing efficiencies and looking to new technology to lower operational costs. The resiliency of operations must be second to none, and of course this requires potentially expensive capital and operational expenditure.

At the same time, there are huge market changes afoot in the sector. New technological advancements and consumer demand shifts away from video-based only teleports to more data-based hybrid teleports. This presents new challenges to the ground segment and wider satellite market, but also enormous opportunities, and could open new, highly lucrative revenue streams. Operators' investment in technology will enable them to adapt to these continuing advancements and changes within the industry.

Consumer demand

Providing a high-quality service has always been of paramount importance in the satellite sector. Consumers rely on satellite for essential operations across the globe and have done so for decades, but never have we seen this level of competition. If satellite customers do not receive the right quality of service (QoS) at a competitive price, then some segments of the sector could find themselves unable to compete at all.

The cost of managing services must be kept low whilst ensuring a high-quality service to end-users. There are naturally limited budgets to enable this, as well as several obstacles to increasing the efficiency of teleports, such as tackling the challenges of rain fade, equipment failure, and interference. As we will explore, there are infrastructure changes that can be made to help in this respect, as well as new, emerging technologies. Another threat facing satellite, and in particular the ground segment, is the migration to the cloud driven by 5G. Big market changes are coming which will surely alter the way the ground segment operates.

We have already seen the advancement in high throughput satellites (HTS), very high throughput satellites

Andrew Bond, Sales & Marketing Director, ETL Systems

(VHTS) and non-geostationary satellite orbit (NGSO) satellites having a substantial impact. VHTS, for example, has the potential to deliver a throughput of 1Tbps – huge progression from the time of marvelling over HTS's 100Gbp capacity.

HTS is therefore enabling us to deliver a superior Internet experience to end-users. Today's consumers want to stream video content on the go, manage the heating in their homes from their smartphones, all whilst tracking a run or cycle via their watch. And they want all of this at a good price, or rather, they *expect* it to be affordable. VHTS in this respect could minimise the cost per gigabit for service providers – a saving they could pass on to their customers. If we consider that in 2015 it was reported that HTS had reduced the cost of bandwidth by 70 percent, imagine what VHTS will do. VHTS also offers greater flexibility, which means operators could even increase capacity in one area during peak times for example, whilst reducing it in another. Of course, there are some drawbacks to HTS and VHTS, not least is the challenge of maintaining accuracy and QoS due to the reusing of spectrum.

The changing needs of consumers is reflected in a changing market which is less dominated by TV broadcasting and more by broadband access and mobility – i.e. the switch from video to data.

As we move forward, we are likely to see an industry focus on applications in IoT, 5G and mobility. Backhaul will also see growth as 5G is rolled out. As many see 5G as a competitor to satellite, the former will rely on the latter to provide much needed connectivity where it remains a challenge to deploy terrestrial fibre connections. It will take a

while for 5G to even near complete ubiquitous coverage, so satellite still has a big role to play.

Technological advancements

Technology has enabled us to deliver all kinds of new services such as those IoT applications highlighted above, that modern customers now require, but many of the same technologies are also making it difficult for satellite services providers to maintain reliable services, especially in the ground segment.

Satellite frequencies have increased and thus so has the available bandwidth, mainly via the use of Ka and Ku-band. These more focused, narrow band spot beams offer a higher data rate, whilst smaller wavelengths also mean that smaller, less expensive terminals can be used. However, the use of Ka and Ku-band can present the potential for reliability issues, particularly in harsher environments due to rain fade. Ka-band in particular is often used in environmentally challenging environments and in order to offset the possibility of rain fade, diverse antenna sites are required, sometimes tens of kms apart.

NGSOs in MEO and LEO represent a big step in satellite tech. They are already enabling real-time applications in sectors such as banking and have the potential to quicken progression in IoT and 'smart cities.' NGSOs are cheap to build and launch, require less power to transmit data and have a low latency. Many rural communities around the globe are becoming connected thanks to NGSOs. But they are also not without their challenges.

NGSOs are much cheaper to build and deploy, but once launched are more difficult for ground systems to keep antennas aligned, due to the movement of the satellites (at a rate of approximately 7.3km/s). NGSO constellations required to provide adequate coverage are also huge. The Field of View of NGSOs is much smaller than those in GEO which means to mitigate the loss of coverage as they move across the globe, many satellites are required. As a result, ground station antennas have to be able to track and change over satellites as they cross in and out of view, which is a challenge. Conventional parabolic antennas can do this seamlessly but are extremely expensive and only available in private markets such as for government or military use. As LEO and MEO satellites launches increase, teleport ground stations must invest in more cost-effective tracking antennas.

NGSOs will therefore continue to require unique capabilities on the ground to ensure resilience, redundancy and systems which can be easily expanded. The ground segment must ensure it continues to advance its technology in this way to maintain QoS and reliability, so end-users remain satisfied with the service.

Responding and adapting to a changing market

The satellite ground segment is already handling an increasing amount of data for cloud and IoT services, emphasising its changing role away from the terrestrial communications market. Teleports need to adapt to support this, as well to take advantage of the opportunities it provides. 5G, Network Function Virtualisation (NFV) and Software Defined Networks (SDN) – all will alter how networks are structured and will require a need for the physical infrastructure to interact with technologies in the delivery process.

As this trend towards data continues, teleport operators will be expected to go beyond traditional duties required in the management of RF and deliver multi-service platforms with software defined networks, cloud integration etc.

Many industries, which traditionally rely heavily on satellite services, are using more data as technology advances and the use of this technology expands. In maritime, energy, cruise, aviation and indeed broadcast, many new applications of IoT, or Machine to Machine (M2M) communications rely on data collection. At the moment, many of these IoT applications are relatively simple in nature, requiring simple data narrowband. As these applications become more sophisticated however, we will see the increased need for broadband to support the transfer of complex data. But of course, with IoT applications managing essential and increasingly large proportions of operations, it is again important that the transfer of this key data is relayed accurately and reliably.

The ground segment of the satellite world should look to these changes in the market as opportunities rather than obstacles. As the amount of data being processed at the ground segment increases, teleport operators may find that big data analytics and storage become attractive ventures.

The future of satellite and the ground segment

There are clearly many changes occurring in the satellite market; changes which could and should be capitalised upon. The market should look to new and improving technology to enable this, many of which will be most effective in the teleport infrastructure on the ground.

The ground segment's role will therefore only grow in the coming years, if it is able to ensure true reliability and QoS, even in new markets such as data. It is absolutely key then, that those in the ground segment appreciate the value of receiving high-quality communications via RF to ensure dependable signals and therefore high-quality data and services.

To achieve the above, it's imperative that ground segments start thinking now about how their complex infrastructures will integrate with new technologies, so they can be quicker off the mark when it comes to evolving cloud-based applications and incoming 5G. Staying ahead of the curve, keeping competitive and adapting to a changing market by opening up new revenue streams sooner rather than later. ■

Photo courtesy of ETL Systems

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Raymond Powers, Director of Sales and Marketing, W.B. Walton Enterprises

Remaining at the top

W.B. Walton Enterprises is a landmark designer and manufacturer of equipment that protects satellite antennas from the environment, across thermal extremes as well as high winds and dust levels, allowing installations to perform at high efficiency in some of the most inhospitable environments on the planet. Raymond Powers, Director of Sales and Marketing, explains how the company has maintained a gleaming 40-year history of success in the market, and how they plan to remain on top.

Laurence Russell, News and Social Editor, Satellite Evolution Group

Question: Walton De-Ice is in its 40th year of antenna de-icing. What are some of the company's proudest moments over the last four decades?
Ray Powers: Well, that's a lot of achievements to summarise. Going back to the beginning, Bill Walton, our Founder and President, was an electrical contractor in the 1970s in southern California where he worked with satellite communications. He gained a contract there installing antennas for the then fledgeling satcom industry.

During his career, Bill became friends with a gentleman also working in antenna installation who was working in the San Francisco bay area. That gentleman happened to mention that 'if someone could figure out how to keep the ice off of these things, they'd make a million dollars.'

When Bill flew home back to California, he found himself drawing out an idea on a cocktail napkin. The design for a prototype which would go on to remain the company's primary, legacy product to this very day, the Hot Air De-ice system. At the time it was something no one had really addressed, though it was a pretty common problem.

The device encloses the back of the structure of the antenna, reflector and hub assembly and uses a heating system, whether it's electric or gas, which maintains an optimal temperature, keeping the reflector dry during inclement weather.

Antennas have started to downsize more recently as VSATs have become more popular, which our conventional solution couldn't address, though the problem of ice and the threat of adverse weather is just as serious. So we developed something bespoke to address the problem.

We were approached by W. L. GORE who proposed a partnership to work on a comprehensive cover because accessing the back of the structure as we did with larger models wasn't possible. To develop a solution, we needed to develop a fabric which was virtually RF invisible as well as UV resistant. We delivered Snow Shield in a PTFE architectural fabric, which was a huge hit on its release 25 years back and has made up a strong pillar of our product portfolio ever since.

When Ka-band began growing in popularity, we found the fabric we were using soon became unavailable, forcing us to find a suitable alternative. Knowing that the materials used by our competition blocked performance in that wavelength, we had to move to a new fabric called Sefar, which is developed in the EU and ticked all our boxes. So once again we were able to remain providing for the cutting edge of antennas.

Jumping right up to present day in the midst of the LEO/MEO boom, of course, many players are looking at constellations, and the need for tracking antennas, which more often than not need to be deployed in areas of extreme conditions. We're talking about some of the coldest and hottest environments on the planet.

So, our next challenge was to provide a solution that worked for virtually everything on the surface of the Earth while allowing the antenna to

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JAVELIN

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150 W X-Band

TITAN

200 W Ka-Band

200 W Ku-Band

The New Shape of Solid State

move: Our answer was the Portable Radome. The Radome has seen a lot of interest from the government and military sectors, although commercial uptake is rising swiftly.

That's essentially the 40-year evolution of Walton in a nutshell, a succession of problems borne out of a fast-moving industry, which we solved one after another.

Question: In the middle of 2019, you celebrated a contract with a leading sports TV provider to integrate your systems including the Snow Shield system, which seems to have been a favourite in the industry. What makes Snow Shield stand out compared to competing systems?

Ray Powers: I would say that the only viable solution for VSAT antennas in any frequency is the Snow Shield. We currently offer three different fabrics for the product depending on the needs and budget of the end-user, however, only one fabric is viable for Ka-band, the Sefar offering.

Competing systems are unable to go in front of the reflector because they interrupt the signal, so their solution is to stay behind the reflector where they use some kind of heat transmission system. The problem there is that the scale and complexity of the platform means their system doesn't offer complete coverage, only parts of the reflector are affected, so ice can still accumulate in certain areas.

Because metal can expand under certain temperatures, and the movement of the sun hits different parts of the platform throughout the day, having only parts of the machine temperature-controlled can potentially cause more problems than it solves. Hot spots and cold spots across the model can potentially compromise the life of the structure.

Question: You've reported that the Portable Radome has seen the most uptake from military and government segments, but you've found increasing interest in the commercial sector. What do you believe will be some of the most popular commercial businesses making use of satellite communications?

Ray Powers: There are multiple segments in the world of satcom. The first is the end-user, television studios for instance that have mobile applications. Not fixed installations like the kind you can get attached to a van, but pop-up antennas that run transmission even more portably.

We met with a television station out of Mexico City that was sent to Russia to cover the Winter Olympics in 2014. They set up their antennas on a roof which had the elevation to transmit effectively, but the winds there were so high that even their small antenna was getting buffeted out of position. In the end, they actually had to put two personnel on the job of physically holding the reflector in the right position as they're trying to transmit.

So you've got this smart, agile little broadcast team sent on a trip to cover a huge event, being held back from delivering their footage solely because of the wind. They were prepared for just about everything else.

When they started working with us, they discovered that the Portable Radome would cover their antenna and redirected the winds around the fabric, allowing it to transmit at full efficiency, of course without having to deploy highly trained engineers and broadcasters to stop it from blowing away.

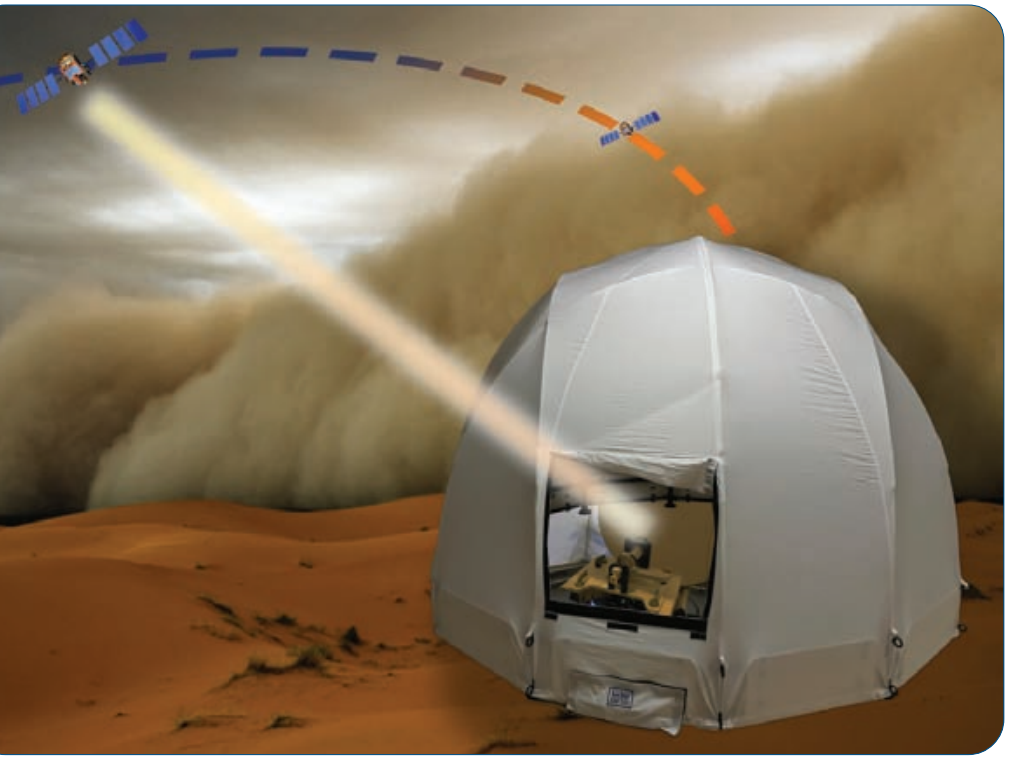
The Radome can offer a consistent resistance of 85mph, which means that even in powerful winds, you can just leave the thing out in the elements, confident that it'll perform.

In the government segment, there are a number of emerging applications. Our first customer was in the EU, a military group who needed to deploy in an arid region where they expected high heat, great winds, and a lot of dust. I'd like to share the name of the group, but unfortunately, I'm not at liberty to do that.

Since then, the business has spread to other governments in the EU that required small numbers of reliable units for testing purposes. Of course, in that unique scenario, we couldn't have known their exact requirements, but the Radome delivered everything that those clients needed, nonetheless.

As you might expect, we also work with the US government, who are interested in a great number of our Radome models as fixed solutions, interestingly, not necessarily for protection against the elements, but also to obscure a specific form of antenna.

So, the applications of our clients have a great deal of variety, which speaks to the adaptability of our product portfolio. As new clients enter this market due to dipping operational costs, we look forward to working with them and solving the new challenges they bring.



Walton portable radome. Photo courtesy of Walton De-Ice

Question: The Portable Radome is set to serve the LEO/MEO const-

ellation boom well, with so many tracking antennas required in remote locations. Do you have any comments or predictions for what we'll see from LEO/MEO technologies once the planned satellites and their infrastructure is up and running?

Ray Powers: I can only comment as one with an outsider understanding of satcoms technology, but rather as a partner surrounded by such people. We think the LEO/MEO constellations are going to become something of a necessity in the near future. Perhaps inside of five years?

Effective commercialisation of LEO delivering broadband to all areas across the globe seems to be the primary goal of this technological movement. Bringing a level of connection to people that have never benefitted from it before, and delivering a greater degree of informational awareness, education, and quality of life.

I also believe LEO will affect the financial sector, which will no doubt take advantage of the faster connections constellations offer. We're not far from instantaneous connections, and when you apply that to world markets, combined with automated systems that can think and respond faster than people can, I think you'll see finance really evolve. That, in turn, is likely to fuel the commercialisation of the technology into other areas, driving access elsewhere.

Technological turnover and generational jumps are faster now than they've ever been before, and as a large, cutting edge industry, satellites are at the forefront of change.

Question: With the growing threat of climate change, conditions in extreme environments are becoming ever more unstable. As a company well placed to provision for those demands, do you have any thoughts about the increasing urgency to future-proof for an uncertain tomorrow?

Ray Powers: Again, I'm afraid my thoughts are outside of the appropriate sphere of knowledge, but I think corporations now are quite green-minded, and certainly looking in positive directions to be more sustainable.

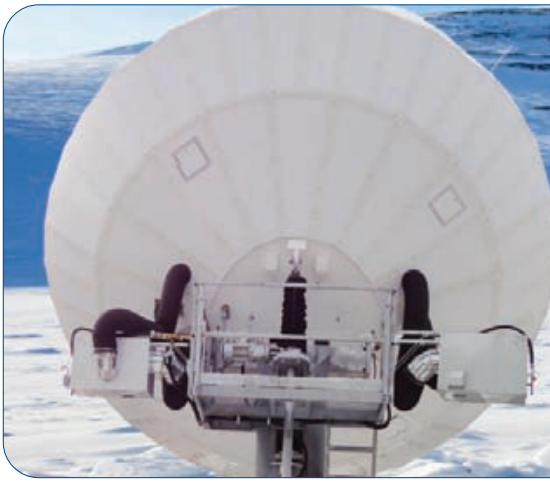
As the climate changes, new markets will develop amid groups serving areas hit the hardest by temperature shift in the proceeding decades.

Temperate areas will become arid, and colder areas will become more liveable. That means countless satcom groups are going to need to sit up and start paying attention to temperature controlling their installations.

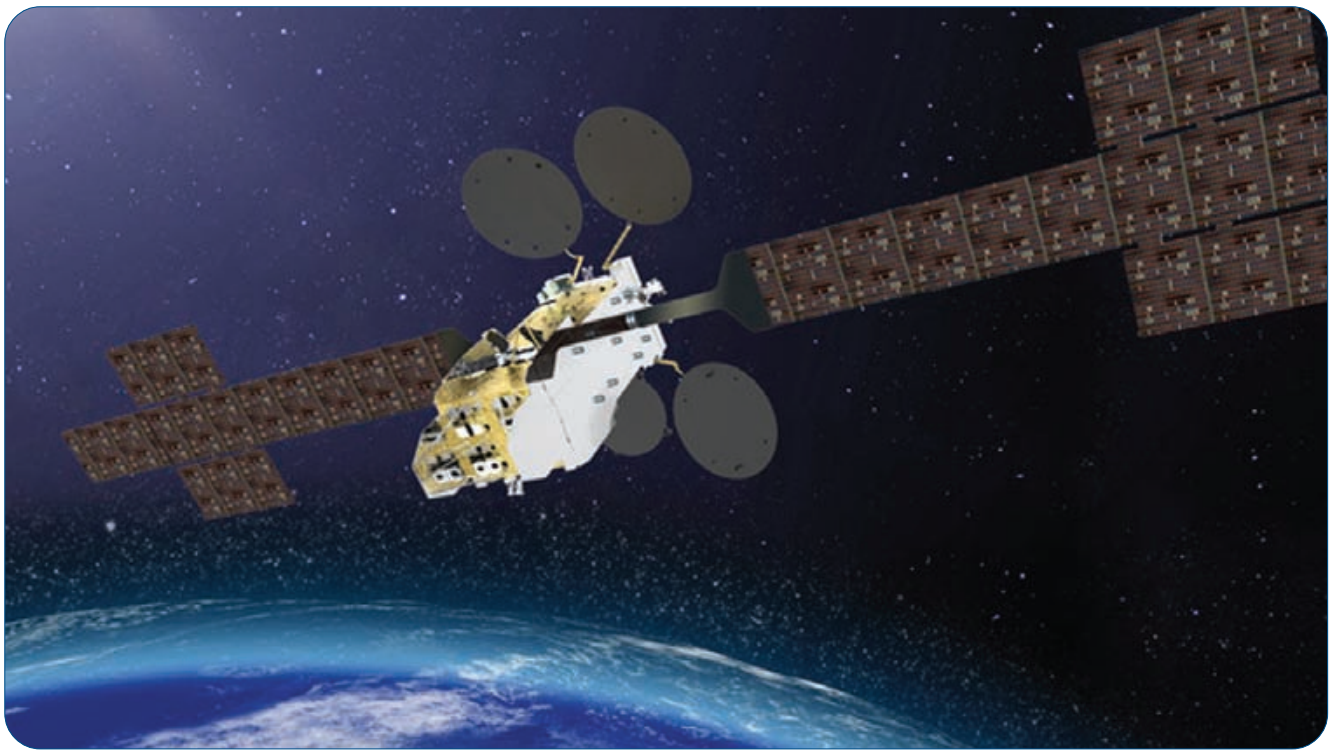
No one can predict the future, but we can look at the past, and see how we adapted to scary new circumstances back then and apply that same culture to the challenges we face today. It's taken us some time to understand how to be responsible custodians of the Earth, but I think we have much of the information we need now, and many industries are well aware of it, they just need to put it all into practice and make it fit with the economy we have.

More widely, the satcom industry is a world where I believe the human benefit uniquely outstrips the environmental cost in terms of power and uptake of land. In that regard, they have a good foundation for carbon neutrality, a more optimistic one than countless more harmful industries, combined with an essential and wonderful human benefit in connectivity.

This is a topic we like to follow quite closely so that we can better adapt with it, which is a perspective Walton possess regarding all evolving trends in this industry. ■



Plenum rear snow device. Photo courtesy of Walton De-Ice



Artist's rendering of KONNECT VHTS

High throughput goes Very High

High throughput satellites (HTS), a 21st century advent, have brought a major change to so many sectors, from maritime and inflight connectivity through to consumer broadband and government connectivity applications. Lower capacity pricing from HTS technology has opened up satellite communications to many end-user markets, with the next generation of very high throughput satellites (VHTS) set to take this even further.

Amy Saunders, Editor, Satellite Evolution Group

When it comes to large communications satellites in geostationary orbits, we've seen a great deal of change since the turn of the century.

First came the high throughput satellites (HTS), which provided up to 20 times more capacity than their predecessors. Indeed, when ViaSat-1 was launched in 2011, its 140Gbps of capacity was greater than all the other commercial satellites covering North America, combined, truly marking the start of a new era in satellite. What caused this huge leap in capacity capabilities was high level frequency re-use and spot beam technology, bringing with it significantly lower cost-per-bit. Naturally, a hugely popular notion among operators, service providers and end-users, the years to follow saw a huge influx of new HTS launched into orbit; alas, the once heralded game-changer of lower cost capacity saw a significant level of industry overcapacity in much of the world, leading to underused satellite transponders, fierce competition, and plummeting prices in the double digits in the years up to 2018.

According to Euroconsult's '*FSS Capacity Pricing Trends*' report, as the growth of satellite capacity on orbit has slowed in very recent years, pricing levels per MHz for regular capacity and per Mbps for HTS capacity have both stabilised at lower rates of decline and are projected to continue that trend through 2020. The report cites capacity pricing as low as US$800 per MHz per month for data applications in regions such as Sub-Saharan Africa, Russia, and Central Asia, and as high as $8,000 per MHz per month in important orbital hot spots for video broadcasting. Moreover, while the cost per Mbps for HTS capacity trended lower over 2019, demand for high-quality HTS capacity in certain bands and regions has exceeded supply, enabling stable pricing in those markets.

"The slowdown in supply growth has helped the market regain a certain degree of equilibrium with demand growth also contributing to the stabilization of pricing conditions underway today," said Brent Prokosh, Senior Affiliate Consultant at Euroconsult. "Pricing ranges remain highly dispersed, although convergence in pricing levels for regular Fixed Satellite Services (FSS) capacity and HTS bandwidth for data applications has been observed."

Although the double-digit pricing declines up to 2018 are now rare and limited to several localised markets, Euroconsult projects that the current pricing stabilization is likely to be short-lived for data-oriented applications as a massive volume of attractively priced supply from Very High Throughput Satellites (VHTS) and Non-Geostationary-Satellite Orbit (NGSO) constellations currently under construction, is

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expected to enter service in 2021.

NSR's *'VSAT and Broadband Satellite Markets, 18th Edition'* report concurs with Euroconsult's assessment of upcoming market pricing, with new technologies across all segments and new business models leading to a chaotic and game-changing ecosystem development.

"Prices are likely to drop further with the influx of VHTS and non-GEO HTS platforms, during the period 2021-2023, unlocking price elasticity across different applications. With falling capacity pricing, it becomes critical for operators to invest in the right strategy for consistent growth," said Vivek Suresh, NSR Analyst.

Indeed, not satisfied with the still-new HTS technology, several key players are now looking ahead to the next big thing: Very High Throughput Satellites (VHTS) or Ultra High-Density Satellites (UHDS), with the first already recently orbited. With even more expected for launch in the next three years, the jury is out on the near-future stability of the satellite sector.

The world's first VHTS

On 27 November 2019, Inmarsat launched the first VHTS on board an Ariane 5 launch vehicle. GX5, the fifth satellite in its Global Xpress (GX) fleet, is scheduled to enter commercial service early this year. It will deliver additional, focused capacity over Europe and the Middle East to meet the ever-growing demand for reliable, seamless, high capacity broadband services.

Built by Thales Alenia Space, GX5 will have a particular focus on aviation passenger Wi-Fi, the commercial maritime market and meeting growing government demand. The all-electric satellite features 72 Ka-band beams and will deliver more capacity into the region than the existing four satellites in the Global Xpress network (GX1-GX4) combined provide worldwide. Over the next four years, this new satellite will be joined by a further seven advanced GX payloads, which represent unprecedented enhancement in overall capacity and capabilities of the GX network; the world's first and only globally available, seamless mobile broadband network.

"I am delighted to confirm the successful launch of GX5, the next exciting step in the story of Global Xpress, which has already become the gold standard of worldwide mobile satellite broadband," said Rupert Pearce, CEO, Inmarsat. "This marks the first of eight launches in the coming four years that will grow our world-leading services to meet rapidly-expanding demand, connecting people around the world to reach their full potential. GX5 will also continue to ensure that Inmarsat's thousands of Global Xpress customers remain at the cutting-edge of global connectivity technologies as their needs evolve."

Inmarsat GX5 launch. Photo courtesy of Inmarsat

VHTS in the works

Eager not to be left behind on next-generation satellite technology, a handful of the biggest satellite operators are also expecting their inaugural VHTS in orbit in the very near future.

Building on its recent success with HTS KONNECT, launched in January this year, Eutelsat is set to launch the KONNECT VHTS satellite, currently under construction by Thales Alenia Space, in 2021, and enter service in 2022. First announced in 2018, the next-generation VHTS satellite will support the development of Eutelsat's European fixed broadband and inflight connectivity businesses. With 500Gbps of Ka-band capacity, KONNECT VHTS will embark the most powerful on-board digital processor ever put in orbit, offering capacity allocation flexibility, optimal spectrum use, and progressive ground network deployment. The project will be launched with firm multi-year distribution commitments from Orange to address the fixed broadband market in Europe, and Thales, a distribution partnership which will serve notably the government connectivity services market.

"We are delighted to sign this agreement with global partners, Orange and Thales, which confirms the place of satellite-based solutions in the drive for enhanced high-speed internet coverage. As a core complement to terrestrial broadband networks, high-speed broadband will be a critical driver of Eutelsat's growth from 2020 onwards," said Rodolphe Belmer, CEO of Eutelsat. "Over the next decade, VHTS satellites will bring enough capacity to serve high speed Internet and inflight connectivity markets at scale, offering fibre-like services both in terms of price and speed."

Meanwhile, Indonesia's Ministry of Communication and Information Technology (Kominfo) selected a consortium led by domestic satellite operator Pasifik Satelit Nusantara (PSN) back in July 2019 to deploy and operate a broadband telecommunication VHTS. PSN has formed Satelit Nusantara Tiga (SNT) to be the operating company to carry out the project.

The consortium awarded Thales Alenia Space with the design and manufacture of the satellite, dubbed SATRIA. Acting as prime contractor, Thales Alenia Space will deliver the all-electric VHTS satellite fitted with a fifth-generation digital processor (5G). The company will also oversee providing two satellite control centres (main and backup), the telecommand and telemetry stations, and the ground mission segment linked to the fully processed payload. In addition, Thales Alenia Space will put in place a complete training program for PSN engineers, some of whom will join the project team as residents in Cannes and Toulouse during the duration of the program. The full Ka-band SATRIA satellite will carry more than 150Gbps of capacity over the full Indonesian territory. Dedicated to bridging the digital divide, SATRIA will connect around 145,000 areas including 90,000 schools, 40,000 hospitals and public buildings, as well as regional government sites not linked by existing satellite or

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terrestrial infrastructure. SATRIA is expected to be launched in the fourth quarter of 2022.

"We are particularly honoured to provide to PSN for Kominfo its first VHTS telecommunication satellite which will be the most powerful one over the Asian region," said Jean Loic Galle, CEO of Thales Alenia Space. "SATRIA will take benefit of all the expertise already developed by Thales Alenia Space on its Spacebus NEO platform as well as on its VHTS payloads."

Selecting a different manufacturer is Hughes Network Systems, which in 2017 announced a new contract with Space Systems Loral (SSL) for the construction of its next-generation JUPITER Ultra High-Density Satellite (UHDS), EchoStar XXIV. The new satellite will target key markets across the Americas, including the USA, Canada, Mexico, Brazil, and other South American countries, and will grow the Hughes Ka-band capacity in the region by two or threefold. Powered by the next-generation JUPITER System, EchoStar XXIV will provide speeds up to 100Mbps, providing new capacity to a wide range of services sectors, including consumer, enterprise, aviation, cellular backhaul and community Wi-Fi, upon its early 2021 launch.

"We are happy to once again partner with SSL in raising the standard for innovation in broadband satellite technology and services," said Pradman Kaul, President at Hughes. "With EchoStar XXIV/JUPITER 3, our satellite fleet will deliver unmatched performance, coverage and speeds, powering continued growth of HughesNet – which today serves 60 percent of the market for high-speed satellite Internet in the Americas."

Taking a different approach to the Thales Alenia Space Spacebus NEO platform used by other operators is SES, which in 2017 announced the addition of a powerful Digital Transparent Processor (DTP), the SpaceFlex VHTS DTP, on board the SES-17 satellite. The next-generation fully digital payload was jointly optimized by SES and Thales Alenia Space, and will cover North America, South America, Central America, the Caribbean and the Atlantic Ocean. SES-17 is expected to be delivered in 2020 and operational in 2021.

Equipped with close to 200 spot beams of mixed sizes, SES-17 will provide mobility customers with an unsurpassed ability to efficiently and flexibly modify their networks in real time in response to changing bandwidth demands, either on a daily schedule or in response to unanticipated changes such as weather. This harmonisation of management of services and optimization of service quality will enable customers to deliver high-speed broadband in a more efficient and cost-effective manner. Other added capabilities made possible by the addition of the SpaceFlex DTP include; improved ability for SES and its customers to implement mesh, broadcast, and multicast network configurations; improved efficiency in throughput and bandwidth use resulting in greater price competitiveness; and new redundancy features that will deliver reliable and robust networks that are essential in today's highly competitive markets. Indeed, SES-17's anchor customer, Thales InFlyt Experience, will enjoy enhanced flexibility and efficiency to deliver industry-leading speed and capacity to support passengers' growing connectivity demands.

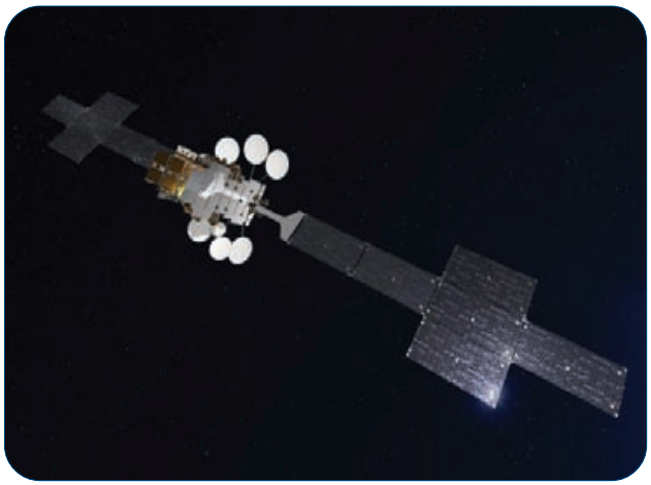
"Consumption of data has evolved dramatically over the years and will continue to do so. Our first geostationary Ka-band satellite with this next-generation DTP is a keystone in SES's unique satellite architecture. It is designed to provide unrivalled flexibility in terms of capacity allocation so that our customers' connectivity needs of tomorrow are fulfilled," said Martin Halliwell, Chief Technology Officer at SES. "Through Thales Alenia Space's expertise, we are excited to be providing a satellite that will deliver seamless connectivity of unmatched performance for our customers."

Also taking an alternative route is Viasat, which is working on a constellation of three VHTS. The ViaSat-3 network will comprise three ultra-high capacity satellites and complementary ground infrastructure. The first ViaSat-3 satellite will provide service to the Americas (due for launch in 2021), the second will cover Europe, Middle East and Africa (due for launch 6 months after the first), and the third will deliver service to the Asia-Pacific (due for launch in 2022). Each ViaSat-3 satellite is expected to offer over 1Tbps of total network capacity to deliver a global broadband network with enough bandwidth to deliver affordable, high-speed, high-quality Internet and video streaming services. The ViaSat-3 constellation is anticipated to have approximately 8x the capacity of Viasat's current satellite fleet combined.

When fully-optimized, Viasat's global constellation will be able to dynamically move bandwidth around the globe to where demand exists, in order to: Bring affordable satellite-enabled community Wi-Fi to the billions of unconnected people in emerging markets; support thousands of commercial, business and senior leader government aircraft with hundreds of Mbps of data for advanced inflight entertainment, connectivity and streaming services; provide up to 1Gbps speeds for use in enterprise applications, comparable to ground-based fibre network speeds; enable US and Five Eye militaries to leverage artificial intelligence and cloud-based and applications over a highly-resilient, assured network at the tactical edge; and deliver 100+Mbps speeds for residential Internet and voice over internet protocol (VoIP) services.

"The innovations in the ViaSat-3 system do what until now has been impossible in the telecommunications industry – combining enormous network capacity with global coverage, and dynamic flexibility to allocate resources according to geographic demand," said Mark Dankberg, Chairman and CEO, Viasat.

Unlike the other upcoming and existing VHTS, Viasat is building its own payloads at its manufacturing facility in Tempe, Arizona, using Boeing's modular structures and satellite chassis. Boeing is also integrating the payloads. ■



SES-17. Photo courtesy of Thales Alenia Space/Master Image Programmes

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On the eve of the NewSpace boom

Comtech EF Data is a leader in satellite bandwidth efficiency and link optimization technology, providing ground equipment deployed globally to support mission-critical and demanding applications for government, mobile backhaul, premium enterprise and mobility. The company has recently performed several acquisitions, expanding its capabilities at the eve of the NewSpace boom. Lou Dubin, Senior Vice President, Product Management and Marketing for Comtech EF Data talks about their strategy at this critical juncture.

Lou Dubin, Senior Vice President, Product Management and Marketing for Comtech EF Data

Laurence Russell, News and Social Editor, Satellite Evolution Group

Question: What's the latest from Comtech EF Data?

Lou Dubin: The most obvious announcements are that we've agreed to venture into purchasing Gilat and UHP, both of which are VSAT ground segment electronics manufacturers. We've also agreed to buy CGC Technology, an XY antenna manufacturer focusing on specific antenna needs that would be required of MEO and LEO constellations as well as telemetry and control tracking.

Comtech EF Data has also released new capabilities and products within the Heights Networking Platform product portfolio. We are introducing a new TDMA waveform which is quite unique in that it breaks the traditional concepts of TDMA capabilities – our system will allow customers to seamlessly move between TDMA and H-DNA waveforms enabling the best fit access scheme for the application.

This will enable our customers to address highly oversubscribed networks, as well as networks that require high capacity, low latency/low jitter while using the same hardware and platform.

It has been a very busy time for Comtech. We are excited about both our acquisition portfolio and our product development programs.

Image courtesy of Comtech EF Data

Question: Famously, the Heights platform can allow users to switch between H-DNA and TDMA connections. As the 5G revolution speeds up, how does Comtech EF Data's best of both world's solution benefit users at the cutting edge?

Lou Dubin: The benefit of being able to seamlessly switch between TDMA and H-DNA is a significant breakthrough for the satellite community. We are enabling networks and our customers to support a wide variety of traffic profiles without the concern and risk of supplying hardware that is improperly suited to the end use demands. Other VSAT terminal manufacturers can offer their customers the up-front choice of oversubscription or efficiency, but we are providing our users with a single platform that can accommodate both without the need to exchange hardware or turn the network down to change profiles. Our system will transition dynamically, on the fly without user intervention to accommodate the traffic profiles as they change.

We are offering flexibility that changes conventional network planning. We are removing the time and money involved when a network is designed with improper or unknown traffic planning. We are enabling our customers to minimise site visits, hardware exchanges and downtime. All of which has a significant impact to our customers finances and the end user experience.

Another significant improvement of our TDMA offering is the ability for each site to burst traffic at its best fit return modulation and coding (MODCOD). Our TDMA carriers aren't static in terms

WALTON DE-ICE

Portable Radome

New LEO / MEO Design

The **Portable Radome** makes satellite networks more survivable and deployable into extreme and harsh environments. Protect transportable antennas and equipment from, snow, ice, burning sun, sandstorms, torrential rains, up to 85 mile-per-hour winds, and more.

- Single-person setup in less than an hour — conventional radomes can take days.
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Walton Ka-Band Advantages

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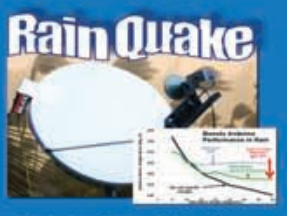
Sheds off snow before ice forms. Huge — up to 100 X — energy savings compared to conventional systems. 0.6 to 6.3 meters.



Minimize Signal Loss due to Rain Fade. Reduce data loss — by 20X or more.

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MODCOD selection. Historically, TDMA carriers require every site that's participating on that carrier to run at the exact same user throughput MODCOD. The only elasticity was how many timeslots the site was given or which TDMA carrier to join. Our TDMA carriers enable every site to transfer data at the highest throughput capacity it can attain.

TDMA systems today only accommodate for a narrow range of signal to noise quality. Our TDMA platform enables all of our 37 MODCODS available in our H-DNA return access scheme to be used, giving our users 17dB of range and enabling the widest trade-off between efficiency and carrier quality of any VSAT system today.

We offer nearly the same level of efficiency for our TDMA waveforms as we offer with our H-DNA.

This makes our TDMA access scheme truly revolutionary. Whether you're enabling 5G or enterprise communications, our connections and throughput are going to give our customers the edge in terms of overall user capacity available for dollar spent.

Question: This kind of innovative application of a return waveform is remarkable and seems to set Comtech EF Data apart. Are these kinds of technical tricks which squeeze efficiency out of your technology common for EF Data?

Lou Dubin: If there's one thing we're known for, it's always trying to squeeze efficiency out of our products. With Comtech, we've certainly made efficiency our speciality. We always strive to provide the best solutions we can for our customers.

As an example, we recognised that we needed to address customers with low-rate traffic profiles servicing terrestrial or mobile network operation restoration services where they might have many primarily idle sites. When restoration services are needed and a terrestrial connection has been compromised, these services need to go over satellite. It is similar to going from park to top speed in an automobile, which can be very demanding for conventional technology to accommodate.

We are enabling our customers to rapidly accommodate traffic profile changes. That's just one example of how we're still innovating, providing the best that we can for our customers.

Question: The world of data security is an ever-evolving frontier. As a company that sells to defence markets, how does Comtech connectivity ensure data security?

Lou Dubin: This is a question with many different answers for many different users. It's very relevant, but it's broad enough that it's hard to give a generalised answer. Comtech has delivered a vast set of security features in all sorts of ways over the years.

We offer a wide portfolio of products, some of which have specific access to certain security features. Other features are more generic. The balance is to offer the best security capabilities while trying to ensure the majority of our consumer base will have access to them. We want to offer multiple levels of security while not alienating customers due to export controls.

We offer encryption from low-level triple DES or AES128 up to NIST certified protection, the standard used by many United States Department of Defence (DoD) organizations.

Question: Some NewSpace executives have previously stated that ground station technology is lagging behind the level of sophistication in satellites. As a supplier of the ground segment, do you think that's true, and if so, how do you think the industry can close that gap?

Lou Dubin: I am sure I have explicitly made this remark before, and I'm glad

Comtech Heights and modems. Photo courtesy of Comtech EF Data

you've asked this because I'd like to clarify my position on the topic.

I think it's quite accurate that satellite-based technology has been hugely innovative. Satellite modernization has made large strides in improving spacefaring infrastructure. This can make it seem like ground segment is lagging in a technological sense.

By comparison, it may appear that many ground segment suppliers seemingly advertise minor evolutions in technology. As we look through the proverbial warzone of new satellites, constellations, and launches, what's missing is the financial impact.

If the ground segment is seen as technically lagging, it illuminates the fact that our industry is an ecosystem. Advancement and investment in satellites cannot benefit the community without similar investments and advancements in the counterparts to that infrastructure.

The large-scale funding of complex constellations must be matched with funding of the ground segment. It's common to hear of multi-billion-dollar companies and governments investing in new satellites.

The same cannot be said about the infrastructure needed to communicate with these increasingly sophisticated systems.

Compounding the issues on the ground is the fact that new constellations don't necessarily have a lot of uniformity. Manufacturers are having difficulty re-using their technology due to the difference in constellations. You're not able to leverage what you've developed for one constellation on the next.

Industry tends to thrive when it achieves an equilibrium, and with the high-speed cycles we're seeing in the world of NewSpace, that symmetry is under pressure.

Question: Several leading satcom developers take pride in working closely with their clients and partners to understand their needs as closely as possible, and even list that practice as the secret of their success. What's the nature of Comtech EF Data's working relationships?

Lou Dubin: In this business, we must work together. If we want our customers and operators to be successful, we must collaborate in terms of expected price point and capability.

Comtech is having those sorts of conversations with the owners of the constellations, operators and the end users we support. We cannot be successful without the proper level of integration and communication between the ground segment, satellite operator, and end customer. We are in communication with our partners and customers more than ever to collaborate on the collective goal of how our companies can each benefit one another.

Question: What are Comtech EF Data's primary goals going forward?

Lou Dubin: I think we'll be quite busy with mergers while focussing on bringing the best concepts and products to market in a comprehensive package as quickly as we can.

We will be in a unique position in terms of engineering resources and we will need to focus our efforts on the platforms and solutions where we believe we can bring value. We will need to assess the market's overall demand and direct resources accordingly.

We believe in the industry, and we're eager to address the issues set before us to forge forward toward the best landscape for everyone. That's what Comtech's always been about, and you can expect more of the same going forward. ■

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COVID-19: Space segment impacts

It's only been a few months since the first mumblings about a novel coronavirus reached us from the Far East – with many opining that it would never reach us, and later as it did, that it was merely a mild flu. Things have since kicked into overdrive, with many counties going into lockdown of one sort or another. The short, medium, and long-term impacts on the space segment, or any other for that matter, are yet to be understood.

Amy Saunders, Editor, Satellite Evolution Group

It would be remiss of us not to address the elephant in the room currently plaguing consumers, governments, militaries, and businesses across the globe.

A novel coronavirus, first detected in Wuhan, China in November 2019, has spread across the globe, wreaking havoc in its wake. The new SARS-CoV-2 coronavirus, belonging to the same family as SARS and MERS, inflicts a whole host of unpleasant symptoms upon most victims - some show no symptoms at all - in the form of COVID-19 disease, which carries a reported mortality rate of 3.6 percent (much higher than the 0.1 percent for seasonal flu). COVID-19 deaths are notably higher among at-risk groups including the elderly and anyone under 70 with a pre-existing condition which, in the UK, renders them eligible for the annual flu vaccination for free.

Methods of transmission are thought to be through respiratory droplets such as coughs, sneezes, heavy breathing, etc. Transmission rates per infected person are the subject of much debate; most reports state that each infected person can infect 1-3 more people, making SARS-CoV-2 much less contagious than SARS or MERS, however, media reports of 'super-spreaders' who have infected tens of people each are muddying the water. The onset of symptoms typically takes 2-14 days after exposure, meaning infected people can carry the virus with them far and wide without even knowing they have it.

On 11 March, the World Health Organisation officially declared the 2019-2020 coronavirus outbreak a pandemic. Countries, provinces, and states across the world rapidly went into lockdown in response. In the UK, a reluctant lockdown commenced on Friday 20th March as a result of the refusal of much of the populace to adhere to social distancing guidelines. In the weeks and months to come, we will see whether these draconian measures are effective in 'flattening the curve.'

Space sector fallout

With COVID-10 spreading far and wide throughout the world, global financial markets have exploded with activity.

More than eight years of gains on the FTSE 100 were wiped out in March, and the British pound fell to a 35-year low. The Dow Jones industrial average of 30 leading US company shares fell by more than 20 percent from its previous peak in just over 20 days, outstripping the speed of the slide

during the 1929 Wall Street crash. The US Federal Reserve cut rates to almost zero, and the Bank of England cut base interest rates to 0.1 percent and promised £200 billion of quantitative easing.

Despite some government spokespeople claiming that once lockdowns and restrictions are eased the world over the economy will spring back to life, many believe we will be looking at a true global recession, and one which we will be paying for over the rest of our lives.

The financial impact on the satellite sector came quick and sharp.

Back in March, NSR reported an alarming 35-50 percent decline in stock prices for SES, Intelsat, Eutelsat and ViaSat in just over one month. NSR 'believes the overreaction by markets calls into question the long-term strategy adopted by several publicly listed operators.' With satellite capacity becoming increasingly commoditized, consistently reducing contract backlogs and low product differentiation, investors have been hard pressed to find unique business cases. The impact of SARS-CoV-2 is expected to be felt for at least another 2-3 quarters due to demand erosion in aviation, cruise and oil and gas sectors, among others.

Indeed, April saw Eutelsat release a trading update in which the company asserted that its activities are 'highly resilient' in light of the coronavirus threat, assisted by a substantial backlog (Euro4.3 billion as of 31 December), long-term contracts and the fact that broadcast accounts for more than 60 percent of its revenues. Eutelsat acknowledged a limited financial impact amongst the occasional use (~one percent of group revenues), mobile connectivity (six percent of group revenues) and fixed broadband (six percent of group revenues) verticals during the third and fourth quarters of the financial year and through to 2021. The company also expects its EUTELSAT QUANTUM satellite launch and EUTELSAT KONNECT ground gateway deployments to be delayed.

Meanwhile, the ACCESS.SPACE Alliance, which represents the small satellite sector and its stakeholders, highlighted its concerns on the effects of the current crisis for its members and the wider space ecosystem:

- Cash flow constrains, lack of resources to fund operations, difficulties in accessing finance, reduction of customer orders, revenue losses and/or lack of visibility about the consequences of the crisis, with a disproportionate impact for start-ups and SMEs , which are at risk of business interruption or even bankruptcy due to the new crisis.
- Delays or difficulties in terms of workforce availability, supply chain disruptions, manufacturing, launches, with sometimes risks of financial penalties.
- Delays in research, development, and innovation (RD&I) projects and operational problems to join, participate or continue such projects.
- Delays or difficulties in terms of networking, contract acquisition and business development due to restrictions in terms of mobility, flight cancellations, travel restrictions and prohibitions of conferences and other events.

ACCESS.SPACE also noted that, due to the ongoing SARS-CoV-2 crisis, global telecommunications networks have been facing unprecedented strain leading to data speed disruption and service level degradation at a time when connectivity is critical to keep the economy running, inform and educate the public and coordinate the battle against the virus. It's only a matter of time before we see major outages, either from congestion or unavailability of staff or spare parts, perfectly exemplifying the need for more disaster-resilient networks like those satellite can deliver.

With such an unprecedented threat, it's entirely natural that our everyday lives have changed irrevocably. The majority of businesses at this stage have reduced their operations down to essential staff only, working remotely from home wherever possible, or else placed workers on furlough.

Satellite launch schedules are taking a hit, with many delays reported so far. The French Government's measures required the Guiana Space Centre to suspend activities for more than one month in March-May, effectively halting Arianespace's launch campaign – what a way to mark 40 years of activities.

Meanwhile, following the early closure of the Satellite 2020 event, other key satellite sector events have either been postponed e.g. ConnecTechAsia, CABSAT, Small Satellites Conference, Space Tech Expo - and at this point, no one knows whether the new postponed dates will go ahead either - or cancelled entirely for the year e.g. 2020 NAB Show, AIAA Defense and Security Forum.

In the absence of any and all events for the foreseeable future, quite a number of organisations are launching a whole host of online content to keep members engaged, collaborating, and keeping open any opportunities that remain accessible. For example, the Satcoms Innovation Group (SIG) has announced a range of online content including discussion-led webinars, member spotlight videos where they can present their latest innovations, and a new YouTube channel, SIG Educates, which it hopes will become a useful educational resource for children and students.

Moreover, we have already seen the first casualties within our sector.

In March, OneWeb filed for bankruptcy and put its business up for sale. To date, the company has launched 74 satellites as part of its constellation, secured valuable global spectrum, begun development on a range of user terminals for a variety of customer markets, has half of its 44 ground

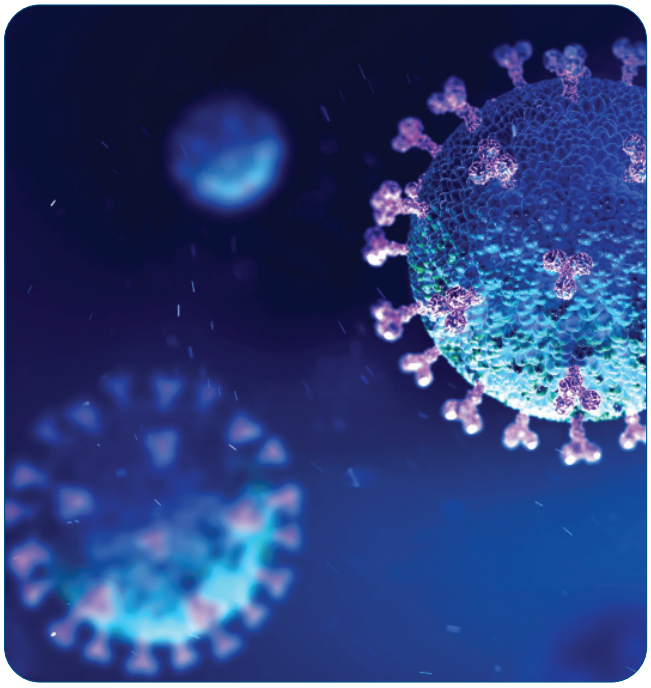

Photo courtesy of Shutterstock

stations completed or in development, and performed successful demonstrations of its system with broadband speeds in excess of 400Mbps and latency of 32ms. OneWeb had been engaged in negotiations for further investment to see if through its deployment and commercial launch phase, however, progress stalled 'because of the financial impact and market turbulence related to the spread of COVID-19.'

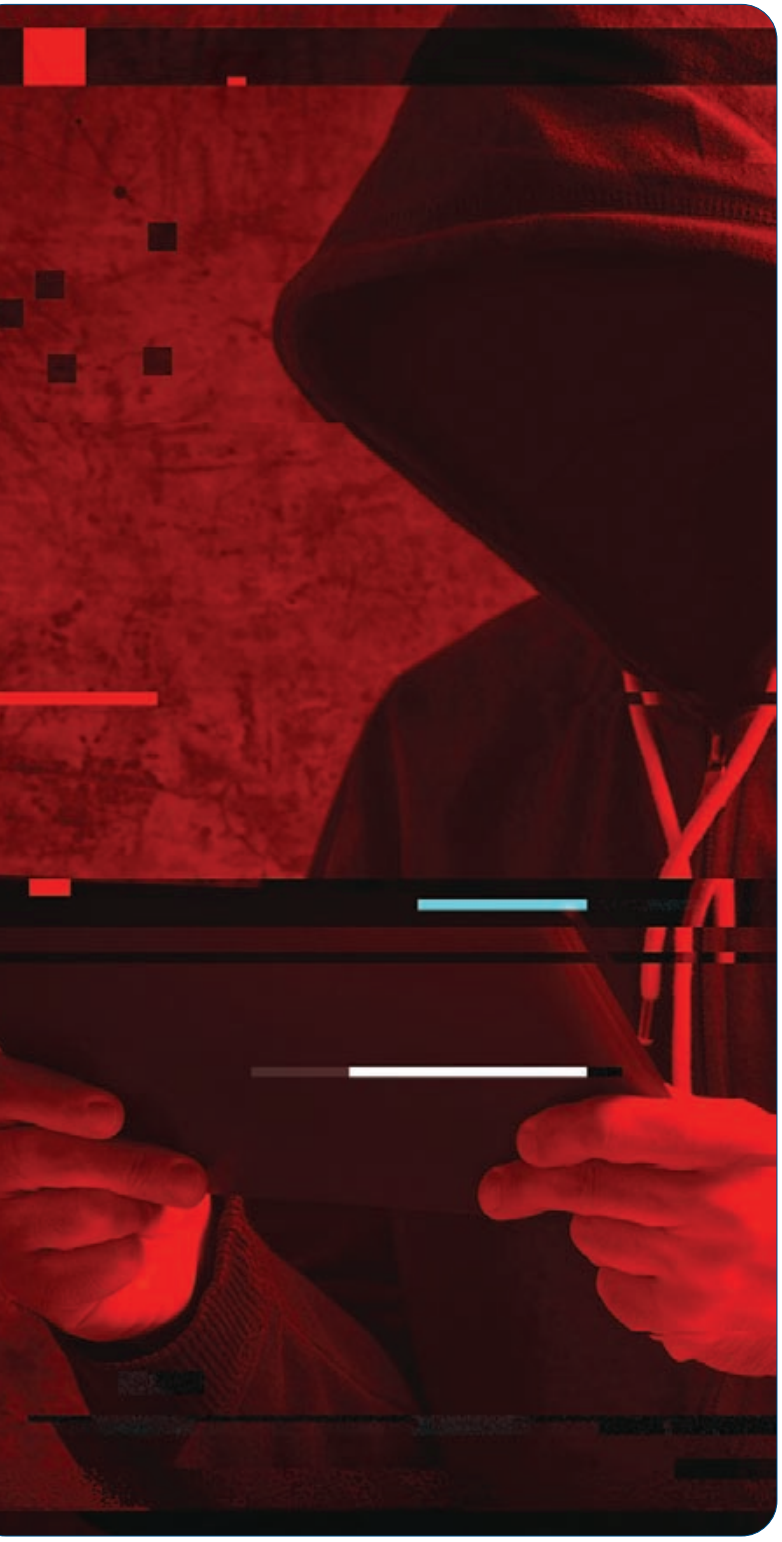

Photo courtesy of Shutterstock

Cybersecurity threats

The novel coronavirus isn't only a significant threat to the nation's health and economy. Several entities have highlighted the growing cybersecurity threats now facing us as unprecedented numbers of the workforce work from home.

GTMaritime has warned of a 'new and highly unpredictable threat as scammers line up to exploit fears.' Unsolicited messages designed to exploit anxieties around the pandemic have been sent far and wide, including a trojan campaign specifically targeting Italian email addresses identified by Sophos back in March. The phishing email came with an attached Word document that claims to contain advice on how to prevent infection – but is in fact a Visual Basic for Applications (VBA) script that drops a payload to steal confidential information. Other coronavirus-based scams include websites selling bogus products, donation requests allegedly for victims or vulnerable people funds, and the delivery of malicious email attachments designed to spread malware or steal log-in details.

"As organisations ramp up physical hygiene, it is important they don't take their eye off cyber-hygiene," warned GTMaritime's Jamie Jones, Operations Director.

The United States' Cybersecurity and Infrastructure Security Agency (CISA) has issued high-level guidance to help organisations plan for physical and virtual impacts to their workforce and operations. As well as reviewing business continuity plans for infrastructure, supply-chain, and workforce impacts, CISA suggests that all organisations should conduct recurrent assessments of preparedness. Above all, its advice envisages all machines having properly configured firewalls plus anti-malware and intrusion prevention software installed.

Veridium CEO James Stickland has also gone on record stating that "COVID-19 is now posing the largest-ever cybersecurity threat of recent times." With millions of employees now working from home, the challenge to keep as many business-critical functions running as possible while maintaining adequate security is well and truly on. Phishing attacks had risen an unprecedented 667 percent in the UK by March compared to February as malicious actors trick users via fake coronavirus alerts.

Many, like Stickland, believe that "the way the world works will change after this – individuals and businesses will rethink their priorities. Flexible working will be more accepted, security will matter more, and relationships will matter more. In the same way it takes a cyber-breach to invest in improving security, this pandemic will make a number of businesses overhaul their remote working strategies."

All in it together

Companies started to rally wherever possible soon after the full threat of COVID-19 began to emerge. The following list comprises just a few of those companies that have come onto our radar:

- Scotland's launch company Skyrora took the decision to start producing face visors using its 3D-printing facilities and up to 10,000 250ml bottles of hand sanitiser per week, according to WHO guidelines. Skyrora has now fully re-focused all its UK operations and has invested all human resources and working capital to help tackle COVID-19 in response to the UK government reaching out to businesses for support.
- Additive manufacturing company CRP Technology has

manufactured in-house several functional prototypes of emergency valves for reanimation devices and link-components for emergency respiratory mask for assisted ventilation. For the manufacture of both types of components, CRP Technology's Rapid Prototyping Department has used the High-Speed Sintering (HSS) 3D printing technology and the Windform P1 isotropic material. The Charlotte Valves have not been certified and their use is subject to a situation of mandatory need.

- In support of businesses and schools across Australia, Optus is offering additional data to existing clients in order to help the transition to remote working and learning.
- VuWall is partnering with frontline organisations by offering its VuWall2 visualization tool as a free download, enabling organisations to create a temporary video wall solution. Managing workflow information in times of disaster is no easy task, and the VuWall2 tool can be utilised to transform any screen into an emergency control centre or waiting room.
- Inmarsat has formalised a 20 percent discount for crew voice calling services for up to 40,000 ships through June end in order to reduce the impact on seafarer wellbeing during the crisis. The company is also ensuring that calls made to the SeafarerHelp service provided by welfare organisation ISWAN are available free of charge. Additionally, Inmarsat is working with partners to provide a free COVID-19 video call service with a trained healthcare professional. In further news, Inmarsat has pledged to provide further enhanced support to the vital aid and NGO sector during the pandemic. New initiatives will ensure emergency responders can continue delivering critical aid and relief. They include enabling Inmarsat's BGAN Link plan for usage globally so that the normally static, geo-specific service can offer organisations the capability to operate cost-effectively and without complexity within a wider geographic range as they carry out their vital operations. Inmarsat will also offer steep discounts on its BGAN Pro Plan and to Isatphone 2 pre-paid users.
- Marshall Aerospace & Defence Group is exploring the technical aspects of a new scheme in which a body of British scientists, clinicians, academics, manufacturers, and engineers working to develop an alternative model of ventilator, dubbed exovent, to help equip the NHS.
- Three UK has launched zero-rating on NHS video consultations provided by Attend Anywhere so that customers can attend virtual outpatient appointments without eating into their data allowance. In response to COVID-19, the NHS has been undertaking a rapid rollout of video consultations via Attend Anywhere in England, Scotland, and Wales to help reduce face-to-face outpatient appointments in NHS hospitals.
- Marlink has launched 'StrongerTogether,' which comprises a broad range of airtime packages and application solutions to support its customers in the maritime, fishing, and offshore industries. The initiative includes connectivity packages such as additional data top-ups, increased bandwidth and free or discounted voice minutes for ship operators to keep the crew onboard connected with their families as well as solutions to enhance remote IT beyond connectivity during the crisis.
- Dejero is providing various support options to broadcasters and public safety bodies that need to create and deliver reliable, high-quality live content or communications during the current crisis. This includes providing complimentary access to its LivePlus mobile app which allows broadcasters and contributors to create and deliver high-quality live video back into the broadcast workflow through to September end.
- SES and OptimERA Inc have significantly expanded the capacity of Unalaska's city-wide WiFi for residents, businesses, schools, healthcare clinics and other organisations to enable more remote working and operating under Alaska's 'Stay at Home' guidance.
- Virgin Galactic has signed a Space Act Agreement with NASA which outlines its commitment to developing innovative solutions to the problems facing healthcare workers on the frontlines. Innovations to date include the development and testing of the PPB Hood - a device designed to support those admitted with COVID-19 with portable oxygen-rich pressure chambers, reducing the subsequent need for ventilator intubation. Virgin Galactic, together with TSC, NASA, and the Antelope Valley Hospital team, has also been working on a separate project to develop and build negative pressure enclosures – specialist equipment that covers a patient on a gurney or hospital bed which protect medical staff by containing infected air and filtering it so that it does not contaminate the wider room environment.

Where it stops, nobody knows…

Sadly, we are very much just coming into the thick of this pandemic, and the long-term impacts will remain unknown for many years to come. Certainly, economies across the globe are going to take a hit unheard of since the Spanish Flu in the early 1900s, and a great many companies are likely to meet their end. With some luck, the satellite sector could escape with minimal overall job losses and perhaps some much-needed consolidation, since the technologies are so essential to everyday life.

And now, in some light relief, please turn your attention to my personal favourite coronavirus story so far: One Australian astrophysicist was reportedly admitted to hospital with not one, but several magnets stuck up his nose while trying to create a device that stops people from touching their faces – an apparently misguided attempt to be useful during isolation.

While procrastinating, the University of Melbourne's Dr Daniel Reardon clipped two of the magnets to his nostril "and things went downhill pretty quickly when I clipped the magnets to my other nostril," Reardon told *The Guardian*. With one magnet outside and one inside each nostril, Reardon removed the outer magnets only to find that the two inner magnets were stuck together deep inside his nostrils.

"After struggling for 20 minutes, I decided to Google the problem and found an article about an 11-year-old boy who had the same problem. The solution in that was more magnets. To put on the outside to offset the pull from the ones inside," Reardon explained to The Guardian. "As I was pulling downwards to try and remove the magnets, they clipped on to each other and I lost my grip. And those two magnets ended up in my left nostril while the other one was in my right. At this point I ran out of magnets."

After further failed attempts to remove the magnets with pliers – which became magnetised by the existing magnets, causing further pain – Reardon had the magnets manually removed from his nostrils in hospital. He is now focusing his efforts on home renovations instead. ■

Photo courtesy of GTMaritime

GTMaritime gives Rocktree a rock-solid platform for data transfer

Connectivity for offshore vessels is critical in the smooth and efficient operation of major businesses around the world. Floating terminal company Rocktree found itself with significant connectivity challenges and a need for reliable data synchronisation over multiple systems, which led the company to GTMaritime. Following a successful installation, Rocktree has now set its sights on much larger digital ambitions.

Keng Teen Phang, Regional Manager, APAC, at GTMaritime

With a fleet of six Offshore Floating Terminals (OFT), the Singapore-based transhipment company Rocktree specialises in the offshore loading of dry-bulk products from barges to bulk carriers at ports with draught restrictions and/or infrastructure limitations.

Essentially, an OFT performs the same functions as a permanent land-based terminal but this approach is considerably less capital intensive, quicker to design, construct and mobilise than a fixed terminal. And in an age of growing environmental concern, the OFT has a measurably smaller impact on local marine and coastal ecosystems, requiring limited or no dredging before opening for service.

Rocktree OFTs have allowed its clients to bypass the infrastructure challenges associated with ports in emerging markets. Even where infrastructure is not an issue, they provide a fast and cost-effective alternative to ports subject to draft restrictions. Currently, these floating terminals have some 30 workstations and services running onboard.

On board connectivity challenges

Rocktree relies on Office365 email and a host of enterprise-grade software for maintenance planning and compliance, safety and accountability in its operations. It is also exploring the possibilities of Internet of Things (IoT) solutions as it seeks to reduce downtime and maximise the productivity of its assets.

Yet, while its OFTs are moored close to the shore, they have often struggled to get online when using internet and WiFi services from land-based ISPs. This is largely due to the location and signal strength of the local communications infrastructure.

The problem was solved when Rocktree rolled out satellite based VSAT systems onboard its OFTs to handle data exchange across a VPN tunnel between its sites and its headquarters in Singapore.

However, the migration from patchy land-based telecoms to satellite brought its own set of challenges. For example, real-time data handshakes between the planned maintenance system did not work efficiently and the IT team often had to intervene and manually transfer data ashore. An in-house developed fix for the problem did not perform reliably enough

Photo courtesy of GTMaritime

for personnel to feel comfortable leaving the system unattended.

A successful communications solution

Rocktree's IT and technical teams set about researching the market for a more effective and lasting data communication solution, with recommendations from its own employees and trusted IT vendors resulting in a decision to implement a package solution from GTMaritime, comprising GTMailPlus, GTSentinel Antivirus and GTRAFT. The latter allows data file transfer, remote folder synchronisation and system monitoring to be fully automated and controlled centrally, removing the need for input from the crew.

Initial planning and preparation for the roll-out started in November 2018. With assistance from GTMaritime's technical support team and an experienced vendor, Precision Infocomm, everything was up and running within just six months. By June 2019, the system went live and Rocktree was successfully delivering mail through GTMailPlus and replicating data between the maintenance, quality assurance and other systems unattended through GTRAFT.

Economic and efficiency benefits

While cost-saving was not an explicit goal of the project, Rocktree believes the migration to GTMaritime has paid for itself many times over in man-hours and stress saved when compared to manually transferring data, as well as allowing the company's applications to operate as they should.

A reliable, robust and easy-to-manage solution helps across the company, de-stressing the IT and technical teams by relieving them of the pressure of having to drop everything and intervene to carry out what should be routine data synchronisation.

Moreover, the ability to monitor the status of all its OFTs from a single unified dashboard makes managing updates and workflow more straightforward and less resource intensive than was previously the case.

Key benefits GTMaritime has brought to Rocktree include:

- Hassle-free, resilient vessel/shore communication
- Reliable data replication with minimal manual intervention
- Enhanced visibility on network status across the fleet
- Straightforward installation of systems on newly acquired vessels

The reaction from HSEQ, crewing, procurement and other operational and back-office functions needed to keep Rocktree's OFTs ticking over has also been overwhelmingly positive.

"Working closely with the team at GTMaritime allowed us to roll out the full solution quickly and efficiently," said Zoeb Patrawala, Senior Manager Digital Technology and Solutions at Rocktree. "This has meant that staff has been able to experience the benefits straight away, saving time and costs as well as simplifying the process to easily and centrally manage all the File Transfer jobs."

Digital ambitions

Although Rocktree initially approached GTMaritime to solve a specific challenge – namely, unattended data synchronisation – it is now carrying out a comprehensive review of its IT strategy with a view to extracting the full potential of what GTMaritime solutions have to offer.

One idea currently on the table is to send images from the nine CCTV cameras fitted on each OFT back to its Singapore headquarters. Apart from transforming the oversight and accountability the company can provide to its clients, this would allow management staff to take a more proactive role in responding to unexpected and rapidly unfolding situations.

Looking further ahead, Rocktree sees considerable potential in adopting IoT solutions coupled with advanced data analytics to further optimize the operation of its floating terminals. Because releasing the value of such technologies depends on ubiquitous connectivity allowing an almost constant stream of data to flow between vessels, shore and the cloud, such investments can only be justified if a resilient communications infrastructure is in place. With GTMaritime as its long-term partner, Rocktree believes that condition has been met. ■

Photo courtesy of Intellian

Making its mark in the years ahead

Intellian is a leading global provider of stabilised antenna systems delivering connectivity to the maritime and offshore, defence and intelligence, and yachting industries. Veteran of marine connectivity Paul Comyns, Vice President of Marketing with over two decades of marine electronics marketing across three countries, opines on what makes Intellian so unique, and how the company plans to make its mark in the years ahead.

Laurence Russell, News & Social Editor, Satellite Evolution Group

Question: What are some recent highlights for the company?

Paul Comyns: Intellian has been building and delivering antennas now for just over 15 years. Some of our recent highlights are with our newer future-proof antennas. These platforms are built to operate on any of the main three frequency bands and with any of the LEO/MEO/GEO satellite constellations we're all anticipating in the next few years.

That's the real change at Intellian, that our products are adaptable for not only all present networks like a Ku-band GEO constellation, but also the possibilities we're likely to see in the future, all with very simple, quick software or hardware alterations.

Fleet operators can install that platform today and not worry about what new systems will emerge in the future. They don't need to be concerned about the networks being released month after month in this industry because the investment they make with us will be paying off for any and all foreseeable changes in network technology.

Question: What are the key demand drivers for maritime customers in the Americas?

Paul Comyns: The main demand we've seen from maritime users is in connectivity, driven primarily by the use of devices onboard that push the bandwidth capacity of the vessel. We do all sorts of trade shows and exhibitions, so I can tell you with confidence that this is our most asked question: "How do I get Internet onboard, and how can I get the kind of reliable throughput that'll let me stream the world's latest technologies?"

That's the main driver in the maritime market. High-speed, quality communications, which comes from a need to support crew welfare and more efficient operations. The enterprise segment wants everything they can expect in a globalized office available on their ships. Providing good quality Internet makes for a happier, more connected, and even better-trained crew, which reduces accidents, leads to higher standards, and perhaps most importantly, increases employee retention.

At the moment, that sort of high-throughput standard of Internet is not remarkably common, so we're finding that crews with good quality Internet are very content to stay serving on that vessel and distinguishing themselves.

As I've found when speaking to these crewmen myself, gone are the days when sailors would sit around with each other after a hard day, making conversation with their workmates. These days they're just as connected to their families, friends, and cultures

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What's New for 2020

- The **future of media** and dealing with the unexpected during **COVID-19**
- 2019 Rugby World Cup – The direct-to-consumer **(D2C) business model**
- **Advertising vs COVID-19**: Woes or Wins?
- **Buy side talk**: What does the future of the video buy look like?
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Paul Comyns, Vice President of Marketing, Intellian

back home as anyone else is. That's the end of an era, really, and that's a pretty significant thing.

Question: How are you investing in L-band technology?

Paul Comyns: We've launched a new range of L-band products with the new Iridium-based C700, which is a product that gives 700kbs down, 350kbs up with a small, compact, high RF performance antenna. At high elevation, as well as rough seas, this antenna is going to perform reliably.

We've also introduced two new L-band products for the Inmarsat Fleet Broadband network: Intellian FleetOne, a small unit with 100kbps for light, always connected, use in the coastal region; and the FB250, with 250kbps downlink speed, which is used as part of the backup antenna in Fleet Xpress for active out-of-band management and failsafe operation.

We have a range of NX products for Fleet Xpress, and these products will be delivered any day now to support Global Xpress whilst augmenting our existing portfolio in Asia and around the world.

We believe L-band is still a viable option to support and introduce new services, and we think it is an important market which shouldn't be neglected.

Question: You recently claimed to set new standards for satellite terminals with the launch of your v240MT Gen-II tri-band product. How are you raising the bar?

Paul Comyns: As I've mentioned, Intellian is proud to produce antennas that deliver on multiple bands and multiple orbits. The tri-band antenna allows us to electronically switch in the field or at sea between frequency bands and orbital realms.

For the ship operators, these antennas are usually best installed on larger vessels where we can mediate between eight antennas and eight modems of the highest technological standards, which the vessel can switch between, to find the most optimal routing for the signal. No matter where the ship is, it'll be equipped with a system that can cycle through multiple connections to offer a great guarantee of a reliable connection, even in more underserved regions.

This is something of an unmatched standard. Some of these ships are delivering 3.6Gbps on a reliable basis, which is actually faster than most urban centres can expect. Providing that speed at sea is fairly amazing, enabling crew and guests to gain access to strong bandwidth suitable for high capacity media applications such as live video streaming.

Question: You're quite well known for delivering a world standard for your partners. What's your working relationship with other companies like?

Paul Comyns: Intellian is interesting because we produce the antennas which operate on anyone's network, so rather than being tied to specific brands or provider, we're unprecedentedly open, which lets us work with just about anyone in the industry.

I always describe it like having an unlocked cellphone, which can jump onto any network available. Whatever frequency or orbit, whichever works for the user, our technology will deliver its strong standards just as well in any of these circumstances.

So, we work with everyone,

Intellian C700. Photo courtesy of Intellian

"We've also introduced two new L-band products for the Inmarsat Fleet Broadband network: Intellian FleetOne, a small unit with 100kbps for light, always connected, use in the coastal region....."

providing the connectivity infrastructure to allow you to excel at sea.

Question: In the NewSpace era, satellite infrastructure is on the precipice of a revolution. How is Intellian preparing for the evolution of the industry?

Paul Comyns: Well, the evolution for Intellian has arrived. We already manufacture antennas that operate with the new providers, and electronically track LEO satellites, which we are actually already doing right now. Of course, the time that we can remain connected is quite limited because the satellites are passing so quickly, and there aren't enough satellites to offer concurrent global coverage yet, but we're able to prove 400Mbps data as well as a 32-millisecond latency.

Question: What do you think is the future of satellite terminals? What will these products look like ten years from now?

Paul Comyns: Of course speeds and throughput will increase, and the costs will come down, but more specifically I think satellite antennas for land operation will become more often flat and optimized for LEO. Flat antennas are showing all sorts of fascinating applications, and there are a wide array of players looking at that technology closely. I think it's only a matter of time before someone comes up with the offering that corners the market and swiftly drives the demand.

For maritime though, because of the limitation of signal strength when you get off the perpendicular plane, the gain drops, and so vessels are always moving, and they have to contend with blockage. To deliver strong performance at sea, there will always be a need for the parabolic, steered antenna, or a tracking unit. These will remain viable, legacy options.

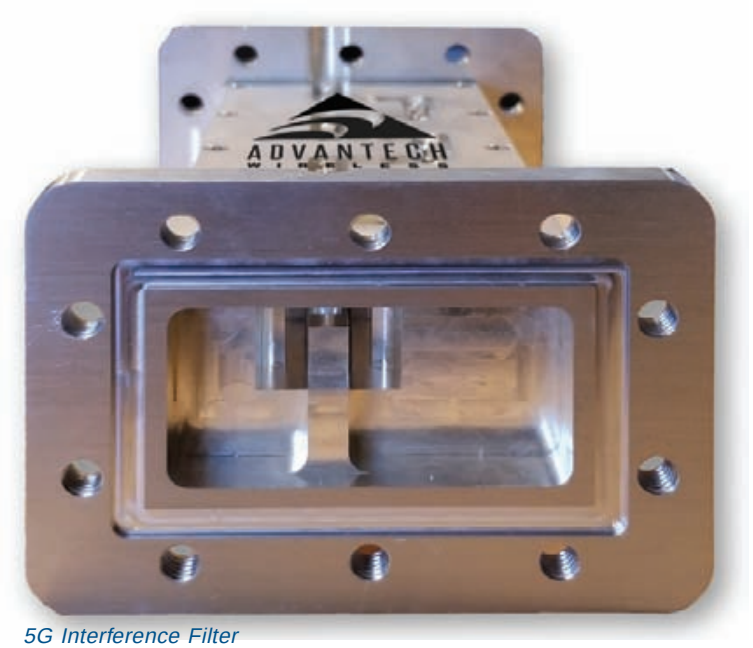
So I think it'll be an interesting decade. Intellian's been around for 15 years now, delivering VSAT antennas for ten of them, so we have no reason to believe that we won't remain the market leader for stabilised antenna terminals with cutting edge antennas and innovative techniques. ■

v240MT Gen-11 - multi-orbit and Tri-band capability

5G and Satcom – The perfect ecosystem

With the upcoming bandwidth sharing of C-band spectrum all but inevitable, satellite sector players will have to find innovative new solutions to maintain service levels. High power amplifier products are expected to play a key role in creating the next new normal.

Cristi Damian, Vice President Business Development, Advantech Wireless Technologies



5G Interference Filter

Based on recent announcements, it appears that the FCC will move forward with plans to auction off 280MHz of satellite C-band spectrum, from 3.7 to 3.98GHz, to 5G cellular networks.

The lack of a firm decision one way or the other has created great uncertainty for the satellite industry in the past few months. The number of deployed ground and space-based C-band assets are significant, and the reallocation will restrict the ability of some satellite operators to deliver services. The impact has also been felt by satcom component manufacturers as requirements for C-band equipment that would normally be used for sustainment, upgrades and modernization had been put on hold pending a decision. The unimagined impact of COVID-19 and the commensurate cancellation of major sporting events has impacted the video broadcast and mobile uplink markets tremendously as well.

Promises made that 5G will deliver both higher bandwidth and faster access to the mobile masses have created a level of demand that can only be met by making spectrum available to mobile network operators that have already made major investments in this new technology.

The coexistence of 5G cellular networks and satellite operations is paramount to both group's long-term success. A symbiotic relationship results in a 'win-win' for both parties. The proliferation of 5G is dependent upon the ubiquity of satellite communications to facilitate international roaming and the needs of mobile customers. Additionally, the enormity of needed backhaul services will benefit teleports worldwide.

Terrestrial and satellite service providers need to ensure that they are taking full advantage of the potential benefits of 5G while mitigating technical risks.

Baylin Technologies Inc., parent to: 1) Galtronics (USA) Inc., a global R&D manufacturer of 5G antenna products, 2) Advantech Wireless Technologies Inc., a market leader in the manufacture of satellite communications products, and 3) Alga Microwave, a designer and manufacturer of high quality, cost effective active and passive RF/Microwave components, bridges the gap between the two technologies. The three sister companies are invested in research and development to provide solutions on both sides of the spectrum.

Life after 5G

As 5G services come online, the necessity of spectrum-sharing for 5G and C-band satellite operators will be required to deliver high quality service. High-power transmitters and beam-forming antennas on the 5G side are bound to cause bleed-over and, as a result, overwhelm sensitive components used in satcom terminal architecture, such as LNAs and LNBs. It will be imperative that specialized filtering be used to maintain RF separation.

Working in conjunction with the C-Band Alliance, a consortium comprised of Intelsat, SES, Eutelsat and Telesat, Alga Microwave has developed a 5G interference rejection filter to ensure that C-band frequencies above the designated 5G band will still be usable for satellite links.

The filter provides an impressive 60dB of rejection at 3.98GHz, while passing signals in the 4.0 - 4.2GHz band. This represents the most cost-effective means for mitigating

Cristi Damian, Vice President Business Development, Advantech Wireless Technologies.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5G interference with C-band satellite services.

Sharing the bandwidth

Once the C-band spectrum has been divided, there won't be enough bandwidth remaining to facilitate the current C-band satellite services without drastic changes to the way RF spectrum is utilized. One solution is to increase the number of 'bits per Hz' and increase utilization efficiency by operating with higher modulation and error correction codes. Advantech has proven that modulation schemes as high as 256 APSK can work well in satellite links.

Previous tests performed using a 4.5m C-band antenna and a 500w C-band GaN Advantech SSPB demonstrated a spectrum efficiency of 8 bits/Hz that represents ~ 240Mbps in a 36MHz transponder. The principal benefits are two-fold; more information is transmitted with less bandwidth (critical for 5G back- hauls) and higher efficiency means reduced OPEX for Satcom service providers.

Pushing higher bits per Hz requires additional transmitter power to maintain acceptable C/N ratios.

Advantech manufactures the highest power satcom amplifiers available in the industry today with the latest solid-state technology.

High power is the key

Advancements in solid state amplifier technology have eliminated the difficulty in achieving extremely high levels of RF output power from satcom transmitters. The Advantech product portfolio includes high-power, standalone amplifiers as well as phase-combined and soft-fail redundant amplifier systems specifically architected for outdoor installations – amplifiers that can be mounted on work platforms of some antennas, greatly reducing insertion losses.

Advantech's solid-state amplifiers, manufactured using Gallium Nitride (GaN) transistor technology, run cooler and reach much higher output power levels and require less mains-power. GaN devices typically operate over wider bandwidths, so more of the C-band (up to 7.025GHz) can be utilized for satellite transmissions. GaN, considered military-grade technology, was specifically developed to operate in harsh conditions.

Satcom and 5G - The big picture

In the near future, low latency and high throughput needs will prompt military customers to incorporate 5G technology into their next generation networks. Advantech's amplifier portfolio includes the military-centric bands including X and Ka.

With more and more services becoming cloud-based, the advent of LEO constellations will take cloud services access to a whole new level. High-power Ka-band amplifiers and beam-forming antennas will continue to be a major staple in ground station architecture.

The unrivalled ubiquity of satellite-based services will provide high-capacity links that utilize high-order mod/cods and high-power transmitters to connect terrestrial 5G networks wherever they are needed. In areas where the saturation of C-band capacity is an issue, frequency separation between 5G and satellite will be possible with the utilization of special filters.

Satellite services will be a fundamental enabler in the proliferation of 5G services worldwide– two technologies that, if properly implemented, will form the perfect ecosystem. ■

Photo courtesy of Shutterstock

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Check out the entries on the following pages. If an item is of interest, click on the links to request more information or to visit the company's website.

Visit website | Request further information

Advantech announces technology partnership

Advantech Wireless Technologies has signed a sales and distribution agreement with TXMission, a designer and manufacturer of high performance SmallSat modems for the NewSpace Industry. The companies will together develop a comprehensive suite of SmallSat, Airborne and Comms-On-The-Move (COTM) communication products for markets requiring versatile, extremely low size, weight and power (SWaP) products that provide leading-edge performance. The range of fully integrated SmallSat and UAV/Airborne products to be developed will include advanced RF transceivers, multi-gigabit modems for onboard and ground segment applications, low SWaP satellite terminals, antennas, network management systems and 5G technology solutions.

1.35m Flexible Integrated Terminal (FIT)

AvL Technologies' new 1.35m Flexible Integrated Terminal (FIT) offers a flexible, user-defined terminal platform with a 12-piece reflector and an integral tripod for a small pack-up in two IATA-compliant checkable cases. The manual-point version operates with manual point assist software and can be upgraded to motorized operation with AvL's AAQ antenna control system. The terminals operate in X, Ku and Ka-band with new bayonet-style feeds and feed kits for quick RF changes. The terminals have a built-in tuner and beacon receiver, are scalable with 75cm, 98cm and 1.35m reflectors, and are flexible with modem, BUC and LNB options and an AvL ARSTRAT-compliant ODU.

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Isotropic Systems has cracked the code for next-gen connectivity

Isotropic Systems' transformational terminals feature patented optics and beamforming technologies capable of unleashing the full potential of new satellite constellations set to come online in the next two years. The roadmap features a converged antenna that operates in multiple frequencies and multiple beams, meaning commercial and government users of the platform can completely arbitrage all the capacity in space through a single terminal.

Isotropic Systems' first-generation multi-beam terminal is a Ka-band platform set to serve Non-Geostationary Orbit (NGSO) constellations. The company has contracts with SES and Inmarsat, as well as US Defense organizations ready to leverage the breakthrough terminal.

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Intellian

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

Intellian's 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.

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.

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ND SATCOM Flyaway Terminal

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Send and receive where other systems have already given up. Discover the new ND SATCOM FLY AWAY terminal with integrated SKYWAN technology, which is revolutionizing the market with its unique robust design. Whether you are experiencing severe storms or gale conditions, this terminal is extremely reliable, ready for immediate action, and raises the bar worldwide in terms of communication security. Plus, its light and durable components enable easy transport and a long product life. Stay tuned to learn more about our new Flyaway terminal launching soon!

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Teledyne launches new Hi-Power Limiter for military apps

Teledyne e2v HiRel has a new addition to its family of high power limiters, the TDLM202402, a quasi-active S-band SMT PIN Diode Limiter that offers "always on" high power CW and peak protection. Packaged in a small 8mm x 5mm form factor for demanding electronic warfare and radar applications, the TDLM202402 utilizes proven hybrid assembly technology. It has 50dBm (100W) CW power handling capability and 60dBm (1,000W) peak power from 2 to 4GHz (25µsec pulse width at 5% duty cycle). Parts are screened and qualified for high reliability applications. These power limiters have an operating temperature range of -65°C to 125°C.

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TERRASAT Communications, Inc

Innovator in the RF space

Terrasat Communications designs and manufactures innovative RF solutions for satellite communications systems. The ground-breaking IBUC - the Intelligent Block Up Converter - brings advanced features and performance to C-band, X-band, Ku-band, & Ka-band satellite earth terminals and VSATs. Terrasat Communications offers the IBUC (Intelligent Block Upconverter) brand RF solution for MILSATCOM terminals. Building on the company's reputation as an innovator in the RF space, Terrasat has launched several IBUC models that play a key part in ruggedized tactical satellite terminals. All IBUCs are engineered and manufactured in the company's modern Silicon Valley facility and are backed by a 3-year warranty.

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Thuraya MarineStar

Thuraya's newest maritime voice solution with tracking and monitoring capabilities is a bestseller due to its flexibility, affordability and reliability. As an entry-level solution, Thuraya MarineStar is built on the same successful voice platform that has sold more than one million Thuraya satellite voice devices. Since it enables tracking and monitoring, in addition to voice communications, vessel operators do not have to invest more in their tracking systems or a brand new tracking application. Thuraya MarineStar makes compliance with national and international fish catch reporting regulations simple. Moreover, it supports multiple languages, further cementing its appeal among regional users. Thuraya MarineStar enables fishing crews to remain connected on their local GSM numbers, even beyond the coastline. The terminal with its IP67 rated antenna can be deployed to perform condition based, on-board monitoring for maintenance activities.

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