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September/October 2020

Maritime Special Issue

# SATELLITE evolution ASIA

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ISSN: 1740-3413

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**Plus**

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Digitizing inflight connectivity

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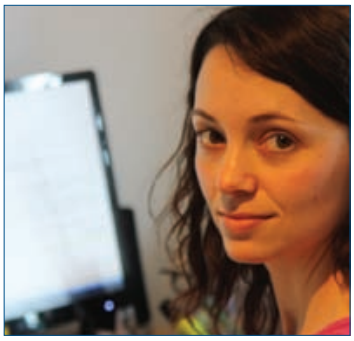

Amy Saunders
Editor

# Winter is coming

Autumn is well and truly upon us with this first September/October issue in our portfolio of magazines. The days are getting shorter, and in this time of COVID-19, the onslaught of normal winter colds is set to be a lot more ominous this year than ever before. With each new cough, the fear of coronavirus is alive and well, with children being sent home from nurseries and schools, and adults being sent home from work until they can be tested.

Moreover, our 'new normal' seems to be slipping less and less away from normal with new areas in the UK, Europe and indeed across the world being locked down again as case numbers spike. In the satellite sector, things are far from normal – with no events taking place in the physical world for the foreseeable, lives have been turned upside down, and we all wait with baited breath to see whether events will resume any time in 2021.

> "Nevertheless, operations continue as normal here at Satellite Evolution Group.."

Nevertheless, operations continue as normal here at Satellite Evolution Group, albeit with a little more working from home than usual for some of our team. In this Mobility Special Issue, we have interviewed key personnel at Kymeta and Intelsat to discuss the ins and outs of mobility from the antennas, services and operator point of view. Marlink opines on the significant advances being made in ship digitalization in the Asian region, while Inmarsat reports on how the IoT is revolutionising shipping as we know it. Meanwhile, we take an in-depth look at the latest trends in VSATs for mobility applications and inflight connectivity developments in a COVID-19 world.

We hope you enjoy this issue and wish you well for the dark months ahead. ■

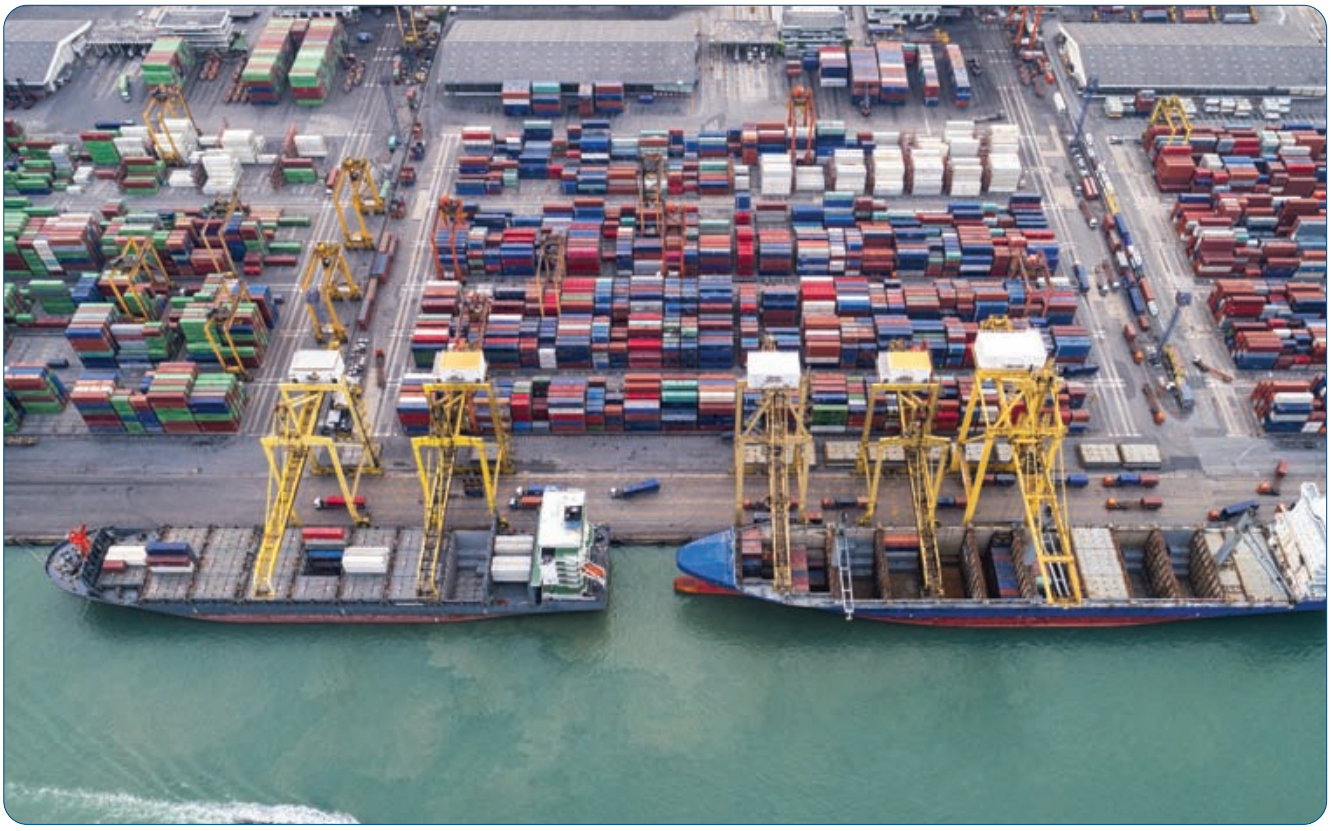

*Photo courtesy of Shutterstock*

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Asia's importance to the maritime industry is undisputed and its importance to the growth of maritime satellite is increasing too. VSAT installations continue to grow in the Asian region, with ship owners increasingly appreciating the importance of high-quality connectivity at sea. Tore Morten Olsen, President Maritime, Marlink explains.

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*Front cover: Photo courtesy of Shutterstock*

ST Engineering

# THE DEVIL AND THE DEEP BLUE SEA

## HOW MARITIME STAKEHOLDERS THRIVE IN THE BLUE ECONOMY

The interdependence of the maritime industry ecosystem has never been so exposed. There is a pressing need to embrace technology, digitalization, and 'ecosystem thinking' to fundamentally transform the future of worldwide trade and travel.

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## Intelsat entrusts Arianespace for the launch of three C-band satellites on Ariane 5 and Ariane 6

Commercial launch services provider Arianespace and fleet operator Intelsat have signed an agreement for two launches of three satellites, Galaxy 35, Galaxy 36, and Galaxy 37, on Ariane 5 and Ariane 6 launch vehicles.

This contract continues the outstanding relationship that dates back to 1983 between Arianespace and its customer Intelsat, operator of the world's largest integrated satellite and terrestrial network.

Arianespace will launch the Galaxy 35 and Galaxy 36 satellites together as a stacked pair in 2022, and Galaxy 37 in 2023. Both launches will be performed from Europe's Spaceport in South America aboard an Ariane 5 and Ariane 64 launch vehicle, respectively.

All three satellites will operate in the upper portion of the C-band spectrum, a range of wireless radio frequencies that is used for critical telecommunications and data connectivity around the world. With this mission, Intelsat will meet the accelerated C-band spectrum clearing timelines established by the US Federal Communications Commission (FCC) earlier this year, in order to make the lower portion of the C-band spectrum available to mobile network operators to further the rollout of critical 5G services.

Maxar Technologies will build the three satellites, all using Maxar's industry-leading 1300-class platform, in its manufacturing facility in Palo Alto, California.

"We couldn't be more thrilled to sign this agreement to launch three payloads for Intelsat. It is a profound honour to see the perpetuation of this deep and lasting relationship with Intelsat while enabling the roll-out of 5G in the US. We are all the more honoured that Intelsat has opted for an Ariane 6 vehicle for the first time," declared Stéphane Israël, CEO of Arianespace.

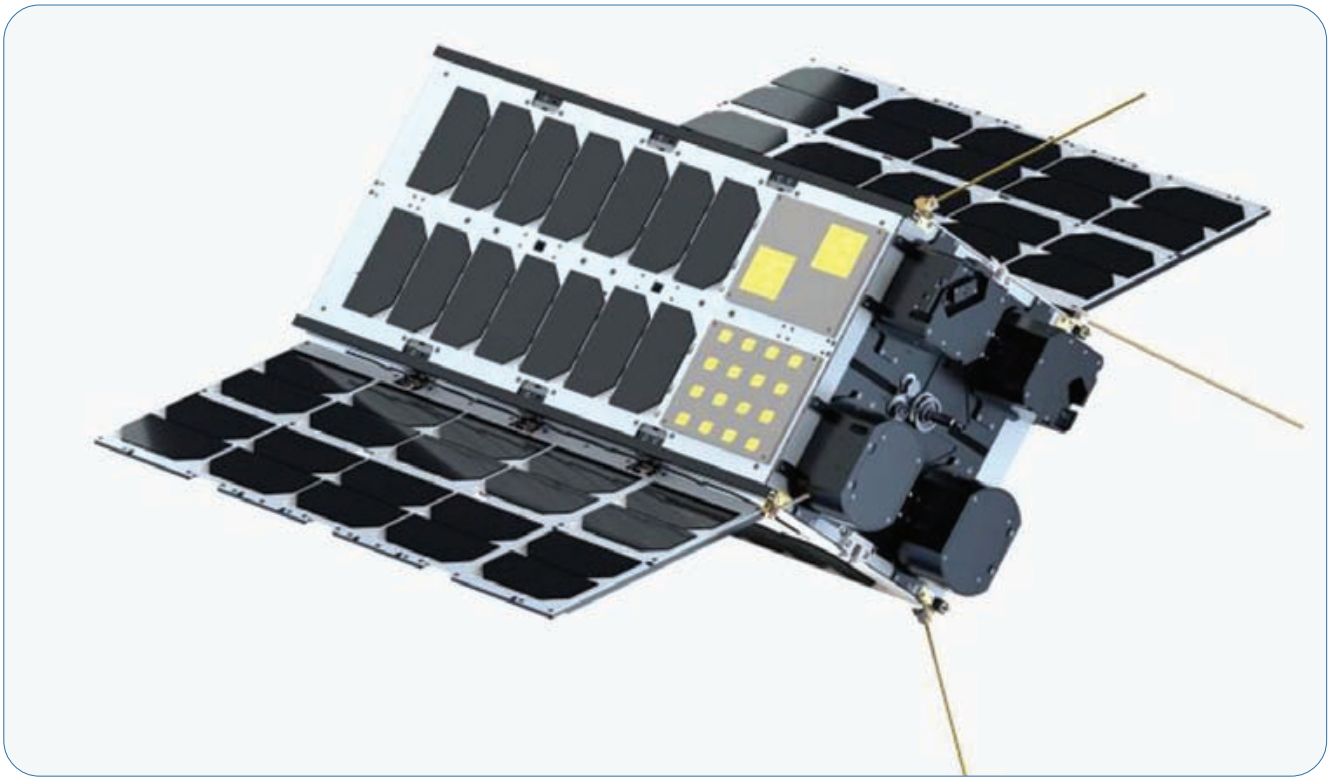
"Intelsat looks forward to continuing our longstanding partnership with Arianespace to launch these satellites, which are critical to accelerating the clearing of the C-Band spectrum and ensuring the US maintains its leadership in 5G and other advanced telecommunications technologies," said Mike DeMarco, the Chief Services Officer of Intelsat. ■

## NanoAvionics enters India's space market through partnership with Ananth Technologies

NanoAvionics, a multinational nanosatellite mission integrator, has signed a partnership agreement with Ananth Technologies Ltd (ATL) which marks NanoAvionics' entry into India's growing NewSpace industry.

The agreement makes Ananth Technologies the official distributor of NanoAvionics' products and services in India, giving companies one stop access to cost effective small, micro and nano satellites including subsystems. The local access will save them time and cost for assembly, integration, and test of at Ananth's facilities in Hyderabad and Bengaluru. Customers will also have access to low cost launch service, using ISRO's Polar Satellite Launch Vehicle (PSLV), and post launch operation services. In addition, this partnership between NanoAvionics and Ananth Technologies is going to foster relationships with Indian research institutions and suppliers.

"Our new partnership with Ananth Technologies opens new doors for NanoAvionics," NanoAvionics' CEO Vytenis J. Buzas said. "Ananth Tech is one of the most trusted names in the Indian aerospace sector. Their network, experience and world-class satellite manufacturing facilities will allow us to serve an emerging Indian NewSpace market more effectively. India's private space sector is a vibrant community of talented individuals having innovative ideas. I am sure that the recent Indian space policy changes, which just opened



*NanoAvionics Multi-purpose 16U Nano-satellite Bus M16P*

up the space sector for private participation, combined with partnerships with international players of the industry, will accelerate the growth and kickstart the birth of more Indian NewSpace stars."

NanoAvionics and Ananth Technology will work together to meet India's demand for small satellites with the flight proven NanoAvionics nanosatellite buses and their subsystems. NanoAvionics' standardized nanosatellite buses satisfy the requirements for a wide range of small satellite applications thanks to their regular connectivity, powerful and reliable hardware, up to 14U of payload volume and integrated propulsion system. NanoAvionics's designs provide functions for nanosatellites that once required much larger spacecraft.

"The new agreement between Ananth Technology and NanoAvionics will bring mutual benefits while serving the new generation of private space companies in India," said Anurup Pavuluri, director of Ananth Technologies. ■

## Huge decrease in levels of streaming piracy seen in Malaysia over the last 12 months

A new study of the online content viewing behaviour of Malaysian consumers has found a massive 64 percent decrease in consumers accessing piracy websites over the past 12 months. The survey, commissioned by AVIA's Coalition Against Piracy (CAP) and conducted by YouGov, found that 22 percent of online consumers currently use piracy streaming websites or torrent sites to view pirated content, substantially less than the 61 percent from a similar survey conducted in August 2019. The YouGov survey also found a 61 percent reduction in the number of consumers who use an illicit streaming device (ISD) when compared to the August 2019 survey.

More than half (55 percent) of online consumers had noticed that a piracy service had been blocked by the Ministry of Domestic Trade and Consumer Affairs (MDTCA). This would appear to have had an impact on consumer attitudes towards piracy, with 49 percent stating that they no longer accessed piracy services and 40 percent stating that they now rarely accessed piracy services as a result of not being able to access blocked piracy sites. 11 percent of consumers said it made no difference to their viewing habits.

Desmond Chan, General Manager of TVB International commented: "We are encouraged by the efforts of MDTCA in fighting online piracy with their site blocking campaign. Malaysia is an important market to our content distribution business. TVB's programmes are popular in Malaysia and have always been the targets for piracy. The swift anti-piracy measures provided by MDTCA will foster a business environment in which we will continue investing."

Melcior Soler, Global Audiovisual Director at LaLiga commented: "This substantial reduction in online piracy in Malaysia is a sign of the success of the actions undertaken by the MDTCA. Piracy only benefits the criminal organisations who operate the websites and illicit applications and harms society as a whole, especially those who work every day to generate content and entertainment for everyone. LaLiga will continue to fight against the problem of online piracy."

The continual site blocking has had an impact on consumers viewing habits who are now more likely to access legal content services. 20 percent of consumers who said they were aware of the government blocking piracy websites and illicit application domains, have since subscribed to a paid streaming service; 15 percent said they now spend more time viewing free (AVOD) local streaming services; and 65 percent now predominantly watch free (AVOD) international streaming services.

Neil Gane, General Manager of AVIA's Coalition Against Piracy (CAP) said: "We applaud the MDTCA for disrupting

Photo courtesy of Shutterstock

piracy website networks which are being monetized by crime syndicates. Consumers who subscribe to illicit IPTV services or access piracy streaming sites are wasting their time and money when the channels and websites stop working. Piracy services do not come with a 'service guarantee', no matter what their 'sales pitch' may claim."

When asked about the negative consequences of online piracy, consumers placed funding crime groups (57 percent), loss of jobs in the creative industry (52 percent) and malware risks (42 percent) as their top three concerns. ■

## ViaLite launches new Mil-Aero RF over fibre link

The RF over fibre experts at ViaLite Communications have launched a Mil-Aero 10 MHz to 6 GHz RF over Fibre Link Pair. The new products' design and features have been specifically tailored for demanding air force and navy applications, army telemetry systems, signals intelligence (SIGINT) deployments, tethered aerostat and drone applications, plus multi-service military electronic warfare systems, where fibre is an essential replacement to coax.

As one of ViaLite's most versatile RF over fibre links it covers bands from HF, VHF and UHF through to telemetry and satcom bands P, L, S and C. It also offers the best Spurious Free Dynamic Range (SFDR) performance in its class, making it ideal for high bandwidth applications or where the application has a large range of RF signal powers. The link is further enhanced by a low noise figure (NF), optional gain and 1 dB compression points (CP).

Supporting distances of up to 50 km, the Mil-Aero link is available in rack chassis card or OEM module format, including ViaLite's new black OEM design which is outdoor rated. All formats come with a 5-year warranty as standard - the industry's longest included warranty - providing protection and reassurance for customers.

Craig Somach, ViaLite Director of Sales, said: "I am very pleased to be supporting our Mil-Aero customers with this new and exciting solution that exceeds current solutions in almost every key category related to SFDR, NF and 1 dB CP.

"The feedback from our users has been very positive and consistently shows the new ViaLite Mil-Aero Link Pair to be setting a new design standard of higher electrical performance and mechanical integrity, along with superior quality and reliability." ■

## Comtech Telecommunications awarded $20.0 million contract with Tier-One mobile network operator

Comtech Telecommunications Corporation's Location Technologies Group, a division of Comtech's Commercial Solutions segment, has finalized a five-year contract worth over $20.0 million for location-based services ("LBS") with a tier-one carrier as part of their 5G implementation.

ViaLite launches new Mil-Aero RF over fibre link

"We are pleased to continue working with this long-standing customer who has leveraged Comtech's location technology in a cloud native platform to deploy several dynamic applications that have contributed to the success of their company," said Fred Kornberg, Chairman of the Board and Chief Executive Officer of Comtech Telecommunications Corp. "We have a proven track record of long-term customer relationships where our location technology serves as the support for multiple offerings for this mobile network operator." ■

### PARADIGM'S HORNET100GX satellite terminal available for Inmarsat Global Xpress

Paradigm Communications Systems has announced that the rugged, quick deploy HORNET100GX is available for operation on the Inmarsat Global Xpress satellite network as a highly efficient Land Terminal Efficiency Group 2 terminal. Inmarsat, the world leader in global, mobile satellite communications, has issued Type Approval of the HORNET100GX for use on all GX Land based services, such as G2X Land, providing cost effective high throughput data services around the world.

The HORNET100GX is based on Paradigm's rugged and portable PIM-based HORNET VSAT terminal. The field-proven HORNET provides a single satcom solution for many different operational requirements, being environmentally rugged, yet lightweight; even the largest 100cm variant can be packed into a single airline-friendly case, as well as saving airtime service charges compared to other terminals.

At the heart of each of Paradigm's satellite terminals is the PIM (Paradigm Interface Module), providing an easy to use operational interface ensuring rapid setup and simple terminal configuration and management. Paradigm's PIM is at the heart of modern satellite terminal operation, designed to simplify operation, reduce operating/training costs, and provide a central unit for the integration and operation of satellite terminal hardware. It is the reason Paradigm terminals are ideally suited for Inmarsat's Global Xpress network. As well as making pointing simple for any user, PIM-based terminals all have excellent SWaP characteristics and operational agility providing key connectivity for edge devices.

Paradigm terminals are all IATA compliant, and the modular, quick deploy single-case HORNET provides the ideal balance of portability with high bandwidth. ■

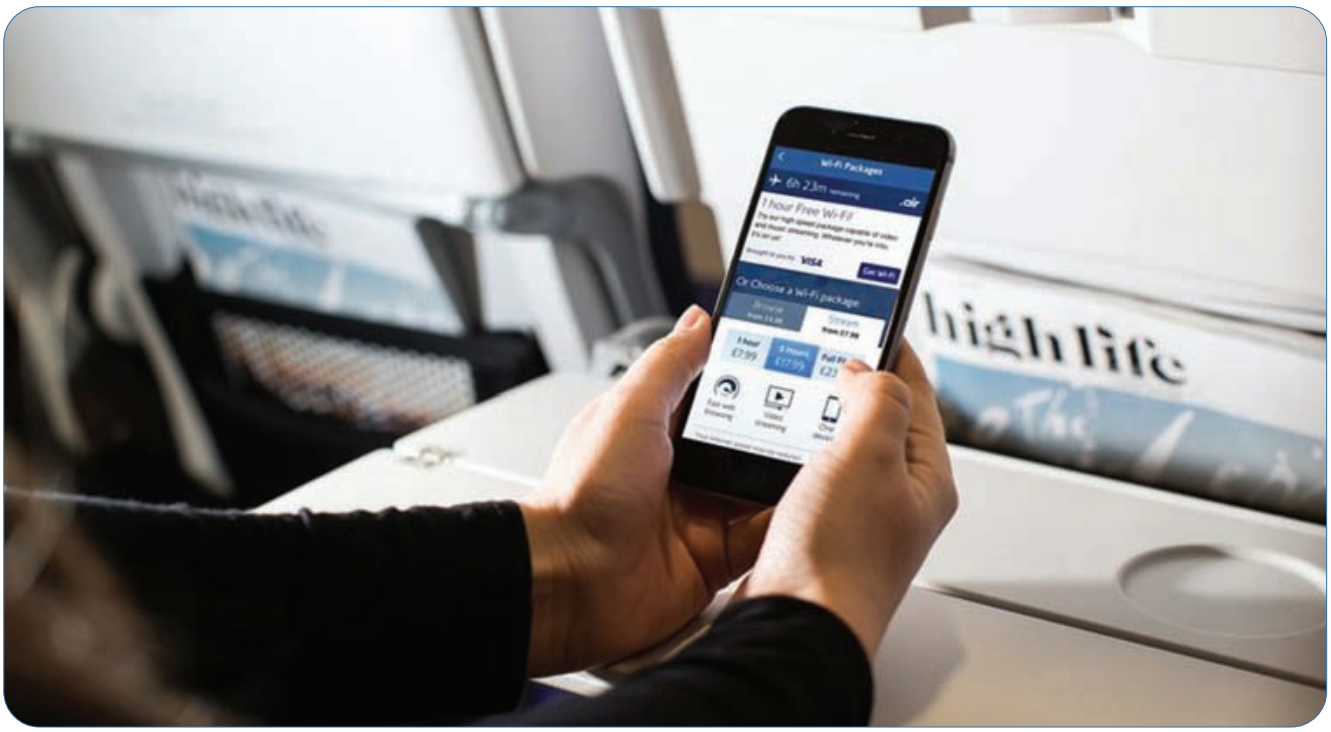
### C-Com partners with international consortium to develop next generation phased array antennas for 5G and satellite networks

C-COM Satellite Systems has joined an International consortium to develop next generation phased array antennas for both 5G cellular and satellite communications networks. Formed under the Intergovernmental Canadian/European EUREKA/PENTA program, the goal is to develop flexible and scalable antenna modules and technologies for operation in the upper 5G bands (Frequency Range 2) and in the high frequency satellite V-band.

In addition to C-COM, the HEFPA (Highly Efficient and Flexible Phase Arrays) partners are: NXP Semiconductors Netherlands BV (project coordinator); Carleton University; Eindhoven University of Technology; Semiconductor Ideas to the Market (ItoM) BV; Skyworks Solutions Canada Inc.; and the University of Waterloo. The consortium combines broad expertise from industry and academia covering a wide range of technologies and all aspects of the project, which will span the next 3 years.

"We are pleased to be part of this ambitious and challenging project, which will lead to the development of the next generation 5G mmWave antenna technology for terrestrial as well as for high frequency (V-band) satellite broadband communications," said Dr. Leslie Klein, President & CEO of C-COM Satellite Systems Inc. "The funding for the Canadian partners in this project has been facilitated by the Government of Canada's IRAP program and we are grateful for their continued support."

Bringing together an ecosystem of partners with experience in RF ICs (radio frequency chips), RF systems, chip packaging and PCBs (printed circuit boards), the HEFPA consortium will develop its modules for use by system integrators and product developers targeting consumer and commercial markets using future 5G and SatCom products, exploiting the benefits of higher frequencies and scalable, flexible designs. These technologies are the key to improved network capacity, significantly faster downloads, and reductions in 'latency'. ■




*Accessing inflight wifi on a mobile device. Photo courtesy British Airways*

# Digitizing inflight connectivity

As we enter the 5G generation and the world becomes ever more connected, the reality of inflight entertainment becomes increasingly high tech and data driven. Given the economic uncertainties brought on in 2020, has anything changed regarding the revolution 5G and NGSO promised us, and how soon can we expect to see true connectivity in flight?

*Laurence Russell, News & Social Editor, Satellite Evolution Group*

**We live in an age sat at the very threshold** of an always-online world.

In developed nations, it's rare that our connections are interrupted by some blip in our routers, or when visiting an especially rural spot data coverage has trouble reaching. Very rarely are we faced with the reality that an Internet connection simply isn't possible.

This unfortunately remains the case in the world's most remote and underserved regions, but we might think it strange that the same has long been true while travelling by air. Children of our time raised with the constant comfort of an unbroken Internet connection often find it hard to understand why a cutting edge commercial airliner, which can cost thousands to book passage with, can't squeeze out the bandwidth we've come to associate from virtually any public building in our day to day environment. Who could blame them?

## A digitising world

Since inflight connectivity (IFC) was successfully introduced to aeroplanes, one of the most common remarks users are known for making are along the lines of: "Why don't all planes have this?" or "What took you so long to get this working?" In a world where network connectivity is considered a human right, being forced offline for the duration of an already uncomfortable flight feels especially palpable.

Our world is steadily digitising, a revolution that has well and truly reached air travel infrastructure. Aircraft cabins and flight decks have become connected, with sensors and Internet of Things (IoT) devices designed for comfort, operations and maintenance. An overarching inflight network capable of delivering to the standards of an at-home connection remains the all-important missing piece of the puzzle. The path to inflight connectivity began in the early 2000s, though offerings at that time weren't particularly sustainable. For one thing, the systems that supported them were often so heavy that they exceeded many airlines' weight requirements. We've come a long way since then, though plenty of obstacles remain. A limitation that has followed the market to this day is one of coverage. Whilst certain airlines are now quick to advertise their inflight connectivity service, a reliable and fast connection that you can swear by isn't quite as common.

## A fragmented market

The most apparent solution for making inflight connectivity a wider reality comes from the LEO/MEO satellite boom. With

# New Realities of Network Traffic

Internet traffic is increasing globally based on the new realities of remote connectivity – teleworking, distance learning, telemedicine, webinars and video conferencing. It's likely we'll see long-lasting changes to the way we live and work. Given the higher traffic volumes and network complexities, it is imperative for operators and service providers to have satellite infrastructure solutions that provide performance, reliability and quality of experience. At Comtech EF Data, we have the solutions for the new realities of network traffic!

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the promise of uninterrupted global coverage via HTS constellations, aircraft will no longer be forced to grapple with awkward air-to-ground solutions, when and where they're available, but instead connect to the satellites above them.

Though GEO satellites have long been capable of this, much has been said of these platforms providing a high latency experience to planes. Gogo CEO Oakleigh Thorne explained that LEO satellites "are much closer to earth, so packets from the teleport from the satellite to the aircraft travel a much shorter distance, and hence arrive much faster than with GEO."

The apparent inevitability of the booming inflight connectivity market is underpinned by findings from the world's premiere satcom research groups. In 2019, NSR predicted a US$36 billion in IFC cumulative revenue by 2028 on the back of HTS fleet rollout, which Euroconsult supported the same year, positing that the number of connected aircraft would also increase to 20,500 planes by 2028.

NSR Research Director, Claude Rousseu explained that: "New and future customers have watched and learned from early adopter mainline carriers and understand better what they can get today from an IFC service onboard aircraft. As a result, the expectation of cheaper and better IFC with higher capacity and more reliable service is a deeply-rooted impression amongst airline customers."

Similarly, Xavier Lansel, Euroconsult Senior Consultant, claimed that: "With less than 20 percent of the world's airlines providing Internet connectivity to their passengers at the end of 2018, and more 'Smart Plane' connectivity coming, there is lots of room for expansion."

As a relatively young and fragmented market, inflight connectivity is a developing space vulnerable to a degree of market disruption as new players and well-invested start-ups spring into the sector. This makes the exact nature of the landscape a malleable one, as working models develop and lines are redrawn.

Viasat VP & General Manager of Commercial Aviation Don Buchman stated: "Each airline's brand identity and promise are unique, which explains why there cannot be a 'one size fits all' approach to free IFC. Over 2020, we expect to see a number of creative deals that span free, freemium, and other sponsored content initiatives. The critical thread tying it all together is a reliable, capacity-rich IFC network that can scale - like the service Viasat offers - where capacity is the crown jewel of the system."

Additionally, Gogo's Thorne suggested that "The issue in the commercial aviation IFC space is that there are too many competitors, and nobody yet has enough scale to build a sustainable business for the long-term." He continued: "Consolidation will occur specifically within the commercial airline in-flight connectivity industry to compensate."

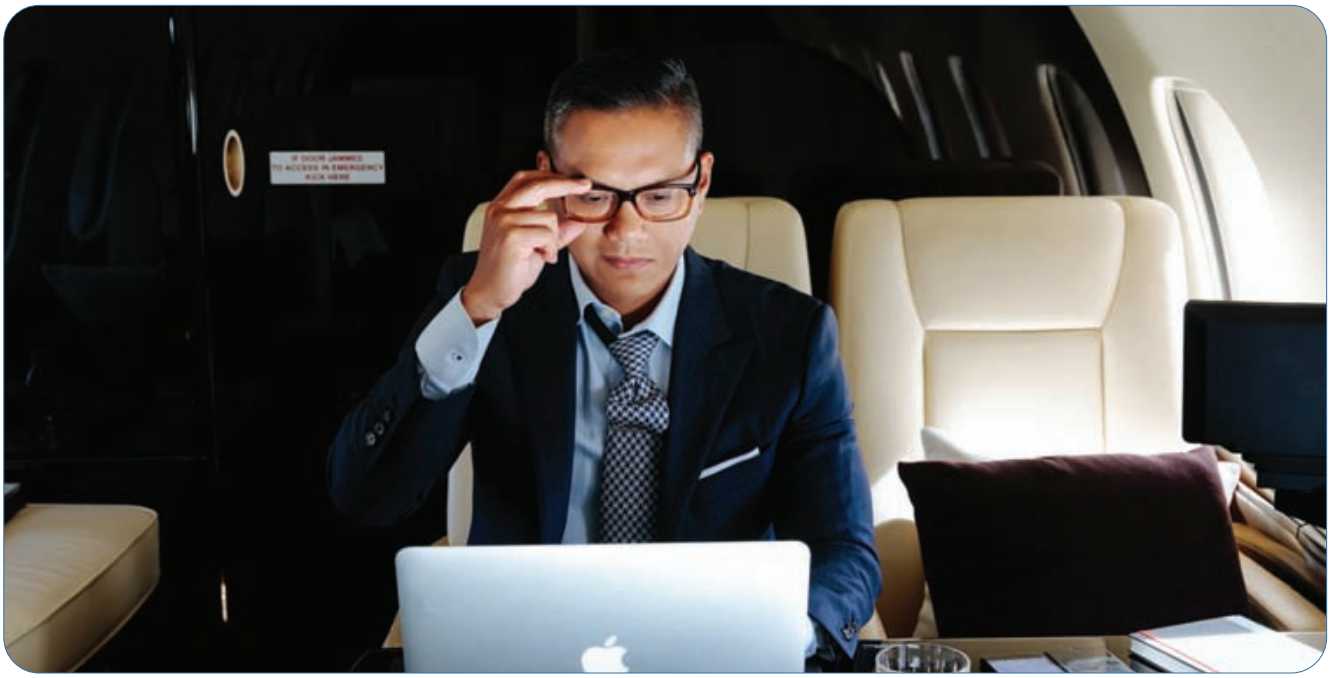
## New trends

However the framework of IFC is forged, we can agree that the technology has the potential to bring unprecedented value to the aviation experience, allowing travellers to stay connected while they work as they would in a conventional office space, or even enjoy quality mobile gaming online while connected to the player base on the ground.

Suitably, an important facet to IFC lies in the Bring Your Own Device (BYOD) trend, which if successful could change the world inflight entertainment by rendering the public hardware at a traveller's seat obsolete, and instead focus the service on delivering to the customer's personal phone, tablet, mobile game console, or laptop.

This trend is driven by universal findings that passengers prefer using their own devices over the alternative, at which point an airline's inflight entertainment portfolio would become a more streamlined and explicitly value-added service attached to connectivity.

As an emerging market, the challenges to cultivating thriving IFC sector are numerous and complex. Despite the outstanding setbacks faced in 2020, the implementation of LEO has progressed fairly well under the circumstances, and with it the actualisation of bringing the stratosphere into our connected world. ■



*An international traveller using an office grade connection. Photo courtesy Collins Aerospace*

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*Photo courtesy of Getty Images*

# Performance and applications

Intelsat operates the world's first globalized network, delivering high-quality, cost-effective video and broadband services anywhere on Earth. Their FlexMove managed service offers high-speed, secure, and reliable connectivity across the world. Mark Rasmussen, Senior VP Mobility, talks about the service's performance and applications and what we can expect from them in the years ahead.

*Laurence Russell, News & Social Editor, Satellite Evolution Group*

**Question: Could you introduce us to the FlexMove service?**
**Mark Rasmussen:** FlexMove is an industry-first managed service that provides high-speed connectivity alongside two key solutions, one being communications on the move (COTM) using vehicle-mounted satellite antennas, and the other being communications on the pause (COTP), which allows for portable connectivity through highly compact terminals for setup at stationary locations.

We call it high-speed because we're bringing 5-10Mbps land mobile communications for the first time, true broadband like that opens up a very wide array of new applications to the consumer.

**Question: Can you detail some of FlexMove's applications?**
**Mark Rasmussen:** FlexMove is ideal for industrial users, particularly in rail, construction, and mining spheres, as well as first responders and humanitarian aid groups. Anyone who's working in remote or unserved locations where you need reliable, high-speed connectivity.

For example, we're seeing companies using this service to monitor, and even in some cases control autonomous machinery in off-grid areas, including remotely driving trains over hundreds of miles in the course of industrial transport.

Another use we've seen is in maintaining continuous live video streaming, driving security and situational awareness to users in potentially contested environments.

**Question: What are the benefits of FlexMove to solution providers and end-users?**
**Mark Rasmussen:** Firstly, high throughput provides access to certain emerging applications which we've seen increasingly adopt cloud infrastructure. As these technologies dynamize, the hardware they run on needs to be capable of keeping up with them, which has always been the case on FlexMove. Additionally, accessibility is a huge driver for us. Our terminals need to support a wide variety of users, not just specialist engineers. With FlexMove, all the in-depth processes have been rigorously streamlined, and you pay by the gigabit, so it's far easier to get your money's worth.

The simplification of satellite connectivity, allowing anyone to get a connection in minutes anywhere affordably has myriad use cases, and we're passionate to deliver on it.

**Question: How accessible is FlexMove? Do you need special training to use it?**
**Mark Rasmussen:** Very little, just the sort of plug-and-play instructions you'd expect with consumer electronics. Our service packages come pre-configured with network specifications, and easy to use controls and interfaces comparable to the average consumer-facing system.

In a real-world scenario, humanitarian aid organizations responding to a disaster can have FlexMove COTM or COTP up and running within minutes to support mission-critical operations.

We see a lot of growth in the satcom market share from simply bringing accessibility to the technology, so we've put a lot of work into providing that with FlexMove.

**Question: What kind of data rates and packages does FlexMove operate with?**
**Mark Rasmussen:** With FlexMove, end-users won't need to worry about the 'use-it or lose-it' terms associated with many bandwidth package offerings. Customers can purchase monthly, quarterly, and annual data plans through their selected solution partner.

This enables end-users to keep terminals on standby until they're needed, without paying for idle airtime. If the customer requires more than the base package, top-up bundles are available. The service itself supports up to 10Mbps in a forward direction, and

*Mark Rasmussen, Senior VP Mobility, Intelsat*

2Mbps in the return, which is pretty robust by modern standards and supports industry standard applications.

**Question: How do service providers manage the service?**

**Mark Rasmussen:** Service providers can purchase the service on a wholesale basis, buying individual terminals and airtime plans which they can then wrap their own services around. An end-user with a fleet of vehicles or dozens of simultaneous users may not want to commit to a monthly plan for every platform. For enterprises like that we can provide a quota of gigabits on a monthly basis which any user on their plan can make use of. That allows for better cost management and stability.

Configuration and monitoring of those users is made simple with the Intelsat Service Management Portal.

This user-friendly terminal lifecycle software enables FlexMove service providers to provision, configure and monitor network access in real-time. Providers can track terminal performance and manage end-user service plans on the fly. Partners also have the ability to set role-based parameters, including Fair Access Policies.

**Question: FlexMove isn't the only mobility service offering Intelsat is running, you provide for the other key domains of sea and air too – could you introduce those?**

**Mark Rasmussen:** Absolutely. We have FlexMaritime, another global service supporting a variety of terminals for merchant shipping, fishing fleets, lifeguards, leisure, offshore and so on.

We also have an aviation service running on Flex called FlexExec and another called FlexAir which both support connectivity to aircraft.

Intelsat sees mobile communications services like these as a pillar to our future as a company.

Satellite is always going to be the very best way to connect things that are moving, especially at sea air and remote locales.

Intelsat is currently striving to make that connectivity faster, easier to use and more economical. Our Flex network represents a set of high-performing satellites and cutting-edge fibre infrastructure ready for our customers to take advantage of to stay in touch across the world. ■

# Maritime digitalization and crew connectivity trends drive VSAT adoption in Asia

Asia's importance to the maritime industry is undisputed and its importance to the growth of maritime satellite is increasing too. VSAT installations continue to grow in the Asian region, with ship owners increasingly appreciating the importance of high-quality connectivity at sea.

*Tore Morten Olsen, President Maritime, Marlink*

**Asia is arguably the region of greatest significance** in the maritime industry, accounting for the majority share of shipbuilding, cargo demand and increasingly ownership of assets themselves. Now its shipowners and operators are driving growing demand for mobile satellite bandwidth.

This growth has been slowed by the Coronavirus pandemic, but the signs are that demand for connectivity will continue to increase across this huge region with potential to transform the industry in two ways; increasingly digitalization of shipping operations and greater connectivity for crew.

*Photo courtesy of Shutterstock*

*Tore Morten Olsen, President Maritime, Marlink*

## Strong growth for new services

We see the biggest uptake by far of broadband satellite services in Asia; it is an increase that has been long expected but has taken longer to materialize than in other regions. Some 50 percent of all new VSAT installations are completed in Asia, predominantly in China, and of these, about half are performed for companies based in the region. The growth reflects the importance of Asia as a shipping and maritime hub and also that owners in the region are converting to VSAT.

Digitalization is the fastest growing trend in shipping – one that has been accelerated by the coronavirus – and owners have recognised the need to connect their assets to a far greater degree than before.

This has had an impact in Asia because the traditional profile of operators has tended towards conservatism and the principle of following what has gone before. Many fleets have installed only the communications systems necessary for regulatory compliance and see no justification for upgrading.

This situation has changed. The transparency of information created by the Internet means that 'ship-spotters' on shore could have as much data on a vessel as its owner, if they continue to rely on daily reports and tiny amounts of data.

## Digitalization brings new urgency

The digitalization trend has brought a new urgency into play; shipowners must participate in the digitalization process in order to understand their own performance, retain competitive advantage and interlink their assets with the wider markets. Their customers expect more and better information about their cargoes from load port to destination and need to understand where the risks exist in the supply chain so that data can be shared.

Local quarantine constraints and restrictions have also tested the ability of service providers to maintain maintenance schedules with implications not just for efficiency but safety too. The effect has been to further accelerate the adoption of

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digital solutions – including remote access via satellite – to a range of 'IT and OT' systems onboard.

Vessels are stores of large amounts of valuable data not just on speed and heading but navigation information, performance of the engine and other critical systems – including the environmental emissions that must be reported to regulators. Taken together this can provide valuable insights into how the vessel is performing across a fleet – metrics which can be demonstrated to their customers.

## Connectivity: A hidden resource

This blend of IT and OT is at different stages of maturity across the industry. With bandwidth becoming plentiful and competitively priced, operators who might have previously hesitated on upgrades are embracing the need to maintain their competitive edge

Asia is also the source of the vast majority of the world's seafarers, and while many work on internationally-trading vessels, seafarers working on ships across the region also represent a huge workforce.

The pandemic has highlighted like never before the importance of this hidden resource, albeit for the wrong reasons. As infections grew, many seafarers have found themselves unable to leave their vessels or have new crew relieve them. For those onboard – as well as for the seafarers currently manning the dozens of cruise ships lying at anchor – the ability to keep in touch with home has never been more important.

Asia's shipping companies are quickly realising the benefits of connecting their crew to the Internet, social media and entertainment services using VSAT, either re-selling or sharing capacity with the crew.

In fact, this requirement has moved from optional to essential because with crew changes not always possible due of local port restrictions, seafarers may be onboard for far longer than their original contracts stipulate. This potentially raises safety issues and if crew need top up training or re-certification, it's possible that this will happen over satellite too.

There are plenty of uncertainties still ahead but in a changed world, the advantages of always-on connections are clearer than ever. ■

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*Artist's view - three satellites OneSat after launch. Photo courtesy of Airbus*

# Digital lift-off

Better connectivity, easier data sharing and a thriving IoT start-up scene demonstrate that maritime digitalization is flourishing, even in these times of COVID.

*Mark Warner, Marketing & PR Director, Inmarsat Maritime*

**For many, the lasting consequence of COVID-19 may** be the upheaval it brought to the familiar rhythms of daily life. Thankfully, the Internet enabled a semblance of routine activity to continue, as many worked from home while their children attended digital classrooms.

The outbreak has forced us to work together yet apart through video conferencing and collaborative online platforms; and to use remote monitoring data to ensure supply chains continued to function. This enforced pivot to digitalization may well bring fundamental changes in the way many businesses – including those in maritime sector – operate and serve as a catalyst for accelerating a transition that was already gaining momentum.

## Digitalization at sea

Already, the technological barriers that once prevented vessel operators from utilising digital solutions have mostly fallen away. The 2016 launch of Fleet Xpress by Inmarsat marked a turning point by making affordable, reliable, high-throughput broadband a reality for the shipping industry on a global scale. Since its introduction, Inmarsat has seen average data consumption of a merchant ship rise exponentially, reaching 270GB per month in mid-2019 compared to 5GB five years ago. Growth rates in segments like offshore have been even greater. The satellite operator is now using its own Digital Index to keep track and analyse trends in data usage at sea over a two-year period by Fleet Xpress users across 8,500 ships. The data can be broken down by multiple parameters including by month, vessel age and type, route, etc.

In addition to improving crew welfare, connectivity comparable in performance to Internet services provided on land has reduced the pressure on shipping companies to send IT staff to visit vessels in person for routine maintenance of onboard digital infrastructure, according to Mark Warner, Inmarsat Maritime Marketing & PR Director. Software can be regularly updated, synched, and backed up, and troubleshooting used for any faults in the ship's local network.

"A dependable, always-on ship/shore connection also means that applications no longer have to be installed locally on each individual vessel," says Warner. "Instead, they can be hosted on the web and accessed remotely via Fleet Xpress, which simplifies and dramatically reduces deployment costs, ensures consistency of operation across the fleet, and allows continual, incremental upgrades."

The transition to cloud-based operation also opens the door to a broader range of participants. The globally dispersed maritime industry plays host to a complex value chain. In the analogue era, it was hard for stakeholders to connect with one another and work in unison, says Warner. "Digitalization eliminates distance and fragmentation, and creates opportunities for greater participation, collaboration, and above all innovation."

## Partnerships driving revolution

Trade 2.0, a 60-page study commissioned and published by Inmarsat last year authored by Nick Chubb and Leonardo Zangrando, profiles the rise of the maritime digital start-up and finds that innovation is flourishing. In April this year, the same authors completed 'A quiet revolution - the maritime innovation ecosystem in Japan,' the first of a series of in-depth Inmarsat-sponsored profiles of maritime technology

*Mark Warner, Marketing & PR Director, Inmarsat Maritime*

and start-ups in specific countries. Here, Chubb and Zangrando again found vibrant innovation but a start-up component still at an early stage of development.

Nevertheless, the new report highlighted how partnerships of all sorts are driving the maritime sector's digital revolution. In this context, Inmarsat is supporting several initiatives spearheaded by the venture development firm Rainmaking aimed at incubating new talent through hubs in established maritime centres. Its Trade & Transport Impact (TTI) programme provides a framework for bringing start-ups together with backers with maritime experience and expertise to tackle old challenges and discover new efficiencies. To date in Europe, 1,200+ start-ups having been scouted, leading to 24 collaboration projects. In April this year, a second TTI initiative was launched in Singapore, in the shape of the 'Decarbonising Shipping' programme for start-ups.

## The first secure IoT maritime platform

Underpinning these efforts is Inmarsat's application enablement platform – and its key constituent Fleet Data, the maritime industry's first secure IoT platform.

"In the past our focus was increasing connectivity at sea – getting ships online with high-speed, high capacity broadband," Warner explains. "Today, we have five Ka-band satellites in orbit delivering Fleet Xpress and seven more in the pipeline, which will be capable of meeting forecast growth in data utilisation."

Fleet Data automatically extracts data from onboard sensors and uploads it to a secure central cloud-based database for easy access with no additional airtime cost. By removing the burden of building expensive interfaces to the Voyage Data Recorder (VDR) and other ship systems, it smooths the path for accelerated take up.

Once data has been siphoned off the ship, Fleet Data stores it in a secure database online rather than transmitting it across to a vessel owner's internal IT system. This was a design choice to make data more accessible to third-party application providers and avoid wasteful duplication of effort.

"The vessel owner retains overall ownership and can grant access to individual data streams to applications according to need," explains Warner.

Fleet Data is especially well positioned to address one obstacle to the advance of maritime digitalization identified early by Inmarsat. In the run up to launching Fleet Data, an Inmarsat a survey of 125 owners found 51 percent identifying an inability to get data off ships in real-time as their stumbling block to IoT adoption.

The same survey indicated that there was certainly no lack of appetite for IoT-based solutions. Of those surveyed, the average shipowner planned to invest in the region of $2.5 million in IoT over the following three years. The overwhelming driver was to realise cost-savings through using the technology for closer monitoring of fuel consumption and energy management. Detailed monitoring will become increasingly necessary in order to demonstrate compliance with emission regulations, says Warner.

"There was also an acknowledgement of the broader possibilities, such as the delivery of personalised training for crew, enhancing safety and onboard security, remote

monitoring and operation of equipment, and cargo management," he adds. Some owners noted the potential for leveraging data to increase transparency and strengthen relationships with their customers – charterers or cargo owners.

"This open platform architecture means owners are relieved of setting up and maintaining their own database systems and avoid getting locked into a proprietary platform. Meanwhile, application providers don't have to worry about installing hardware onboard to transfer data to and from vessels. Where closed platforms discourage sharing by design, open platforms are built for scalability."

As a digital enabler, Fleet Data can support a myriad of applications so it is no coincidence that Inmarsat has already signed agreements with maritime technology majors such as ABB Marine & Ports and Hyundai Global Services, as well as start-ups intending to shake up the industry.

Alongside its efforts to nurture start-ups, Inmarsat is also supporting industry initiatives aimed at establishing industry-wide data standards, including the One Sea autonomous ship industry alliance.

"Conversations don't go far if everyone is speaking a different language," Warner observes. "The same goes for data – and is particularly important for making the most of Big Data analytics and machine learning systems, which rely on large data sets often pooled from multiple sources." ■

*Inmarsat network operation centre. Photo courtesy of Inmarsat*

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# Innovating is the name of the game

Kymeta is an innovative developer of satcom systems developed out of investments delivered on the strength of scientific research at Duke University, North Carolina, which found success delivering disruptive prototype technologies. The company is still innovating, as with the recent delivery of its unprecedentedly affordable satcom solution: Kymeta Connect. Bill Marks, Chief Commercial Officer and EVP, discusses the technology Kymeta is delivering and how he believes it will change the industry.

*Laurence Russell, News & Social Editor, Satellite Evolution Group*

**Question: In the modern world of antennas and satcom terminals, what do you think are some of the biggest vacuums in the market today?**

**Bill Marks:** With the invention of the modern world of satcom terminals, many new markets are opening up as business cases crop up. There are a few barriers to that growth though, for instance, you can't put a big satellite dish on a train yet. The business case there isn't very strong at the moment, partly through inexperience of the buyers, but it's also because the technology's not quite there.

That's just one example of a vacuum where the demand exists but certainly isn't being effectively addressed because the satcom ecosystem hasn't adapted to it well. That's why Kymeta has taken on the challenge of delivering a one-stop-shop solution that suits the unaddressed opportunities we're seeing. Hopefully this way we can grow the market by trailblazing new applications and bringing even more sophisticated connectivity to more and more people.

**Question: What does your new Kymeta Connect solution include, and what sort of performance can we expect?**

**Bill Marks:** The Kymeta Connect solution includes the hardware necessary to connect to the satellite besides a variety of service plans. What we've found is that most of our customers need services that go anywhere from a 4MB down by 1MB up package to a 5MB down by 2MB up service. We're also able to customise a plan and its speed however needed.

That plan is going to look quite similar to a cellular arrangement, negotiated down to the needs of the user over a monthly payment. From the satellite perspective, this is truly remarkable affordability which we think will really open up the markets and help them emerge.

**Question: This connectivity package will be the world's first to cost under US$1,000 per month. How are you able to offer such an affordable system?**

**Bill Marks:** For a couple of reasons, one being the adaptation of technologies, materials, and bulk manufacturing usually involved in delivering publicly affordable consumer electronics such as smartphones and TV setups.

In order to make satellite more relevant, we had to make the technology accessible to install and use. Being that we're a company based in Redmond Washington, right down the street from Washington DC, we have a lot of fantastic software engineers who've taken this very complex science to turn it into a one-button solution. It works much like the way you would buy cellular technology today.

The active part of our antenna looks almost identical to the sort you might associate with a television set. That's by design. It's how we managed to make it viable for a wide range of people.

**Question: You're also introducing the new electronically-steered Kymeta u8 flat-panel antenna terminal. What unique advantages do flat-panels offer over other antennas?**

**Bill Marks:** This is our second-generation antenna, following up from the first model that we dropped in 2018, which we installed over a thousand of across the globe. That's across all sorts of public and private vehicles across land and sea, including military ones. We learned a lot from that process and applied that information to our strategy when developing the u8 design which was released in 2020.

The u8 is a flat-panel antenna that uses very little power. It forms multiple beams with no moving parts, so you can install it onto platforms that could usually never accommodate a satellite uplink.

Some satellite antennas take up to 1,000W of power, which isn't practical

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*Bill Marks, Chief Commercial Officer and EVP, Kymeta*

to attach to a car or even a truck because those vehicles can't generate power like that. The u8 runs off 14W, a dramatically more manageable amount. It's innovations like that which make this model uniquely appealing, to the point that new markets that have never known satellite uplinks to be possible are suddenly seeing a very viable solution.

I think the satellite industry is going to undergo a similar revolution to what the cellular market saw in terms of the smartphone boom, in which a product went from a fascinating novelty to a common, yet very advanced necessity that the majority of people on Earth carry with them their whole lives.

The u8 is a big leap forward for us, and it's a herald of the times. I expect more jumps forward in technological sophistication like this that'll steadily drive satcom into an increasingly common concept for the average person.

**Question: Much of the industry seems to have an interest in promoting accessibility in satcom connectivity. Why do you think that is, and what will a new standard of accessible satcom mean for our world?**

**Bill Marks:** When you talk about putting a parabolic dish mechanically steered on a gimbal, they're not very versatile, and these days increasingly irrelevant. They often need lifting onto ships with a crane, which is hardly practical in this day and age. They also need to be installed by highly trained engineers, then calibrated for specific uses.

By comparison, our antenna can simply be carried around and is simple enough to just be plugged in and turned on for it to deliver cutting edge results. That's accessibility powerful enough to drive satcom further into mainstream understanding, which is good for everyone. If the industry wants to see the growth in the market which they obviously want, and to some extent, desperately rely upon, they actually need to do the work to open the market up by driving accessibility, amongst other things.

Otherwise, the market's going to find itself fighting over the same addressable market forever, which can badly hurt the industry at large. We should think about a future where satcom equipment is increasingly open to consumers in which service and prices are open to the maximum amount of people. Once we see that being done often and well, satcom is going to enter the mainstream, which will be a real revolution.

**Question: Why is Kymeta critical for high demand applications for militaries and first responders?**

**Bill Marks:** When we put our first product out on the market, there was a pent up demand for militaries and first responders around the world because in many cases, they need to communicate from very remote vantages.

We deployed our antennas into those verticals where it performed exceptionally well to the point where those markets are increasingly pulling for us to deliver new technology to address all their applications, especially our next generation product. Currently, we're sold out of our old generation product partly because of this remarkable demand.

Because there are no moving parts in our antenna, it has a lot more longevity. At present we've seen virtually no failures of our devices, and with reliability being so critical to these markets, that's something that's always set us apart with those buyers.

**Question: In the wake of these new solutions, how does Kymeta intend to capitalise on them in the near future?**

**Bill Marks:** We're the first and only electronically steered antenna with the attributes to widen the market. We're going to capitalise on that by taking advantage of our time-to-market lead and optimise our pricing to capture market share.

We have a very competitive set of services that the market is going to find compelling, and the market growth we're investing in is going to help a lot of people both in the industry and of course at the consumer level. That's a very exciting movement to be a part of, and I'm looking forward to being a part of it. ■

*Photo courtesy of Kymeta*

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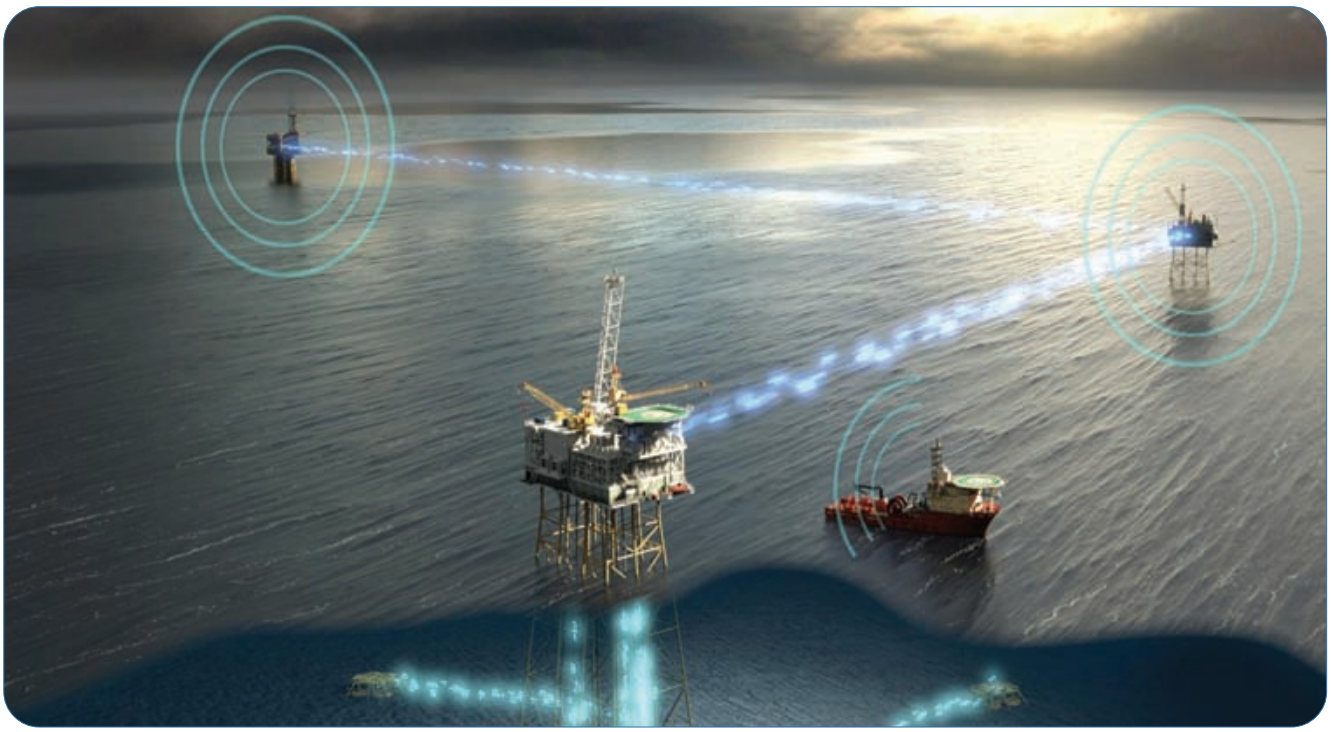

*Inmarsat Fleet LTE. Photo courtesy Tampnet*

# VSATs at sea

The VSAT sector has gone from strength to strength, delivering essential connectivity remote, rural, and mobile destinations with unprecedented efficiency. The maritime sector has been one of the most benefited user segments, with communications capabilities greatly enhanced by VSAT technology. The segment is booming, with global satcom companies reporting excellent results.

*Amy Saunders, Editor, Satellite Evolution Group*

**The very small aperture terminal (VSAT) sector has** come a huge way in what is, really, very little time. First gaining in popularity in the 2000s and coinciding with the launch of the world's first high throughput satellites (HTS), VSATs have opened up whole new markets for satellite connectivity, with the land, air and sea mobility segments, remote and rural connectivity, and military communications segments, in particular, feeling the benefit. Solving especially pressing connectivity needs in the maritime industry, it is this segment which is currently the main talking point for everyone in the VSAT sphere.

It's also the most financially lucrative. Indeed, NSR's *'Maritime Satcom Markets, 7th Edition'* report expects VSAT-enabled maritime vessels to grow from more than 20,000 vessels in 2018 to more than 75,000 by 2028, with the maritime connectivity market forecast to generate almost US$42 billion in cumulative revenues in 2018-2028.

"Setting aside some weakness in the Offshore Oil & Gas Sector, the Maritime connectivity markets are moving in high-gear," said Brad Grady, Principle Analyst and report author. "The right combination of price, end-user requirements, and connectivity demand is having a significant impact on the market. With new investments across the throughput spectrum, there is one clear message – a significant part of the maritime market has become unlocked for broadband satellite connectivity. Falling capacity prices in addition to lower equipment costs have opened the next tier of maritime end-users, accelerating adoption rates, and unlocking more vessels. FSS and MSS will play pivotal roles in generating retail revenues, but HTS from GEO and non-GEO is the growth story."

According to the report, everyone across the value chain stands to gain. For satellite operators, the passenger markets will require massive amounts of connectivity – exceeding 870Gbps by 2028, while for service providers, merchant vessels are adopting VSAT connectivity at unprecedented rates, adding over 40,000 vessels between 2018 to 2028. For equipment manufacturers, the fishing and leisure markets are expected to post some of the best growth rates for equipment revenues, at almost 8 percent and over 12 percent CAGR between 2018–2028, respectively.

However, offshore oil and gas will continue to face near-term challenges, but by 2028 should show some signs of positive revenue growth.

Ranging from shipping, passenger ferries, leisure cruises, superyachts, fishing vessels through to the offshore oil and gas vessels and maritime military vehicles, VSAT connectivity is penetrating every type of ocean-going vessel in every corner of the world. VSAT connectivity applications vary from basic connectivity for crew and passengers, e-medicine, smart vessels with the Internet of Things (IoT), communications capabilities with on-shore personnel, etc., the list is endless. It's no wonder then, that so many satcom

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companies are getting in on the action and reporting so many new developments.

### Full steam ahead for KVH

KVH Industries has had a busy few months since the milestone celebration of the shipment of its 10,000th VSAT system in October 2019, living up to its identity as Euroconsult's market share leader for maritime VSAT terminals.

In October, KVH launched KVH Elite, a premium unlimited VSAT streaming service delivering HD-quality, dedicated bandwidth to yachts in selected geographic regions. Launched in November 2019 from Florida through the Caribbean, including the islands of the eastern Caribbean, with the Mediterranean expected to follow in 2020, the service, part of KVH's fully global mini-VSAT Broadband HTS network utilising Intelsat's FlexMaritime service, is designed for maximum coverage, maximum data speeds, and a premier user experience for simultaneous streaming. Making use of the company's VSAT antenna systems - the 60cm diameter TracPhone V7-HTS and the 1m diameter TracPhone V11-HTS - KVH Elite enables users onboard to use their favourite apps for streaming popular HD movie and TV content, music, etc., on an unlimited basis.

Meanwhile, January 2020 saw KVH and Kongsberg Digital announce the successful installation of their first joint maritime IoT system on an active working vessel. The team installed a KVH Watch VSAT antenna for IoT connectivity and the Kognifai Vessel Insight platform on Simrad Echo, a Norwegian research vessel owned and operated by Kongsberg, which will continue normal operations during the pilot maritime IoT project. Together, KVH Watch and Kognifai Vessel Insight provide an integrated infrastructure for IoT connectivity and vessel-to-shore data. Simrad Echo will rely on Kognifai Vessel Insight to monitor main and auxiliary systems on the vessel and help ensure 100 percent availability. For example, the Kongsberg Mapping Cloud application will move high-resolution echo sounding data from vessel to shore in real

*KVH antenna. Photo courtesy of KVH*

Russian Satellite Communications Company

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time so that shore-based experts can provide analysis to optimize vessel operations. The data flow from Simrad Echo will be facilitated by KVH Watch IoT Connectivity as a Service, a VSAT solution that leverages KVH's end-to-end maritime connectivity services and HTS network. The two companies plan to utilize Simrad Echo as a platform to develop tighter integrations for remote support and smart bandwidth utilization that will benefit both new and existing customers.

Also, in January, KVH Industries and BW Group signed a new contract to continue KVH VSAT services for at least five years and is upgrading 102 vessels to utilize KVH's mini-VSAT Broadband HTS network for advanced satellite communications. BW Group first chose KVH in 2013 to provide satellite connectivity for a portion of its fleet and since that time has rolled out KVH VSAT systems on additional vessels. The vessel migration is expected to be completed by the third quarter of this year. Under the new contract, BW Group will equip the majority of the 102 vessels with KVH's TracPhone V11-HTS, a 1m Ku/C-band maritime VSAT antenna designed to deliver worldwide data speeds as fast as 20Mbps down/3Mbps up.

### Intellian: New terminals and certifications

Another world-leader in mobile satellite communications, Intellian has launched several new products and celebrated key contract and certification wins.

In October 2019, Intellian launched a satcom package for smart ships with Hyundai Global Service (HGS), a subsidiary of Hyundai Heavy Industries (HHI). The package integrates HHI's Integrated Smart Ship (ISS) Solution with Intellian's satellite communications antenna systems. The new package will provide HGS with a standardized smart ship package to supply for newly built HHI ships, while Intellian will secure new customers. Moreover, as it offers Internet provision right from the sea trial, customers are freed from the inconvenience of fitting network services to the vessel. HGS will also provide customer support for any smart ship solution issues, guaranteeing faster response times and trustworthy service.

Meanwhile, last November Intellian released the latest model in its new NX Series future-proof, performance-leading and low lifecycle cost VSAT antenna portfolio. The v130NX is the world's first Ku-Ka convertible VSAT terminal with a 1.25m reflector, making it an ideal platform for high-speed global Internet on ships, offshore vessels, and superyachts. The v130NX is a flexible system supporting Ku-band and Ka-band (2.5 GHz Wide) networks. It is also compatible with GEO, MEO and LEO constellations. With a highly efficient design and high-power BUC options up to 40W, the v130NX delivers the highest RF performance of any 1.25m system on the market today. Its smart satellite handover capability provides a seamless network service on practically any satellite, fulfilling the need for enhanced resilience, reliability, and redundancy whilst maximizing the long-term value of the investment by reducing the cost of migrating to future GEO HTS and low-latency MEO and LEO networks. Moreover, the new AptusNX interface enables the antenna to connect to any network in a matter of minutes and provides remote access for ease of operation and maintenance. The NX Series also features a cutting-edge modular design, which results in lower cost of ownership throughout the entire lifecycle. It improves reliability and can speed up maintenance and reduce costs further with a 40 percent reduction in spare parts needed.

December saw Intellian unveil yet another new product, the GX150NX, the world's first 1.5m Global Xpress terminal. As the largest terminal which will be available for the Inmarsat Fleet Xpress service following type approval and successful sea trials in 2020, the GX150NX will unlock the full power of the Global Xpress network for users with high bandwidth demands seeking the most resilient platform for digital and cloud-based operations. In line with the future-proof ethos of Intellian's entire NX Series antennas, the GX150NX features an optimized reflector and radome and is ready for operation on forthcoming 2.5 GHz Wideband Ka networks as well as GX5 satellites. The GX150NX also introduces a new 'All-in-One' GX Below Deck Terminal (BDT) which integrates an antenna control unit (ACU), a modem, a power supply, a 4-port switch, and a mediator in a single unit to further reduce the time and cost of installation in Intellian's Fleet Xpress Rack.

In January of this year, the Intellian NX series products

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### Speedcast wins key contracts

Speedcast International, which in 2019 was named VSAT and Satellite Applications Company of the Year at the VSAT Stellar Awards, secured several key contracts towards the end of 2019, making it very much a maritime VSAT company to be reckoned with.

In September 2019, Speedcast and VSAT service provider Nelco Limited were awarded a new contract to deliver satellite communications onboard a leading Indian Cruise line catering to the Indian domestic and international cruise markets. The cruise ship will sail initially in India before proceeding to the Middle East. Throughout its journey, it will be able to enjoy seamless Ku-band connectivity in and out of Indian waters as a result of the recent partnership agreement between Speedcast and Nelco.

In October, Speedcast signed a multi-year fleet contract extension with a major Norwegian ship owner to deliver significantly increased VSAT connectivity along with the latest Iridium Certus back-up solution. In addition to the provision of global VSAT and L-band connectivity, Speedcast will install its industry-leading SIGMA Gateway network management platform across the entire fleet of over 40 vessels. SIGMA Gateway seamlessly manages Speedcast's global VSAT, L-Band, 4G/LTE and Wi-Fi services, bringing powerful capabilities to support vessels with advanced technology requirements.

Later in November, Speedcast was awarded a new multi-year communications and value-added services contract with Aurora Expeditions for the Greg Mortimer expedition ship, including live TV, Speedcast TV on Demand with custom radio streaming and PressReader digital newspapers and magazines. The Greg Mortimer is Aurora Expedition's newest state-of-the-art vessel, to which Speedcast will provide VSAT connectivity with L-band backup for seamless and truly global mobile satellite service. Beyond connectivity, Speedcast has tailored a suite of value-added services for guests and crew, including live television, films and thousands of newspaper and magazine selections to support the growing demand for home-like entertainment while onboard.

*Photo courtesy of Intellian*

### Inmarsat launches Fleet LTE

A major player in maritime connectivity, Inmarsat offers a whole range of services, including its Fleet Xpress offering, which provides high data speeds via Inmarsat's Global Xpress Ka-band technology combined with its reliable flagship FleetBroadband L-band connectivity.

In December 2019, Inmarsat launched Fleet LTE, a new service aimed at offshore support vessel operators, but which could also be used by fishing and ferry operators. Fleet LTE leverages low-latency, high data speed communications available via a dedicated Access Point Name (APN) on the Tampnet North Sea LTE network and could be extended to other regions such as the Gulf of Mexico if successful. The service enables customers to access high speed 4G, Fleet Xpress maritime VSAT Ka-band and continuous L-band connectivity within a single, fully managed hybrid package. The unique 'three-in-one' offer delivers 4G and VSAT Ka-band and L-band without the complication of dual billing or the risk of connectivity drop-off. Fleet LTE is available in a range of service bands that deliver data speeds of up to 40Mbps with Round Trip Delay of around 35-40ms. However, when LTE is not available, services automatically switch over to Ka-band Fleet Xpress committed information rates, with continuous back-up from L-band FleetBroadband. Meanwhile, connectivity via FleetBroadband continues even outside the LTE coverage area. Service transition between LTE and VSAT is fully automated, with routing depending on data needs and network conditions, while vessels only need to add two LTE antenna and a modem on deck to enable the upgrade.

### Marlink sees business boom

Of course, no conversation about maritime VSAT connectivity can possibly be complete without a nod to connectivity provider Marlink, which has reported an extremely busy few months.

In September 2019, ship management company Misuga Kaiun Holland B.V. selected Marlink to provision cost-effective, unlimited global Sealink VSAT connectivity for its dry bulk, multipurpose and wood chip carrier vessel fleet. Marlink will install 1m Ku-band antennas and integrate an extensive package of solutions and applications designed to provide secure connectivity for business and operations as well as crew welfare. In addition, Marlink's XChange integrated communications management platform will be deployed on all vessels to run business operations efficiently as well as enabling crew Internet access. XChange Universal Remote Access is also an integral part of the service, helping Misuga Kaiun Holland B.V. to improve its IT resilience and compliance by providing secure, network-independent access to all devices connected to XChange, allowing technicians or administrators to manage IT equipment on board from any location worldwide.

Meanwhile, October saw Marlink and Intelsat agree a multi-year renewal and expansion of their partnership to

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provide broadband services to maritime vessels around the world. The agreement will deliver additional throughput to vessels via multiple layers of space-based coverage, ensuring that ship owners and operators have the flexibility and access to reliable, high-quality, always-on connectivity. Under the extension, Marlink's customers will see even greater benefits on board. The flexibility, reliability and reach provided by Intelsat's global network of wide beam and high-throughput Intelsat Epic$^{NG}$ satellites provide unprecedented high-speed connectivity to maritime vessels, enabling the delivery of a diverse range of value-added services and applications such as asset tracking and improved cyber security that supports their current and future connectivity needs.

Later in November, OFW Ships selected Marlink to provide a multi-band connectivity solution, combining high-throughput global VSAT with an L-band back-up for connectivity redundancy. OFW, which sustainably converts saltwater into drinking water, will utilise Marlink's multi-band connectivity to provide seamless crew connectivity including enabling crew to use their own devices onboard. Greater operational efficiency will be achieved by operating in a more satcom-enabled digital maritime environment and by adapting new applications for smarter decisions and on-board safety. OFW's contract with Marlink is based on the multi-band combination of global Ku-band Sealink VSAT with L-band back-up, which ensures seamless global coverage and connectivity in all maritime conditions.

Reporting another new contract in December, ship owner and management company Leonhardt & Blumberg (L&B) renewed its long-standing partnership with Marlink for the provision of quality global VSAT connectivity. Marlink's managed connectivity service excellence and digital solutions are recognised as a strong foundation for L&B's on-going fleet digitalization, which will deliver more efficient and greener maritime operations. The contract scope for L&B covers 30 vessels currently using the Sealink Premium Plus solution – powered by the XChange communications management platform and accommodating value-added services including the SkyFile Mail and antivirus suite. This ensures VSAT connectivity with guaranteed backup to keep onboard applications online and crew connectivity working seamlessly.

Similarly, January 2020 saw Solstad Offshore renew its connectivity contract with Marlink, committing 65 offshore vessels to Marlink's high-throughput Ku-band VSAT Sealink service. Solstad's vessels will be provided with Sealink Services and L-band backup to ensure seamless global connectivity. A tailor-made setup comprising five diverse packages will allow Solstad to choose the hardware fitted to each vessel, ranging from basic 4G connectivity to a fully managed, high-throughput single or dual antenna VSAT system. Marlink's services for Solstad Offshore are made flexible through use of an innovative Self-Service portal, on board and on shore. Without needing to pick up the phone, users will be able up- or down-grade their bandwidth allocation, activate or deactivate services such as content filters, and change their coverage area. This adaptability will allow Solstad Offshore more control, for example by increasing the bandwidth for a vessel in alignment with current on-board requirements.

In the same month, Teekay Offshore selected Marlink's ITLink solutions portfolio with its benchmark IT operational platform, KeepUp@Sea, to streamline and improve fleet IT management. Marlink will provision ITLink solutions across Teekay Offshore's fleet of shuttle tankers, ALP towing vessels and floating production storage and offloading (FPSO) units to ensure more availability of operational tools, resulting in more efficient and sustainable fleet operations. The implementation of standardisation, automation and remote network management generates substantial savings in time and resources while reducing the possibility of human error and the requirement for technicians to travel to a ship to fix IT issues. Marlink's seamless VSAT connectivity is crucial to the successful running of Teekay Offshore's operational processes, expediting everything from document/data transfer, remote diagnostics, voice communications and videoconferencing to planned maintenance system updates and morale-boosting social media browsing for crew welfare.

### Hughes Communications India Ltd launches India's first maritime VSAT services

Hughes Communications India Ltd (HCIL), majority owned by Hughes Network Systems, is currently the largest satellite service operator in India providing a comprehensive range of broadband networking technologies, solutions, and services for businesses and governments, including the maritime sector.

In September last year, HCIL announced the launch of commercial maritime mobility services in India. HCIL was the first to receive a Flight and Maritime Connectivity (FMC) license in India, which permits the company to provide mobility services within 125km of the Indian coastline. As the first to offer satellite maritime services in India, HCIL enables reliable and ubiquitous connectivity to vessels sailing in domestic waters as well as internationally, through roaming partnerships with select maritime providers. Until now, ships entering Indian waters were required to shut down their VSAT connections; now, they can connect to HCIL's high-speed Ku-band satellite network. This connectivity ensures that ships and their crews switch seamlessly to the HCIL network, with uninterrupted data and voice applications from the port of origin to the port of destination. The HCIL maritime service offering includes the Hughes JUPITER System platform domestically and provides for roaming among international waterways with global ecosystem partners. ■

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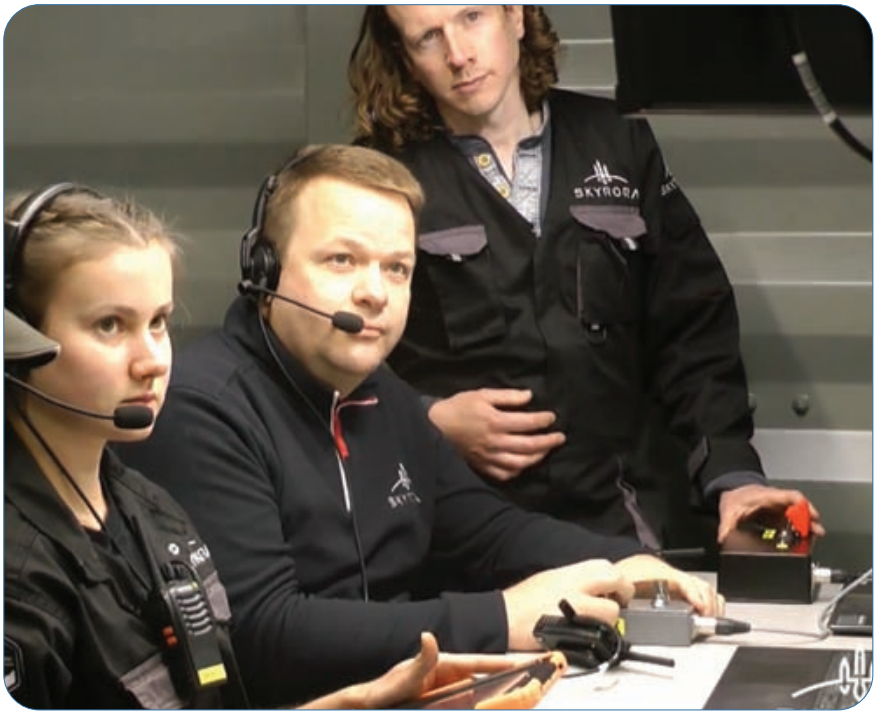


*Skyrora control room at launch. Photo courtesy of Skyrora*

# Greater goals on the horizon

Skyrora recently enjoyed a successful launch of its Skylark Micro rocket from Iceland's Langanes Peninsula including a nominal trajectory for which they received the Leif Erikson Award for environmental responsibility, in particular its Ecosene project, which converts unrecyclable plastic waste into a usable high-grade aviation fuel. The launch provided vital insights into the performance of their launch infrastructure and subsystems. With greater goals on the horizons, Robin Hague, Head of Launch at Skyrora talks about their achievements and hopes for the future.

*Laurence Russell, News & Social Editor, Satellite Evolution Group*

**Question: How has 2020 affected the state of the UK's space economy?**
**Robin Hague:** Fortunately for the UK space industry, it's very flexible. In many cases, we've seen it capable of functioning remotely. In some cases, teams were fairly remote before 2020. Skyrora is already very familiar with collaborating over tremendous distances.

We continued with our workshop to produce PPE and hand sanitiser for local communities in the UK. That allowed us to keep our people working while we contributed to the nation's effort against the virus. We were also thrilled to hear that the visors we'd designed for the NHS had been awarded the CE mark for European safety standards. The pandemic has inevitably pushed the UK space industry back, and Skyrora is no exception, but we've fared much better than other parts of the economy.

**Question: Skyrora recently launched the Skylark Micro from Iceland with the assistance of the Icelandic government and Space Iceland. How have you navigated the delivery of the safety measures necessary to organise a space launch?**
**Robin Hague:** We had to plan this operation with the safety of our staff to minimise the risk of inadvertent transmission. To do that, we followed an isolation process quite closely, especially in our work in Iceland.

Iceland uses an excellent test and trace system, which we were rightfully assured of. Visitors of the country are tested on arrival and then tested before departure with a very speedy procedure.

In terms of the safety and sustainability of the launch itself, we were pleased to make use of our safety case template, which we've been developing over the last couple of years. We also have a number of similar launch applications progressing through R&D channels, and we've been working with the Civil Aviation Authority (CAA) for the potential to launch within the UK. We've built up a very substantial and reliable documentation process accounting for the safety of our launches.

That's all been transferrable to our operations in Iceland, where it's been well received. That's always been one of the aims of the smaller vehicles too. Building their capability, quality control and safety step by step, moving from simpler vehicles up to satellite launchers.

**Question: Until now, Iceland had no permit procedure for allowing rocket launches. Considering the success of this operation do you see Iceland becoming a regular launch site for the UK, in the Langanes Peninsula or elsewhere?**
**Robin Hague:** We've seen a tremendously positive response from the Icelandic authorities and the broader public. It's something I know they'd certainly be keen to see more of. For us, our focus is to launch from the UK spaceports, but Iceland is a fantastic launch site which is well-cited for supporting the UK space industry in terms of downrange tracking and that sort of thing.

Scotland and Iceland could well become complementary locations across launch and tracking aspects of the space economy.

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*Robin Hague, Head of Launch at Skyrora*

**Question: The Skylark Micro launch plans to test onboard avionics and practice marine recovery operations. What are you hoping to learn from them?**

**Robin Hague:** We're taking a procedural approach. In the case of nano and micro, both use commercial off the shelf (COTS) solid rocket motors, which lets us focus on the operation, the avionics and developing launch confidence as we continue to develop our own in-house bioliquid propulsion, Ecosene.

Each step on, the rockets are supporting the next one up. As small as micro is, we're carrying subsystems which we plan to deploy with the larger rockets. Physical launch is the ultimate test of this hardware and demonstrates conclusively what can and can't be done. Indeed, the small solid rocket motors are actually more violent than what you would see from larger vehicles, so if the electronics can hack it with this launch, they'll be proven for bigger launches.

Of course, to make any serious launch attempt in Europe, it's always going to be coastal, and we want to recover all parts. That's both because we want the materials back to track data and re-use them, but it's also an enormous environmental responsibility.

**Question: Skyrora's de-risking programme is based on testing its systems with smaller and more cost-effective vehicles before they are used in their larger Skylark L and Skyrora XL rockets. Historically, vehicle loss has been endemic to the field of space launch. Do you think the NewSpace era of reusable technology could change that?**

**Robin Hague:** There's always going to be a significant chance in the early days of testing new launch technology that you may not get your vehicle back, but the same development that's been enabling smaller and smaller satellites have been enabling more and more capable small rockets.

The downsizing of sensors, communications, and other electronic systems make them easier to keep track of and increase survivability. There have been many failures in recent NewSpace history, but perhaps that's more a product of increasing ambitions. Launch equipment has never been safer.

**Question: The government's purchase of a 45 percent share of OneWeb suggests the pandemic hasn't reversed its priority to invest in space infrastructure. What are your near-future predictions for the sector?**

**Robin Hague:** I think we're arriving at a very exciting moment in our history. There's quite a large number of companies working on what would be commonly considered micro launches, vehicles at 500kg and below. We know many won't progress to hardware, but we're reaching the point where credible contenders like ourselves with the bioliquid Skylark L, or Virgin Orbit, Astra and Rocket Lab, which already has a number of successful launches, are becoming serious.

We're finally reaching the point where this new wave of start-ups is aspiring to true flight.

I think there's plenty of market share for these enterprises, and I think we'll see a whole set of us beginning some very promising ventures, unlocking a much easier route to orbit for small payloads, which could well lead to more launches in step with the increasing degree of demand we've been seeing.

**Question: Skyrora XL is scheduled to launch in 2023. How do you feel about that deadline?**

**Robin Hague:** We're cautiously optimistic. Of course, there's a lot to be done, but our subsystems are coming along very well which the small rockets have helped with a lot, and major steps forward in ground testing our engines have been tackled.

One important point with Skyrora XL has been its nature in being designed for manufacture, modularity, and logistical convenience. That gives us a high degree of commonality between the first and second stage structure. It's a rigorously practical design with many common parts, drawing on the innovations of new manufacturing. We're using multiple examples of the same high-pressure tank distributed through it, which means we can very quickly arrange to demonstrate the full rocket.

Skyrora is approaching a crucial juncture as we undertake an increasing number of tests. Skylark Micro is just the beginning of a test launch campaign which has us quite optimistic that we'll see near-space and space launch from the UK soon. ■

*Skylark Micro at the moment of launch. Photo courtesy Skyrora*

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For further information visit: https://advantechwireless.com

**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)**
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For further information visit: https://www.avltech.com

**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.

For further information visit: https://www.isotropicsystems.com

# 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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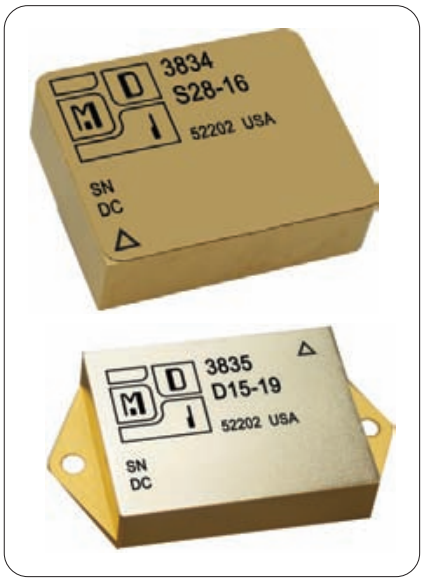


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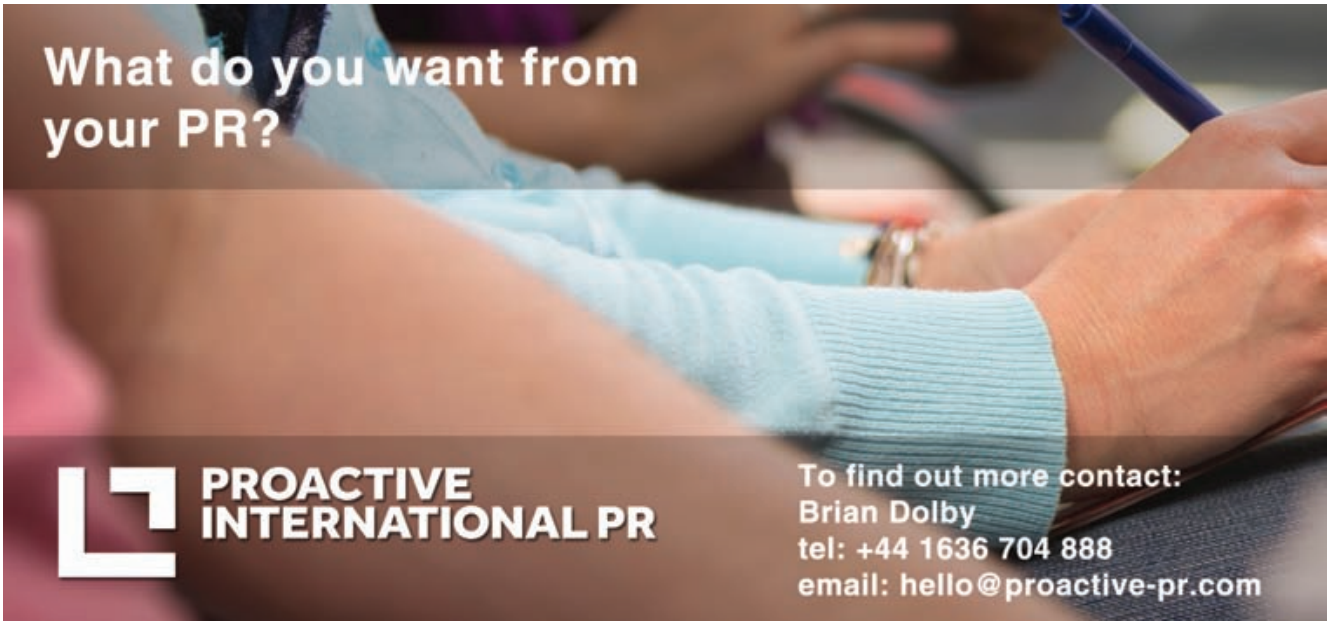

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**mosaic-TTM, a highly secure and accurate GNSS timing module**
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For further information visit: https://www.septentrio.com

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**Teledyne launches new Hi-Power Limiter for military apps**
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For further information visit: https://terrasatinc.com

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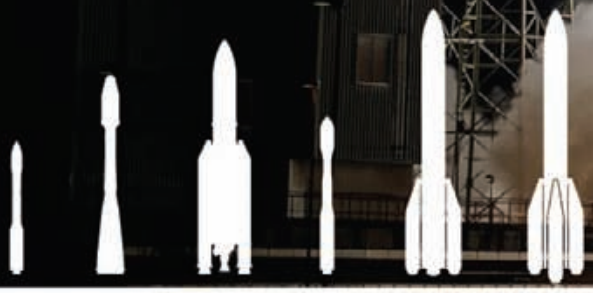
At the forefront of the smallsat revolution, the cutting-edge Vega small launcher has already acquitted itself as the world's premiere delivery system for small payloads to LEO.

On **September 2, 2020** Arianespace has successfully realised the first European "rideshare" mission for small satellites, with 53 satellites onboard the Vega launcher for 21 customers.



**40 years** of delivering the future