

ISSUE 79 | MAY 2022

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# SATELLITE PRO

TECHNOLOGY INTELLIGENCE

MIDDLE EAST



## QATAR'S RISING STAR

With a young fleet, a state-of-the-art teleport and advanced satcom services, Es'hailSat secures Qatar's satellite future

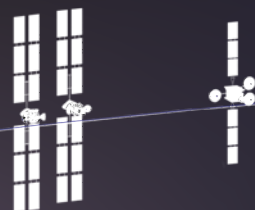




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INTRO

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## WELCOME



Space is no longer an inaccessible frontier, and it's fascinating to see how some ideas that were merely on

paper a few years ago are now slowly unfolding before our eyes. Last month, I had the opportunity to speak with serial entrepreneur and CEO of Orbit Fab Daniel Faber, whose mega plan to build gas stations in space is now slowly becoming a reality.

Faber's team has been working over the last four years towards this, and now most of the underlying technology needed to have fuel depots in space has been developed. In fact, the first operational propellant depot has been launched in LEO and two years from now, Orbit Fab will have shuttles to take the fuel from the depot to the operational satellites.

Besides creating a brand new opportunity for the first time to refuel satellites, which were previously rendered useless if they ran out of gas, Faber's dream is to help "create the bustling economy that will ultimately support permanent jobs in space".

Faber has been clever. His fuel depots have a payload that produces no data, consumes no power and requires no antennas. By keeping the depots simple, he has also ensured they are cost-effective. Likewise, the fuel shuttles have rendezvous docking elements that allow them to dock to another satellite. Here again, Orbit Fab relies on the satellite having a

fuelling port, akin to a gas cap, which incorporates grappling elements so it can be used for docking.

Faber sums up the whole package as "a tank and a pump to deliver the fuel" and says most of the innovation is not as much in the technology as in the business models.

Another interesting conversation *SatellitePro* had was with Astroscale, which is specifically working towards "safely removing defunct objects from space and pioneering new ways to service, upgrade and transport spacecraft".

Such innovations hugely support big players who already have satellites in space, and this issue of the magazine has tried to capture some of the traditional solutions we need while also exploring different sub markets that are mushrooming to support this sector. From traditional GEO players and upcoming software-defined satellites to regional developments and startups, we have put together an interesting read to complement the satellite showcases and discussions at CABSAT this year. See you at the show.

**VIJAYA CHERIAN**  
Editor  
*SatellitePro* ME



## LEADING SIMPLICITY IN THE SATELLITE NETWORKS



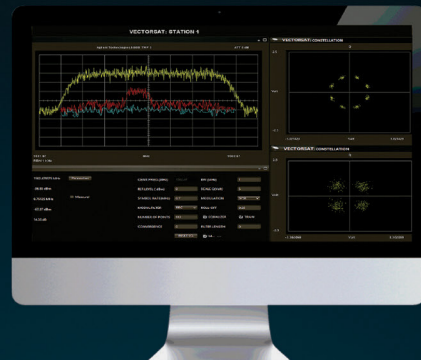
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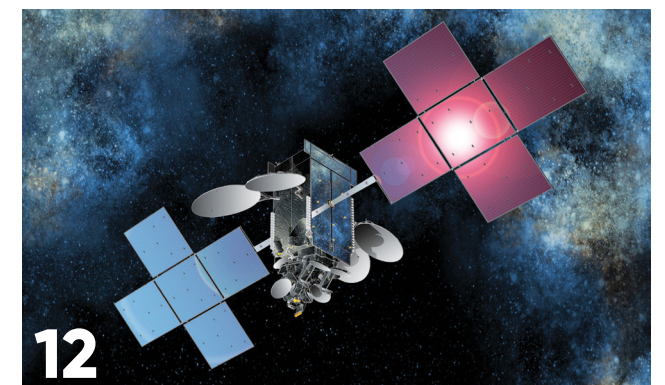
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**17 - 19**  
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- 05** **UPDATE**  
**Industry News**  
 NileSat to launch fourth satellite in May 2022; Arabsat signs MoU with Actia Group; Hughes launches flat panel antenna technology for OneWeb; SpaceChain launches Abu Dhabi office; Safaricom and Intelsat expand LTE coverage in Kenya; and more
- 12** **COVER – ONE SATELLITE AT A TIME**  
**Tracing Es'hailSat's journey**  
 Hamad Al Mannai, VP – Commercial, discusses Es'hailSat's GEO plans, its role in the World Cup and its roadmap for the future
- 18** **TECH FEATURE**  
**The future of comms**  
 Software-defined satellites will enable more flexibility in space, allowing people on the ground to adapt to market changes, says Carmel Ortiz
- 20** **ADDRESSING SPACE DEBRIS**  
**The rise of new players**  
 As the world goes into full throttle with new satellite launches, space debris is becoming a massive concern. We look at a new industry emerging to address this on various levels
- 26** **INTERVIEW**  
**Aiming for the stars**  
 Salem Humaid Al Marri, newly appointed DG at MBRSC, gives us a flavour of what's cooking in the MBRSC lab these days
- 30** **SPECIAL FEATURE**  
**Global regulators on spectrum management**  
 DSA President Martha Suarez shares how regulators across the world are attempting more efficient utilisation of spectrum
- 34** **CABSAT 2022**  
**Tech showcase**  
 New solutions and discussions at the event
- 40** **GUEST COLUMN**  
**Jamming and interference**  
 Alvaro Sanchez reveals ways to avoid interference





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## NileSat-301 launch delayed, new date not announced

### SATELLITE LAUNCH

NileSat-301, the fourth satellite from Egypt's commercial satellite communications operator NileSat, will not launch in May 2022 as previously scheduled owing to some delays. European satellite manufacturer Thales Alenia Space had previously stated that Nilesat-301 was placed inside its transport container and was ready for departure.

NileSat signed the contract back in December 2019, and the project had a development

timeline of 25 months.

However, the timeline was extended by four more months from January 2022. NileSat also signed a launch contract with SpaceX for the in-orbit delivery of the satellite.

The satellite will have a minimum lifespan of 15 years in orbit and will deliver communications and satellite broadband services to Egypt and neighbouring countries in North Africa and the Middle East. It will also help extend the company's provision of Ku-band communications

and direct digital broadcasting services in two new large regions of Africa, while providing broadband Ka-band connectivity over all of Egypt.

Nilesat-301 is based on the Spacebus 4000-B2 platform and will weigh about four metric tons at launch. NileSat 301 is the second GEO satellite built and fourth payload developed by Thales Alenia Space for Nilesat. Once delivered to SpaceX, it will be fitted onto a SpaceX Falcon 9 satellite launch vehicle and launched from Florida.

## Arabsat signs MoU with Actia Group



Dr Badr AlSuwaidan, CEO of Arabsat.

### PARTNERSHIP

Arabsat and Actia Telecom, an Actia Group company, have signed a Memorandum of Understanding to strengthen a strategic business relationship initiated a few years ago during the Arabsat 13th Telecom Forum. Arabsat and the French satcom integrator combine their expertise to offer Arabsat

end users state-of-the-art, cost-effective, end-to-end satcom solutions for commercial customers in the MENA region. While Arabsat will provide high-throughput satcom capacity in Ku Appendix, Actia Telecom will integrate, deliver, install and support the Ku Appendix satellite communications terminals.

**This business model shall be extended for other satellites services in Ku- and Ka-band. Actia has an extensive line of terminals and satcom power amplifiers to meet Arabsat's – or its clients' – needs wherever its satellite capacity is available in the MENA region.**

**Dr Badr AlSuwaidan, CEO of Arabsat, said:** “Arabsat operates the most trusted satellite fleet in the Arab world and beyond, delivering high-quality service. Along with Actia Telecom, we will continue delivering innovative solutions through cutting-edge space and ground technologies, to be the destination for satellite communications and one-stop shop for our customers.”

## Yahsat reports \$408m revenue for 2021

### BUDGET

Yahsat's momentum continued in Q4 2021, with revenue of \$123.3m exceeding the previous year by 7.9%, leading to full-year revenue of \$408m, marginally up year-on-year. During the year, contracted future revenues rose more than 35% to close at over \$2bn, underpinned by the 15-year T4-NGS Managed Capacity Services Agreement signed in June 2021, which added more than \$700m, equivalent to additional annualised revenues of \$47m from mid-2024 onwards.

A significant number of contracts were also signed in the Data Solutions and Mobility Solutions businesses, with particularly strong momentum in Q4. Over this period, the aggregate value of contracted future revenues in these two segments more than doubled. Together with an extensive pipeline of new business opportunities, Yahsat aims to grow in 2022, with approximately 70% of the Group's 2022 projected revenues contracted as of December 31, 2021.



# Hughes announces flat panel antenna technology for OneWeb at Satellite 2022

## SATELLITE TECH

Hughes Network Systems revealed its new technology for electronically steerable flat-panel antennas, including a prototype for delivering OneWeb low-Earth orbit (LEO) connectivity services at the Satellite 2022 trade show in Washington, DC. As a technology partner, investor and service provider for OneWeb, Hughes designed and is deploying the gateway electronics for the worldwide ground system.

The antenna seamlessly hands off signals from one satellite beam to another every 11 seconds, and from one satellite to the next every three minutes. Over a series of tests, the antenna technology has been proven to support LEO connectivity

at speeds of 190Mbps down and 20Mbps up, with average roundtrip latency of 55ms.

Pradman Kaul, Hughes President and CEO, said: "With our hybrid Jupiter satellite-LTE capability and our flat-panel LEO antenna, Hughes is realising a multi-transport vision for our customers and partners. The Hughes technology demonstrations at Satellite 2022

are proof of our continued engineering leadership on the path to an integrated, worldwide ecosystem of terrestrial and multi-orbit satellite connectivity."

As owner and operator of HughesNet, Hughes continues to enhance its offerings with faster speeds, more data and network optimisations. To help shorten the time it takes for an internet signal to transmit (the latency),

Hughes developed the integrated GEO satellite-LTE capability that employs Hughes Active Technologies to route data intelligently and seamlessly over the optimal transport path.

Adrian Morris, Hughes Executive VP, Engineering, stated: "The Hughes flat-panel LEO antenna

technology is unlike any developed to date. Combining our decades of experience working on low-Earth orbit systems with our intimate understanding of the OneWeb system, our engineers created an entirely new design that delivers high performance that will change the paradigm for LEO service implementations worldwide."

Neil Masterson, CEO, OneWeb, added: "This new antenna is the latest example of Hughes' engineering expertise and its commitment to working in close collaboration with OneWeb to enhance our service offering for enterprise and mobility customers."

Hughes aims to make its antenna technology for OneWeb services available by early 2023.



A prototype of the new Hughes phased array antenna panel was on display at Satellite Show 2022.

## Viasat and Batelco partner to distribute broadband services in MENA

### BROADBAND

Viasat has signed a non-binding MoU with Bahrain Telecommunication Company (Batelco) to distribute satellite broadband connectivity to the MENA region, focusing on the potential commercialisation and distribution of satellite broadband connectivity to businesses. The companies also plan to

explore other potential service areas, including hybrid connectivity solutions combining satellite and terrestrial broadband for businesses; corporate local area network extension services; satellite connectivity for mobile backhaul; and IoT business-to-business applications.

Viasat and Batelco seek to leverage satellite

broadband capacity from Viasat's current satellite systems, with plans to evolve to the ViaSat-3 satellite platform once launched and operational. As a first step of the MoU, the companies expect to implement a proof-of-concept trial within the next several months.

Commenting on the deal, Peter Langkilde, Viasat GM, Broadband Services, Europe,

Middle East and Africa, said: "Viasat is on a path to bring high-quality broadband connectivity. By signing an MoU with Batelco, we can strategically explore various business synergies and collaborations with a proven market leader in the MENA region, ahead of the launch of our next-generation ViaSat-3 satellite constellation."

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# SpaceChain launches Abu Dhabi office

REGIONAL LAUNCH

SpaceChain has opened a new office in Abu Dhabi as it looks to tap into markets in the Middle East. Incorporated and operated under the legal entity of SpaceChain MENA Ltd, the new office is located at Hub71, Abu Dhabi's global tech ecosystem, where the company will spearhead the planning and development of integrated space-blockchain projects and initiatives in the MENA region.

The establishment of SpaceChain's UAE office is a milestone in advancing SpaceChain's decentralised satellite infrastructure (DSI) for business and fintech applications, and extending its space-as-a-service



Zee Zheng is co-founder and CEO of SpaceChain.

capabilities to enterprises and communities across MENA to create a next-generation infrastructure for the blockchain industry in outer space. To date, SpaceChain has successfully launched

six blockchain-enabled satellite payloads into space to realise its DSI vision.

Zee Zheng, co-founder and CEO of SpaceChain, said: "Being part of the Hub71 community places SpaceChain at the gateway to the burgeoning space industry in the MENA region. Our presence alongside other high-growth tech companies will allow us to share expertise and collaborate with leading influential players in Abu Dhabi's growing innovation ecosystem that are interested in capitalising on the new space economy."

SpaceChain MENA will collaborate closely with start-ups and organisations

in the space, blockchain and fintech arenas within the region to uncover business and growth opportunities across multiple service offerings, including e-wallets, space commodities exchange, micro-geoservices that connect EO service providers with user communities, and decentralised finance (DeFi) applications.

The UAE government has lent support in developing a space industry across the region. The National Space Strategy 2030 aims to enhance the space sector's contribution to the national economy and promote the UAE's regional and international presence in the space industry.

# Safaricom works with Intelsat to expand LTE coverage in Kenya

LTE PARTNERSHIP

Kenya's telco operator, Safaricom, has signed a multi-year contract with Intelsat to modernise its network and expand LTE coverage to more subscribers across the country. Intelsat will provide Safaricom with both cellular backhaul over satellite and enterprise connectivity services. The availability of Safaricom LTE service everywhere will enhance connectivity for the 68.9% of the Kenyan population that lives in rural areas. Bringing such service to these challenging, hard-to-

reach places supports the Kenyan government's vision for a digitally empowered citizenry.

Intelsat's global satellite network, with Safaricom's expertise, will ensure secure coverage even in the most remote areas of the country. Intelsat's network delivers carrier-grade bandwidth where and when it is needed most, ensuring a seamless, reliable experience for businesses to operate optimally, connect with their customers and benefit from new commercial opportunities. LTE



Hans Geldenhuys, Intelsat Director of Sales in Africa.

technology delivers the fast mobile internet connectivity needed for an optimal experience, turning smartphones into connected devices

and opening up new opportunities.

Intelsat Director of Sales in Africa Hans Geldenhuys said: "This partnership enables Safaricom to leverage our global hybrid network and expand its LTE coverage to remote areas and more subscribers in Kenya, helping them increase their revenue and provide an improved, more reliable experience to their customers. The reach of our network across Africa also offers growth opportunities as Safaricom looks to expand its activities in other areas in the region."

# Yahsat and Al Seer Marine to offer satcom solutions to maritime vessels

MARITIME

Yahsat Government Solutions has signed an MoU with Al Seer Marine to test line-fitting unmanned vessels with advanced comms-on-the-move (COTM) satellite communications solutions. Yahsat's advanced satellite communications solutions will be jointly offered to customers to support critical operations such as Exclusive Economic Zone (EEZ) protection, security, anti-piracy, anti-human trafficking and coastal patrol. The MoU will enable Al Seer Marine to build on Yahsat's experience in delivering highly secure satellite

communications services for safety and security mission-critical applications, such as COTM and beyond line of sight (BLoS).

By pre-qualifying its COTM solutions to work efficiently on Al Seer's unmanned vessels, Yahsat has developed a strong business model and value proposition which reduces integration and timeline risks, ensures platform structural and design integrity, warrants onboard combat systems and sensor compatibility, and optimises system integration costs. The combined expertise of Al Seer Marine and Yahsat in melding



Eisa Al Shamsi, General Manager of Yahsat Government Solutions.

COTM, BLoS and other combat systems on maritime platforms opens the door to a range of add-ons, creating massive value for customers

while ensuring performance, reliability and security.

GM Eisa Al Shamsi said: "We are delighted to have signed this MoU with Al Seer Marine. It will allow Al Seer Marine to draw upon Yahsat's rich expertise in system integration on airborne, shipborne and land vehicular platforms, enabling dynamic and versatile applications requiring satellite connectivity. By using our pre-equipped and pre-tested solutions, Al Seer Marine will be able to provide its customers additional value while trimming unwanted costs associated with testing and qualification."

# MBRSC launches World Space Sustainability Association

SPACE PARTNERSHIP

Mohammed Bin Rashid Space Centre (MBRSC) has announced the launch of the World Space Sustainability Association, part of the official proceedings of the World Government Summit 2022, with the aim of strengthening efforts and coordinating initiatives that will address challenges facing the space industry, and undertaking initiatives that will develop the industry.

The WSSA was launched in cooperation with Elseco, Herbert Smith Freehill and a



At the World Government Summit.

number of major global corporate entities. The MBRSC and its partners will work to expand the scope of the initiative by attracting more stakeholders in the sector, including operators

and developers of space and satellite solutions, space business entities, leading policy-makers, regulators, international organisations and innovators.

The initiative will

focus on a number of existing challenges, such as the management of debris in space and the sustainable development of innovation and space technology, in cooperation with many stakeholders and relevant authorities.

The World Government Summit hosted more than 4,000 participants, including senior government officials, experts and leaders of the private sector, to explore the future of governments in more than 110 key panel and interactive workshop sessions.



# Thuraya and Cobham partner to launch radio communications solution

## SATELLITE TECH

Thuraya Telecommunications Company, the mobile satellite services subsidiary of Yahsat, has launched its new IP-based radio communications solution, Thuraya Push-to-Talk (PTT), developed along with Cobham SATCOM. It will enable users across a wide spectrum of industries to extend the range of their voice communications beyond line of sight (BLoS) wherever their assets and teams are located.

Thuraya PTT is an IP-based radio communications solution that works in conjunction with any Thuraya broadband terminal to establish a private network. It gives users the ability to combine and integrate different technologies, such as 3G/LTE/LMR (land mobile radio), via Thuraya's advanced satellite system for seamless voice and data communications.



The solution manages communications from multiple devices and locations and provides real-time, uninterrupted switching between satellite, cellular and LAN, ensuring cost-efficient and reliable connectivity. Thuraya PTT is designed for mission-critical operations to support organisations in remote areas that often struggle with a lack of reliable connectivity, particularly when there is an urgent need to

communicate across different areas, countries or continents.

Thuraya CEO Sulaiman Al Ali said: "Our partnership with Cobham SATCOM has been a key component of this successful launch. It has enabled us to broaden and enhance our portfolio offering by creating a platform for further innovation and development of features and applications to increase our global market share. We're looking forward to more

collaborations with Cobham SATCOM and reaching more milestones of this nature in the near future."

The global PTT (including hardware, solutions and services for all network types) market size is set to grow from \$29.2bn in 2021 to \$45.2bn by 2026, a CAGR of 9.1%, with the public safety, government, energy and utilities sectors occupying a significant proportion of growth. In addition, the global hybrid-satellite cellular terminal market is expected to reach around \$700m by 2031, a CAGR of 22.81% during the forecast period 2021-2031.

Thuraya PTT extends legacy push-to-talk capabilities to hybrid data networks such as terrestrial cellular networks where available, supplemented by the Thuraya satellite network where no terrestrial network coverage is present.

## Bahrain signs US-led Artemis Accords

### PARTNERSHIP

Bahrain is the latest nation to sign the Artemis Accords, which embrace a common set of principles to guide cooperation among nations participating in NASA's Artemis programme.

NASA Administrator Bill Nelson said: "This important decision by Bahrain follows the recent successful launch of the Light-1

spacecraft, developed by Bahrain's National Space Science Agency (NSSA) in cooperation with the UAE, another Artemis Accords signatory."

NSSA CEO Dr Mohamed Al Aseeri signed the Artemis Accords for Bahrain, which joins 16 other countries to sign this deal. Bahrain is the third country in the Middle East to sign, following

the UAE and Israel.

NASA, in coordination with the US Department of State, announced the establishment of the Artemis Accords in 2020. The Artemis Accords reinforce the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies, otherwise known as the Outer Space Treaty.

Additional countries will join the Artemis Accords in the months and years ahead, as NASA continues to work with its international partners to establish a peaceful, and prosperous future in space. Working with new and existing partners will add new energy and capabilities to ensure the entire world can benefit from this journey of exploration.

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# ES'HAILSAT'S BLUEPRINT FOR QATAR'S SPACE FUTURE

As Qatar's state-backed satellite operator Es'hailSat enters its 12th year since launch, Hamad Al Mannai, Vice President – Commercial, traces the company's journey and discusses its GEO plans, its role in the World Cup and its roadmap for the future with **SatellitePro ME**



You've been around for 11 years. What are your commercial and technical

milestones over the years, and do you have any numbers to share?

As Qatar's satellite operator of choice, Es'hailSat has been serving broadcasters, telecom companies, enterprise and government customers for the past 11 years from our headquarters in Doha. Es'hail-1 launched to 25.5 East in 2013 followed by Es'hail-2 at 26 East in 2018, both carrying Ku-band and Ka-band capacity for MENA. The early years since our incorporation in 2010 saw strategic partnerships with customers such as Al Jazeera, beIN and Ooredoo for broadcast, telecommunications and VSAT services.

Between 2015 and 2020, the trend continued with government customers such as the Civil Aviation Authority in Qatar as well as commercial partnerships across the

MENA region. 2019 saw the launch of our state-of-the-art teleport in Doha and the commissioning of our iDirect hub, which can deliver fully managed services. Spread across 50,000sqm with more than 99.9% availability, we are now able to expand into a host of new services from our teleport. With capacity utilisation across both our satellites at about 70%, which is above industry standards, we support key customers in the region with adequate capacity availability for expansion and to support new customers.

Can you elaborate on what advantage you enjoy in these spaces, and if there are specific preferences for Ku-band or Ka-band in different MENA markets? How much capacity do you have left?

We definitely operate in both, as is evident from our two satellites and their capacity configuration. We believe each band has its own

target market and customers who cannot do without the advantages that they offer, be it technical or commercial. The premium video neighbourhood at 25.5 East / 26 East relies on our Ku-band capacity and reaches millions of viewers across MENA. This gives the major broadcasters in the region the ability to deliver their content to the maximum number of eyeballs, all from our teleport located in Doha.

Ka-band, on the other hand, provides data networking services to a wide variety of government and commercial customers. The economics of a lower cost per bit in Ka-band enables these customers to run efficient networks that are both robust and financially viable. In terms of capacity, we are certainly operating our satellites at a high fill rate because of the reasons mentioned above, but depending on the requirement, we can provide potential customers with as much as they need.







Es'hailSat's teleport in Doha, which was launched in 2019, provides a range of services including back-up studios for TV channels and disaster recovery.

**Are there plans for a new satellite soon?**

At an average fleet age under six years, we at Es'hailSat have one of the youngest fleets of any satellite operator in the MENA region. Our plans are to continually upgrade our capabilities in terms of our teleport, ground segment and managed services, to be able to leverage our young fleet in orbit today. We are working on multiple long-term projects to fulfil our vision to be a world-class satellite operator and service provider that effectively contributes to the success of Qatar's National Vision 2030 by adding a new dimension to the diversifying economy. We are evaluating new satellites in GEO for future applications such as IFC, IoT and others. At the same time, we are also open to partner with NSO constellations to achieve a winning proposition for all parties concerned.

**Tell us more about your teleport – some of the tech highlights and how it will improve your services.**

Es'hailSat's state-of-the-art teleport in Doha was launched officially in 2019 to manage the operations of our satellite, and also to support value-added

services for our customers. To support one such initiative, we have commissioned Comtech and iDirect VSAT hubs at the teleport to provide fully managed service packages to our end users. This has helped organisations improve their own network and offer services to their end users, providing them with resilient and reliable communication services for the enterprise needs. Our teleport enables us to adopt the latest advancements in international technology, including cloud playout services, content delivery networks (CDNs), and mobility and telecommunication services. We provide hosting services both in terms of data centre and

equipment and antenna hosting, and provide managed services as required by the customers.

**You were primarily developed to establish Qatar's presence in space. How has your mandate changed over the years, and what is the evolving vision?**

Es'hailSat's satellites are a symbol of Qatar's commitment to free, secure and independent communication, and the World Cup offers the perfect opportunity for us to showcase our capabilities. Even beyond that, Qatar's 2030 Vision has been designed to move us from a carbon-based to a knowledge-based economy, and Es'hailSat is a key part of that vision. For our business, the priority over the next 12 months is to expand our services to support the rapid growth of Qatari customers across the board. The sky is the limit for Qatar's ambitions, and Es'hailSat wants to ensure that we are the first choice for companies in the country and across the region wherever there is a need for connectivity over satellite.

**What are your current offerings in the DTH space, and how are you adapting to**

**"Our plans are to continually upgrade our capabilities in terms of our teleport, ground segment and managed services, to be able to leverage our young fleet in orbit today"**

**Hamad Al Mannai, Vice President – Commercial, Es'hailSat**

**the new OTT ecosystem?**

For our customers, path-breaking broadcasters such as Al Jazeera and beIN Sports, opportunities lie in delivering every possible genre of content to consumers across all touchpoints – the television at home, the mobile device on the move and over Internet connectivity over land, sea or air. Es'hailSat is enabling these opportunities by adopting cutting-edge technology and delivering a world-class service from our strategically located teleport facility in Doha. In addition, we are evaluating various OTT projects both from a perspective of supporting existing clients and independent OTT aggregation.

**With the World Cup coming up in Qatar and significantly higher broadcast demands, is Es'hailSat also looking to ramp up? What will you have on offer for media companies coming in to cover the event?**

For the various mega-events such as the World Cup which are broadcast live across the globe, we at Es'hailSat have enhanced our satellite news gathering services capabilities. These, along with our Es'hail-1 and Es'hail-2 satellites at 25.5/26 East hotspot, will provide the backbone required by news broadcasters and television channels to carry these events across the region and beyond.

**What challenges are satellite operators facing these days, and how are you addressing them?**

The first would be piracy, as content protection is still a concern for the MENA region. Although a majority of the large piracy incidents have been addressed and discontinued, there is still rampant online piracy of content. Then there are always price pressures when it comes to satellite capacity, services and equipment. This has

**"Es'hailSat's satellites are a symbol of Qatar's commitment to free, secure and independent communication, and the World Cup offers the perfect opportunity for us to showcase our capabilities"**

**Hamad Al Mannai, Vice President – Commercial, Es'hailSat**

come to the forefront in the last few months, with supply chain issues causing delivery delays and further delaying implementation, service roll-out, etc.

**The big, inevitable question: how deeply has the pandemic impacted your business, and what measures have you taken to recover from the last few months of lockdown?**

Over the last two years, the pandemic has shown us how important it is to have cost-effective connectivity solutions to enable people to remain connected and productive. Online activities have surged in the last year or



Es'hail 2 was launched in 2018 and operates at 26° East.



two, initially because of the compulsions that arose during the pandemic, but also because people have thereafter realised that a lot can be accomplished online, even if one is not physically present in offices and other locations. The net result of this has been that connectivity has become more critical to the lives and livelihoods of people, and robust telecommunication services are now seen as an essential utility. While the industry can do a lot more, the pace of broadband growth in MENA has been quite encouraging. The deployment of 4G and 5G infrastructure has been critical to developing low-cost wireless broadband in MENA. Es'hailSat's satellite services and our teleport infrastructure are well positioned to deliver cost-effective broadband solutions across the MENA region.

**There's a lot of activity in the LEO and MEO space. What are Es'hailSat's plans on this front?** We remain open to partnerships with NSO companies to leverage upon our strengths, which are

**"Our teleport enables us to adopt the latest advancements in international technology, including cloud playout services, content delivery networks and mobility and telecommunication services"**

**Hamad Al Mannai, Vice President – Commercial, Es'hailSat**

world-class teleport facilities and top-of-the-line assets in space and on the ground, to name a few. As Qatar's satellite operator of choice, we bring tremendous value to any NSO partnership and can provide the local and regional expertise that these global companies need to build a sustainable business in the region.

Doing business in any space-based industry is hard, even if

one considers the established geostationary satellite services segment. LEO and MEO are relatively young and unproven, which makes the recent gold rush of announcing constellations a trend that we believe needs to be approached with cautious optimism. A lot needs to be done before these systems become fully available to market, and the sheer volume of capital and technology advancements required makes it an uphill climb for the companies involved. We are happy to collaborate with these companies and bring our strengths to the table in a manner that enables collaborative growth.

**They keep saying satellite is dying and linear channels are taking their last breath. What is your opinion about the place satellite will occupy in this market in the future, and why? Do you have any numbers to back up your claims?**

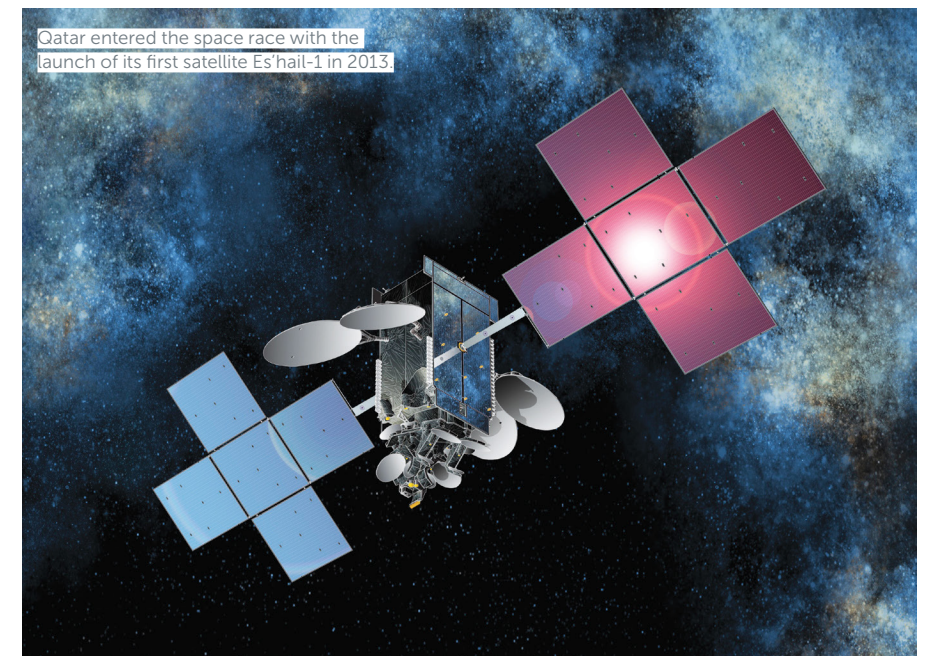
From our perspective, the commercial television market still looks robust, even though the broadcast industry has seen a

radical shift from linear satellite distribution to adopting internet-based OTT delivery over the last few years. MENA as a region has a mix of users who prefer streaming services, as well as a healthy number of those who would still want to consume their premium 4K/UHD content on a smart TV over a satellite DTH service. Due to this underlying demand demographic, we continue to remain bullish on the future of satellite television in the region for many years to come.

**Are there any regional or global partnerships that you would like to elaborate on?**

As recently as 2019, Es'hailSat signed a joint venture agreement with BridgeSat (now called BridgeComm) based in Denver, Colorado. This enables the installation of an optical ground station at our facilities in Qatar for low-cost laser satellite communications across the Middle East. We have signed agreements with global mobility satellite service provider Inmarsat for mobility services within Qatar, complementing the services we provide on our satellites. We have multiple agreements with other terminal and antenna and service providers, such as iDirect, Cobham, etc, that enhance and support our end-to-end service provisioning.

Over the past year, Es'hailSat has signed many strategic partnerships to enable Qatari companies to benefit from the most advanced technologies. We showcased some of our partnerships regarding maritime and mobile broadband connectivity at the Qatar International Boat Show in November 2021. Certain partnerships we now have allow us to offer enhanced VSAT support services in the maritime segment, while others cater to communications infrastructure



required for vessels at sea. One such example is the successful proof of concept that we completed in 2021 using low-profile flat-panel VSAT terminals for the maritime environment, using the Es'hail-1 satellite.

**Who are some of the other customers in the Arab world that use your capacity?**

Es'hailSat's two satellites, Es'hail-1 and Es'hail-2 located at 25.5/26 East, offer coverage of North Africa and the Middle East, including both Gulf countries

as well as other neighbouring countries such as Egypt, Sudan, Libya, Algeria, Morocco and Eritrea. We have commissioned Comtech and iDirect Hub Services from our teleport, which offers fully managed data service packages to end users. Innovative solutions include fully encrypted, secure, fixed and mobile communications, anti-jamming capabilities, as well as robust and reliable broadcasting services catering to audiences across MENA.

**What steps have you taken to protect the interests of content owners and legitimate rights owners?**

By enhancing our monitoring and anti-jamming capabilities, we are able to offer content owners the assurance that their media properties are in safe hands from a distribution perspective. We continue to support numerous organisations that are trying to combat piracy issues across the region, and remain committed to this cause. **PRO**

**"Qatar's 2030 Vision has been designed to move us from a carbon-based to a knowledge-based economy, and Es'hailSat is a key part of that vision"**

**Hamad Al Mannai, Vice President – Commercial, Es'hailSat**





# SOFTWARE-DEFINED SATELLITES: SHAPING THE FUTURE OF COMMUNICATIONS

Software-defined technology will bring more flexibility in space, allowing people on the ground to adapt to market changes and create connectivity on demand, where and when needed, says Carmel Ortiz



A few years back, as we set out to reassess our strategy based on our customers' growing connectivity needs, we looked at how to optimise an already powerful network. We had a clear vision of what we wanted to achieve: we needed to be able to deliver the exact bandwidth our customers would need, when and where they would need it. We also needed to ease the provisioning of new connectivity services and be able to respond to traffic spikes in a matter of seconds. We needed to enable telecom operators to quickly and efficiently extend the reach of their network, while allowing airlines and cruise ships to benefit from a seamless, always-on experience. For this, we needed to design a truly global and unified 5G network to answer the call for high-speed, reliable, dynamic coverage on a global scale.

While our network of traditional and high-throughput satellites already responded to our customers' connectivity needs, we looked at how we could evolve the design of our combined satellite and ground networks to accelerate performance

and flexibility. Following a thorough assessment of various technologies, we determined that the advanced software-defined satellite technology envisioned was critical to enabling us to respond to these growing requirements – and would be the catalyst for our growth. Today, we have more than ten software-defined satellites planned, including four already in production.

Technology investments and innovations over the past few years have coalesced to maximise the effective and efficient use of satellite resources. Fully reconfigurable while in orbit, software-defined satellites allow bandwidth to be dynamically adapted and flexibly reconfigured to concentrate capacity where demand is highest. Unlike traditional and high-throughput satellites, we no longer have to decide in advance where to provide service and capacity. And with faster build and deployment times, software-defined satellites eliminate network bottlenecks.

Realising the benefits requires an equally innovative and advanced ground network – space and ground components working seamlessly to detect changes in customer demand and dynamically reconfigure capacity

and service coverage. The future is software-defined everything! Satellite beam size, power and bandwidth change in response to signals from terminals, hubs and our advanced resource management system, providing continuous connectivity over land, sea and air, resulting in uninterrupted, high-quality service for aircraft and ships.

The combination of ground network innovations with these satellites enables greater agility, flexibility and automated network orchestration. Software-defined technology will bring more flexibility in space so that people on the ground can adapt to market changes and create connectivity on demand, where and when needed.

While all software-defined satellites announced so far are geostationary (GEO), what ultimately matters for end users is not the orbit or the frequency band, it is the network's performance, availability and value proposition. We believe strongly that GEO has the best economics from a cost-per-bit and total cost of ownership perspective and will always be well positioned to address these key requirements.

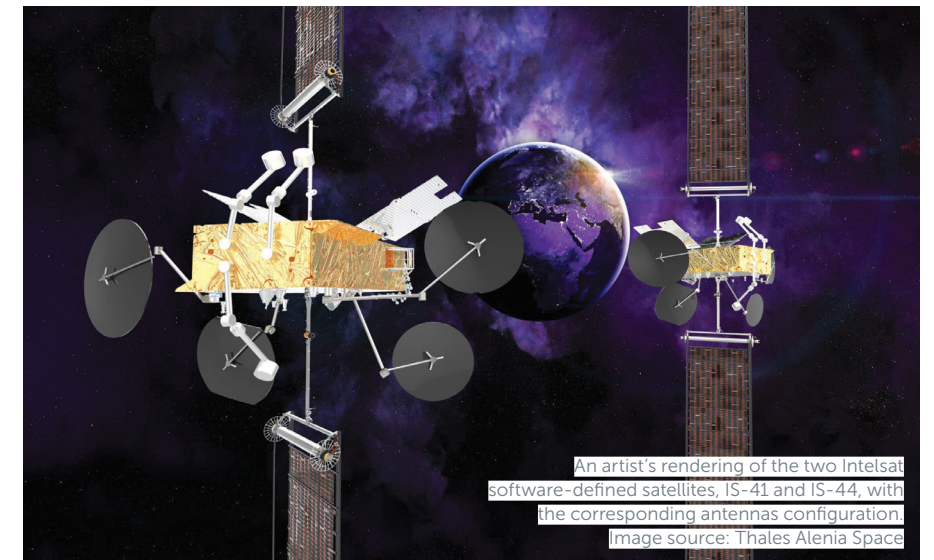
GEO satellites are unmatched in their ability to focus coverage over densely populated areas; even more so with software-defined GEO satellites, which means no wasted capacity over unpopulated areas. Having said that, non-geostationary (NGSO) constellations have compelling benefits in terms of latency, terminal look angle and ubiquity. We fully believe that ultimately the best networks will be multi-orbit, combining the benefits of GEO and NGSO in a complementary way.

## Unleashing 5G and new apps

5G will open up a new era for communications, bringing more homes and enterprises online, increasing throughput and efficiency, enabling more powerful applications and opening new business opportunities. The technology will make the fourth industrial revolution a reality, with 5G-powered smart cities, smart homes and smart agriculture transforming the way we live and work.

To make 5G successful, all stakeholders must put in place the building blocks to maximise the opportunity that the technology can bring. Our industry is a key stakeholder, and we can bring satellite communications into the telecommunications mainstream by adopting 5G standards in our networks. This is an opportunity to seamlessly integrate with terrestrial infrastructure, to allow our customers to deploy applications and services globally without the custom adaptations often required for satellite deployments. We can expand the ecosystem of suppliers, driving down cost and increasing flexibility. This will enable us to adapt and respond to users' growing connectivity requirements as they evolve in real time.

5G will enable many groundbreaking applications, with software-defined satellites playing a



“While all software-defined satellites announced so far are geostationary, what ultimately matters for end users is not the orbit or the frequency band, it is the network's performance, availability and value proposition”

Carmel Ortiz, VP, Systems Innovation, Intelsat

key role in realising the technology's full potential, complementing the capabilities of terrestrial networks and helping to bring network connectivity to places they can't reach. Enterprises will be able to securely access public and private cloud-based applications from virtually anywhere in the world. With satellite beams capable of following aircraft individually anywhere in the world, airlines will always get the capacity they need, enabling them to develop new business models based on the provision of reliable and robust

inflight Wi-Fi to passengers. Defence customers will benefit from capacity which can be dynamically allocated, tracking aircraft, troops or ships to deploy resources precisely where they are needed.

The successful deployment of 5G networks will require engagement with the broader telecom ecosystem and embracing the same standards and partnerships. This is fundamental. We believe that 3GPP's 5G specification, known as Release 17, should bring all the specifications necessary for this integration, and with it the ability to drive new business models.

**Empowering underserved areas**  
The roll-out of 5G technology across Africa is still in its early stages, but analysts expect significant volumes of 5G subscriptions by 2022. Satellite communications networks built on 5G standards can help accelerate 5G deployments in places where terrestrial infrastructure is not available. Adoption of standards used by the telecom industry, combined with software-defined satellites, will help make 5G a reality. **PRO**

Carmel Ortiz is Vice President, Systems Innovation at Intelsat.



# THERE'S BIG MONEY IN SPACE JUNK

As the world embarks on a golden age of space, the pressing problem of space debris must be addressed. Estimated at \$14bn for on-orbit services alone, could this give rise to a new industry, asks Keith J Fernandez



The accelerated pace at which satellites are being launched into space has now drawn attention to some of its unintended consequences. In the process, a new sub-industry in the space sector is emerging.

Over the past year, Japanese startup Astroscale has been testing its End-of-Life Services by Astroscale-demonstration (ELSA-d) technology, to show how man-made objects can be serviced and space debris can be removed

from low-Earth orbits (LEO).

The two spacecraft that comprise ELSA-d – a 175kg ‘servicer’ and a 17kg cubesat ‘client’ equipped with a magnetic docking plate – were launched into a 550km LEO orbit in March last year. In August, the company said ELSA-d had successfully released and recaptured the client multiple times, offering early proof of concept. Although irregularities stalled the mission earlier this year, Astroscale is set to resume it soon and is learning valuable lessons about satellite

servicing operations in space, the company said in a statement.

Astroscale is also working on several other on-orbit products. Its ELSA-M spacecraft, based on an evolution of ELSA-d’s technologies, is being created to tidy up non-magnetic satellite debris of up to 800kg at altitudes of 1,325km in a single mission. The Active Debris Removal by Astroscale-Japan (ADRAS-J) craft, selected by the Japan Aerospace Exploration Agency, will show how large-scale debris can be taken out of orbit. And its Life

Extension In-Orbit (LEXI) mission will provide life extension and manoeuvring services to satellites weighing up to several thousand kilos in geostationary orbit (GEO).

“We expect that Astroscale will become a critical service provider for safely removing defunct objects from space and pioneering new ways to service, upgrade and transport spacecraft to maintain and grow the viability of Earth’s orbits,” Ron Lopez, President & Managing Director at Astroscale’s US arm, tells Satellite Pro.

The tech firm is among the early movers in a developing high-tech garbage disposal industry. Since the USSR launched Sputnik 1, the world’s first artificial satellite, space has become increasingly crowded. As of January, there were 4,852 active satellites currently in orbit, according to the Union of Concerned Scientists (UCS), a science non-profit. But there are also more than 3,000 inactive orbiters above our heads. More than two-thirds of all satellites are in LEO, which requires the lowest energy for satellite placement.

In addition, millions of pieces of space junk circle the Earth. The result of explosions, collisions or anti-satellite tests, these debris are both working and defunct pieces of spacecraft or satellites, including discarded rocket stages, fragmented hardware and even paint flecks.

According to NASA’s Orbital Debris office, at least 25,000 of these objects are larger than 10cm across, while another 500,000 are particles between 1 and 10 cm in diameter. There are more than 100 million particles larger than 1mm. Of these, the US Space Command actively tracks more than 40,000 objects in space to avoid collision risks.

NASA puts the aggregate weight of material in orbit around Earth at 9,000 metric tons. This



**“If the projected trillion-dollar-plus space economy is to be realised, it must be built on a more sustainable foundation. On-orbit servicing is that foundation”**

**Ron Lopez, President & Managing Director, Astroscale**

junk travels at speeds of up to 17,500mph, fast enough for even a relatively small piece of orbital debris to damage a satellite or a spacecraft. With debris constantly in motion, even communications or navigation systems here on Earth could be rendered inoperational by crashes and collisions.

As the frequency of such collisions increases, more space junk is being created. In theory, the result could be the Kessler Syndrome, a chain reaction of collisions making it difficult to launch new space missions, scientists warn.

“If we don’t do something within the next few decades – 50 years at most – then the Kessler Syndrome will become a reality. The youth of today will certainly need to solve the problem,” says author and space debris expert John L Crassidis, Professor of Mechanical and Aerospace Engineering at the University at Buffalo, who works with NASA and the US Air Force on the issue.

In April, an international team of researchers writing in



An artist's rendering of Astroscale's Life Extension In-Orbit (LEXI) Servicer.



the Nature Astronomy journal highlighted another potential problem, warning that a dramatic rise in space debris will impact a wide range of fields, including astronomy.

“Modern society is completely dependent on services from space,” Lopez says. “Communications, financial systems, navigation, weather and national security warnings, and climate and environmental monitoring are all powered by satellites. The orbits these satellites occupy around Earth are becoming dangerously crowded.”

“While satellite operators and launch service providers have evolved approaches that remove satellite and spent upper stages from orbit at end-of-mission, this larger active and retired satellite population, and the more crowded orbital environment it will create, will drive future debris volumes unless we take proactive steps to manage the space environment. If the projected trillion-dollar-plus space economy is to be realised, it must be built on a more sustainable foundation. On-orbit servicing is that foundation.”



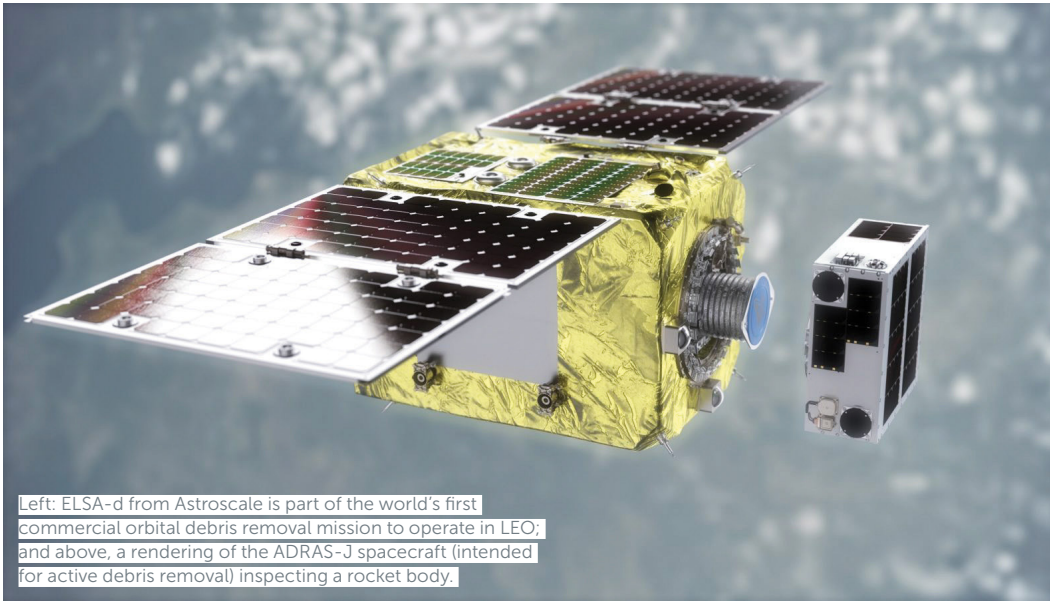
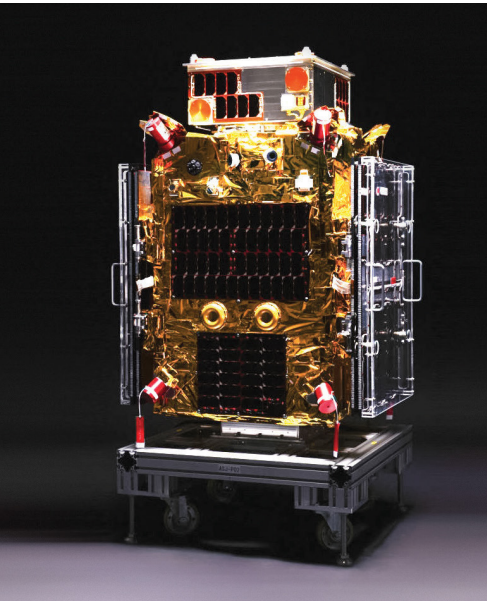
**If we don't do something within the next few decades – 50 years at most – then the Kessler Syndrome will become a reality. The youth of today will certainly need to solve the problem”**

**John L Crassidis, Professor of Mechanical and Aerospace Engineering at the University at Buffalo**

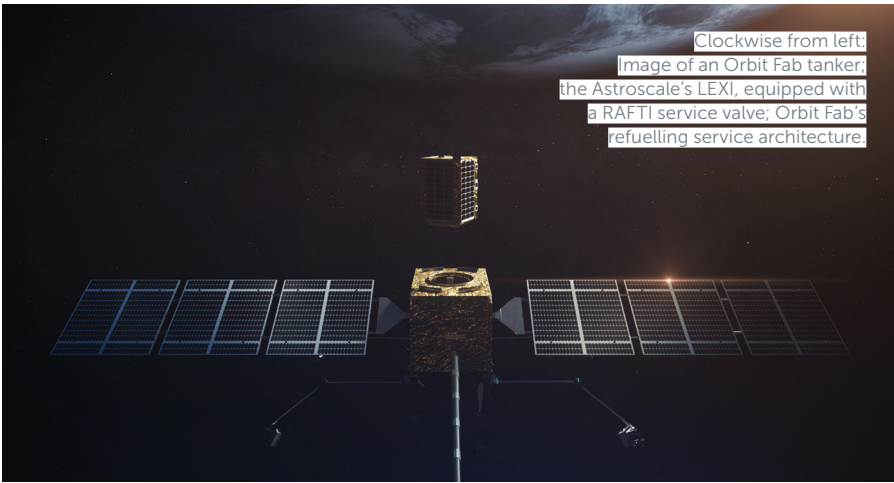
This could generate \$14.3bn in revenue through 2031, he adds, citing Northern Sky research.

An exponential increase in the number of launches in this golden era of space exploration is only going to exacerbate the problem. Some 17,000 new satellites are set to be launched through 2030, research from Euroconsult shows. That's a four-fold increase from the 3,800 sent into orbit over the previous decade, thanks to economies of scale in satellite manufacturing and a strong decrease in launch prices. Of the 170 constellation projects assessed, 110 are by commercial companies, often called New Space players. OneWeb, Starlink, Gwo Wang, Kuiper and Lightspeed represent 58% of these new launches.

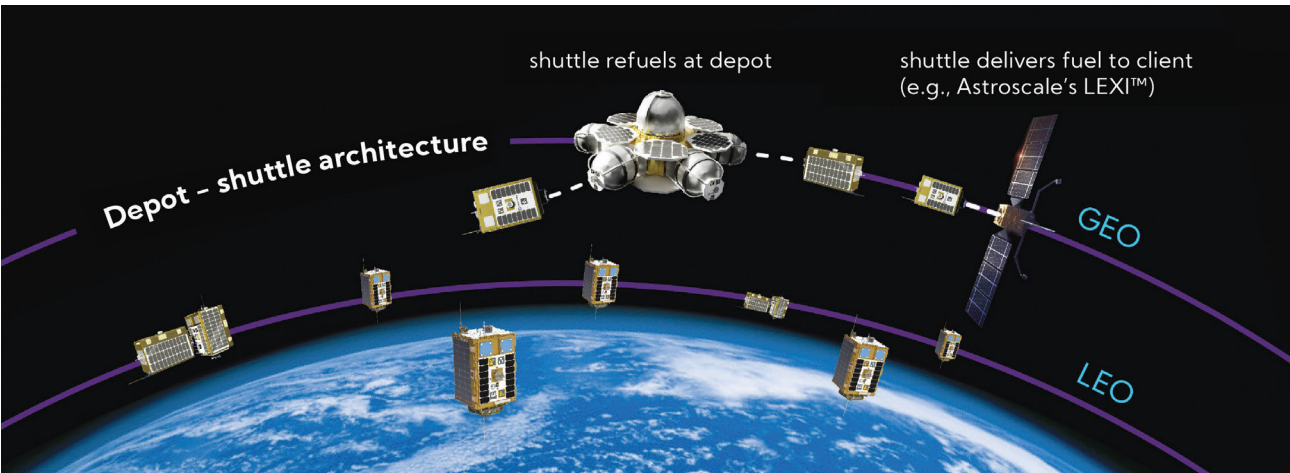
Besides defence and aerospace, IT and telecom provide the most significant revenue opportunities over the short and medium term from this pie in the sky. In particular, satellite broadband internet is in greater demand, with the global economy increasingly underpinned by connected technologies such as the internet of things (IoT).



Left: ELSA-d from Astroscale is part of the world's first commercial orbital debris removal mission to operate in LEO; and above, a rendering of the ADRAS-J spacecraft (intended for active debris removal) inspecting a rocket body.



Clockwise from left: image of an Orbit Fab tanker; the AstroScale's LEXI, equipped with a RAFTI service valve; Orbit Fab's refuelling service architecture.



The space economy is projected to be worth \$1tn or more in 2040, up from \$350bn at present, according to estimates by Morgan Stanley. Government space programmes continue to dominate the sector, accounting for three-quarters of current revenue at about \$240bn, but even here the playing field has become more diversified. McKinsey data shows that around 70 countries now have established space programmes, including the UAE, Costa Rica, the Philippines and Rwanda.

Even without this increase in launch rates – in a business-as-usual scenario – the number of space debris objects greater than 10cm could double in the next 50

years, according to projections by the European Space Agency (ESA).

The ESA is the first space agency to commit to debris neutrality. By 2030, it hopes to be adding zero net debris to the Earth orbital environment, and by 2050 it hopes to have fostered a circular economy in space by using in-orbit servicing to ensure long-term orbital sustainability – in other words, to recycle, repurpose and reuse satellites and other man-made space objects.

In 2025, the agency hopes to be the first to remove an item of debris left in orbit. Its Clearspace-1 mission will deploy an experimental four-armed robot to bring back a 100kg Vega Secondary

Payload Adapter (Vespa) from an orbit at about 800km, left there in 2013. The \$104m project, carried out by Swiss startup ClearSpace, will work to match the velocity of the object before capturing it and bringing it back down into the atmosphere, Chief Engineer Muriel Richards told Newsweek.

Clearing debris is one approach to the problem. Another is refuelling, which could extend satellites' lives, meaning fewer new launches. At present, satellites reach the end of their useful life when they run out of fuel. Many must be decommissioned at that point because there is no way to refuel them easily.

San Francisco-based Orbit

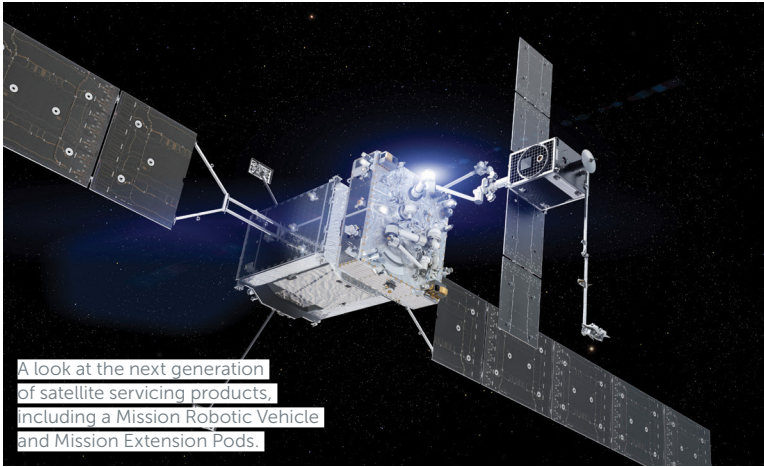




**"On our horizon is enabling the eventual repurposing and recycling of what is already on-orbit, to make space truly sustainable"**

**Rob Hauge, President, SpaceLogistics, Northrop Grumman**

Fab wants to enable permanent jobs in space and is currently building out the propellant supply chain to support that vision. CEO Daniel Faber tells *SatellitePro* how his "gas stations in space" will operate: "We will have fuel depots, big simple tanks of fuel that we launch on any available rocket, and reusable fuel shuttles that can take the fuel from the depot to operational satellites." This reusability allows the company to amortise



its costs over many deliveries.

In June last year, Orbit Fab launched the first fuel depot to LEO. Tanker 001 Tenzing stores the green propellant high-test peroxide (HTP) in a sun-synchronous orbit to refuel other spacecraft. It hopes to launch a similar depot to GEO this year. Its first two shuttles could be in orbit by 2023.

"We have had quite a lot of interest from both companies and governments interested in

the refuelling and what it can do to their capital costs, such as moving CapEx to OpEx, as well as introducing mobility and flexibility to the business model, which has previously never been possible in the space industry," Faber says.

Orbit Fab won a \$12m contract from AFWERX and SpaceWERX, the US Air Force and Space Force innovation hubs, to integrate its Rapidly Attachable Fluid Transfer Interface (RAFTI) with Department of Defense

spacecraft for on-orbit refuelling missions. RAFTI is a high-tech refuelling system valve comprising a service valve and alignment markers. The company is also working with Astroscale on its new Life Extension In-Orbit (LEXI) Servicer spacecraft.

Several other startups have entered the space with proposed life extension and debris monitoring and clearance services. In India, five-year-old startup Manastu Space has created a satellite propulsion system that uses affordable green fuel. It has similar plans to offer refuelling services in space, Indian media report. Portuguese startup Neuraspace raised €2.5m in March for its AI-powered space debris monitoring platform. The solution aims to enable safe and sustainable in-orbit operations in the New Space economy.

Other proposals are looking at repurposing larger objects into small-scale space stations, sending objects at the end of their lives into a graveyard orbit where they are unable to interfere with most space travel and existing satellites, or using the debris as a source of fuel, Crassidis explains.

Taking a comprehensive approach is SpaceLogistics, a US satellite-servicing firm owned by Northrop Grumman, with solutions for repair, recycling and refuelling operations. Rob Hauge, President, SpaceLogistics, tells *SatellitePro* how the company is working on several space sustainability projects aimed at enhancing and extending satellite life.

"SpaceLogistics is the only company providing in-space servicing today, with our two Mission Extension Vehicles (MEVs) which are extending the lives of two Intelsat satellites. Our second-generation vehicles, known as Mission Extension Pods



**"We have had quite a lot of interest from both companies and governments in the refuelling and what it can do to their costs"**

**Daniel Faber, CEO, Orbit Fab**

(MEPs), will be installed by our Mission Robotic Vehicle (MRV). The MRV and MEPs will continue to reduce the need to build new satellites by extending and enhancing those already in orbit."

SpaceLogistics' MEVs are the company's first generation of in-space servicing spacecraft and were designed to extend the life of satellites running low on fuel. Its MEPs, set to launch in 2024, will similarly extend the life of client satellites. The MRVs that install them will also provide on-orbit augmentation, inspection and repair capabilities.

"In addition, the MRV will also be the first commercial satellite designed with robotic arms to be flexible to serve as a multi-mission platform to also enable inspection, repositioning and repair of client satellites. The MRV and MEP programmes have completed

their preliminary design reviews, the first robotics arm has been assembled, the first test of the MEP capture mechanism has completed, and first light has been achieved with the Hall Current Thruster (HCT) for the electric propulsion system," Hauge says.

In February, SpaceLogistics sold the first MEP to Optus, an Australian satellite telecommunications major. By 2025, the company hopes to take refuelling a step further with Mission Refuelling Pods (MRPs) and active GEO debris removal. By the end of the decade, it wants to be manufacturing and assembling spacecraft on-orbit.

"On our horizon is enabling the eventual repurposing and recycling of what is already on-orbit, to make space truly sustainable," says Hauge.

The US recently became the first country to announce a ban on missile tests against space satellites, but the scale of the problem requires more than individual approaches, something the global community seems to realise.

The United Nations published guidelines concerning space debris in 2010, the start of what has been called a highway code for space. Last June, the leaders of the EU and the G7 group of nations – Canada, France, Germany, Italy, Japan, the US and the UK – agreed to focus on the development of common standards of sustainable operations, as well as space traffic management and coordination.

Now momentum is building around the Net-Zero Space Initiative, aimed at actively reducing orbital debris. Yet, resolving the issue needs more action. "We need to have all countries agree to these common guidelines, which hasn't happened yet," Crassidis says. **PRO**





# AIMING FOR THE STARS

Salem Humaid Al Marri, at the helm of some of the UAE's satellite projects from conception, recently assumed the mantle of Director General at Mohammed bin Rashid Space Centre. In conversation with **Vijaya Cherian**, he gives us a flavour of what's cooking in the MBRSC lab these days and his vision for the organisation



**How did you come to be involved in space projects in the first place?**

I was working as a telecommunications engineer and there was an opportunity to join in a project to develop a satellite for Dubai government, and that excited me. So I applied and was one of the first engineers to be selected. This was basically to join DubaiSat-1 and build that project. This was before the establishment of the centre (MBRSC). Back then, in 2005, it was called the Emirates Institute for Advanced Science and Technology (EIAST). We did the initial study and then there was a decree which led to the establishment of the Mohammed bin Rashid Space Centre. We started work on DubaiSat-1. What attracted me to this was that we were looking at knowledge transfer. It was a joint development and we were trying to develop these technologies in the UAE. As we went into 2006, I was the project manager for DubaiSat-1.

**Where did you get your ideas from when you started with those projects?**

We started by looking for established industry partners. We were very focused on the element of knowledge

transfer, and we looked at countries that had taken a similar approach. South Korea was one of them. They did knowledge transfer with the UK. Then we looked at Surrey Space Technologies (STL) and some companies in Europe. They proposed projects they would build and where we would participate in the knowledge transfer programme, but we eventually chose South Korea because they learned from a knowledge transfer programme and then started building satellites on their own. So that means they had the capability to take this knowledge and use it efficiently.

**What are your short-term and long-term goals as chief at MBRSC?**

Short-term is to maintain a healthy flow of projects, as MBRSC is predominantly an engineering entity. Our focus is on engineering projects that are space-related, so a steady flow of engineering projects is one of my top priorities. Growing and developing existing projects while also initiating new and exciting projects is the way forward for us.

Long-term, we are looking at the UAE leadership's objectives. The exploration of the moon and Mars are part of that, and how

we can potentially contribute on a more global level. We are on course with a number of unique engineering and scientific projects at MBRSC to fulfil those goals.

**What projects are you cooking in the MBRSC kitchen right now, and what stages are they at?**

We are cooking quite a few projects, but many of them are under wraps. But we are looking at our next Earth observation satellites, what types of satellites we want to build and what our next exploration missions are. As engineers, that's what excites us at MBRSC. We come up with initiatives, propose them to our board and then if they are approved at the government level, they are announced. So that's just to give you a flavour, though we can't divulge specifics.

**What's the progress on the Rashid Rover?**

The Rashid Rover will be the first object from the UAE to land on the surface of another celestial body. It's the first time we have gone into robotics by building a robotic rover. It will land on the moon and do exploration there, and it's fully developed in the UAE. This is why it's significant



for us. We plan hopefully to launch this at the end of this year.

We also have the MBZ satellite, which is the follow-on satellite to KhalifaSat. This is a very high-resolution imaging satellite, remote sensing, and is about 800kg. So it's one of our largest ever satellites built, designed and developed in the UAE and manufactured with UAE manufacturers, such as Strata and others. Strata are airplane parts manufacturers in Al Ain; they are now developing mechanical structures for us. We plan to launch that at the end of next year.

We also have other pipelines that we're working on, which is the training of our astronauts and looking at future human space flights for astronauts.

**What major challenges is the space industry facing, and how do you hope to address them?**  
Space sustainability is a big one. The sustainable use of our orbit around Earth and how we can continue using that orbit safely is important.



HE Salem Al Marri, flanked by Emirati astronaut Hazaa Al Mansouri (r) and Sultan Al Neyadi (l), and MBRSC team members.

This is a big challenge for everybody today regionally and internationally. The other one is sustained investment in space, and that's a challenge for governments. Out here, we are continuously looking at doing our projects sustainably.

**Is space debris a project you are looking to work on?**  
As an engineering facility, MBRSC is very focused on engineering projects. While we are not actively working on projects to remove space debris,

we are careful to ensure our projects do not add to the space debris.

**How many people currently work at MBRSC, and what percentage of those are women?**  
We have around 200 people and a little under 50% of them are women.

**What about the astronaut programme?**  
We got close to 4,000 applications for the first phase and about 4,300 for the second phase. We selected four astronauts – three men, one female. They are all currently training in the United States. Nora AlMatrooshi and Mohammad AlMulla are the two new candidates who have joined a batch with NASA astronauts and are training jointly with them. The other two are training on other elements related to ISS operations. We're currently working on finishing their training and then securing the next flights for our astronauts.

**What are the criteria for selection?**  
We don't really discuss astronaut criteria with anybody, but we choose the most suitable astronaut – there's obviously seniority, training readiness, capabilities, compatibility with the rest of the crew. There are many elements that come into choosing who is going to fly.

**What is unique about the UAE space ecosystem?**



The ecosystem here allows you to innovate. Sometimes we get to select projects that are exciting and unique. Sending a rover to the moon or sending humans to space excites us. We're proud and humbled that we are able to contribute to that whole process.

**Are you able to share how much has been invested in these space projects?**  
Emirates Mars Mission was around \$200m, and that is public information. At MBRSC, we try to develop innovative missions in a cost-effective manner. We don't have very huge budgets, but we have big minds that are able to achieve big objectives in a very cost-effective manner, because we're able to develop these technologies on our own. We are not buying these technologies. We are not sourcing them from outside. We are developing them, which

**"The Rashid Rover will be the first object from the UAE to land on the surface of another celestial body"**

**Salem Humaid Al Marri, Director General, Mohammed bin Rashid Space Centre**

then inherently reduces some of our costs. The majority of our costs would be our staff. So this is how we are able to achieve big objectives in a cost-effective manner with very efficient budget utilisation.

**Could you tell us a bit about your new payload initiative?**  
Yes, it's called PHI – Payload Hosting Initiative. It is a 12U satellite. We intend to launch one every year. This satellite has

multiple purposes. One is to test new payloads, so we provide space for startup companies in the UAE and entities that want to launch a payload into space but don't have the capability to do that or it is too costly for them. We then launch it for them. We've worked with two startup companies here in the UAE to launch their payload next year. We've also cooperated with the UN on this, so they provide access to space to developing space nations. Nations in Africa and Asia that don't have the capability to launch into space but have great ideas will be considered for this. Students sometimes have great ideas; in that case, they build the payloads and we can launch them into space. We will integrate them into our satellite and launch them. This will happen at the end of this year or the beginning of next year. This is in cooperation with the UN. **PRO**

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# GLOBAL APPROACHES TO SPECTRUM MANAGEMENT

The Dynamic Spectrum Alliance's Global Summit regularly brings together policy-makers, regulators, academia and private sector leaders in spectrum management to discuss and debate spectrum sharing methods and models, from exclusive use licensing to unlicensed allocations. In an exclusive for **SatellitePro ME**, DSA President Martha Suarez shares how regulators in different parts of the world, including the Middle East, are attempting more efficient utilisation of spectrum



Policies and regulations are factors at the heart of effective spectrum sharing.

It is governments and regulators who are able to implement laws and rules on spectrum sharing, which allow for the opening of bands, sharing of spectrum and subsequent access and innovation which follows. Governments and regulators globally have been taking steps to effectively share spectrum through laws and regulations.

#### Spectrum is oxygen for the wireless world

In 2021, the Commissioner of the Federal Telecommunications Institute (IFT) in Mexico, Javier Juarez Mojica, highlighted the

importance of connectivity for Mexico throughout the Covid-19 pandemic: "Spectrum is not a natural resource. Unlike oil and water, we need to create technology to take advantage of electromagnetic waves. Spectrum is like oxygen for the wireless world."

Mexico is allowing efficient use of spectrum through methods such as spectrum leasing, spectrum sharing for public use licences, and secondary use. In June, a public consultation was begun regarding the 6GHz band. The spectrum unit is proposing to use 1,200MHz as unlicensed spectrum for Low Power Indoor (LPI) and Very Low Power (VLP) indoor and outdoor. IFT has shared its views with the Ministry of Finance, with the intention of reducing the fees spectrum users must pay in order to work towards more affordable services for end users.

"Connectivity is one of the main tools to create a better world and for that, spectrum is of paramount importance," said Juarez.

Spectrum is a finite resource, requiring prudent management

South Africa has been involved in studies regarding the concept of spectrum sharing, recognising the need to innovate the existing static spectrum management paradigms towards innovative spectrum management. Peter Zimri and Yolisa Kedama of the ICASA have spoken on the vitality of connectivity throughout the pandemic, and the value of prudent management of spectrum as a finite source.

Priorities for South Africa include the auctioning of multiple IMT spectrum bands: 700, 800, 2,600 and 3,500MHz. It also temporarily released spectrum in these bands, in order to relieve some of the pressure caused by the Covid-19 pandemic. The TVWS regulatory framework has been completed, with regulations coming into force in April 2021. Hopefully, 2022 will

**"Connectivity is one of the main tools to create a better world and for that, spectrum is of paramount importance"**

**Javier Juarez Mojica, Commissioner of the Federal Telecommunications Institute (IFT), Mexico**

be the year to consider licence-exempt access to the 6GHz band that will enable technologies like Wi-Fi 6E and conditions for massive adoption of augmented and virtual reality applications in the country.

#### Reaching remote communities

Since 2018, Canada has been gradually releasing priority-one spectrum bands, including 3,500MHz, 3,800MHz, 37-40GHz, 26GHz, 28GHz and 6GHz. ISED made the decision to enable unlicensed access to the 6GHz band, according to Shalini Periyalwar, Expert Director at the Ministry of Innovation, Science and Economic Development in Canada.

ISED aligned with the US decision to open the entire 6GHz band for unlicensed access, thanks to the immediate socio-economic benefits, improving the economy and allowing innovative use cases to emerge. In fact, having opened an extra 100MHz of standard power use in comparison to the US, Canada has assigned by far the largest amount of spectrum for use with a spectrum sharing database.

Furthermore, modifications to the plans for TVWS have been made, to support broadband services and rural and remote communities in Canada. During May 2021, ISED released the technical and policy framework decision for the 3,650-4,200MHz band, as well as changes to frequency allocation of the 3,500-3,650MHz band. Further consultations are being made on releasing mmWave spectrum to support 5G, and ISED is reviewing its processes and technologies in order to stay agile and prepared for the next generation of spectrum management.

#### Taking advantage of economies of scale

SUTEL of Costa Rica recognises





the necessity of unlicensed spectrum for applications such as IoT devices, with mixed allocation in the 900MHz band as well as the 2.4GHz and 5.8GHz bands available for wireless access points and routers. The entire 6GHz band is open for unlicensed access in the country, which is important for Costa Rica's 200 service providers, half of which operate on unlicensed spectrum.

"Small countries like ours have to take advantage of the economies of scale," says Glen Fallas, General Director, Quality of Service and Spectrum Department at SUTEL. "It is very important we have as much spectrum as we can to deploy new use cases."

**Unused spectrum**

In February 2021, Brazil was congratulated on its decision to open the entire 6GHz band for unlicensed access. Later in September, it took the spectrum management plan one step further by approving the use of TVWS. A flexible way to make efficient use of spectrum while protecting existing and incumbent users from interference, this decision was a significant step towards addressing capacity demands in unserved or underserved regions. All those actions have been combined with a successful 5G auction, demonstrating the importance of addressing different technologies to enhance broadband access and providing access to the resource to different market stakeholders, creating a larger ecosystem.

**Adopting a collaborative approach**

"For three years, Europe has been in discussions about 6GHz harmonisation," explains Pavel Sistek, Head of Policy and Strategy at the Czech Telecommunication Office. In November 2020, the lower part of the band was



**Hopefully, 2022 will be the year to consider licence-exempt access to the 6GHz band that will enable technologies like Wi-Fi 6E"**

**Martha Suarez, President, Dynamic Spectrum Alliance**

approved for LPI use and VLP outdoor and indoor use in the Czech Republic, with the upper part of the band under review. The Commission Implementing Decision – C(2021)4240 on the harmonised use of the frequency band 5945-6425 MHz for Wireless Access Systems including Radio Local was published in June 2021.

Furthermore, the ECC recently adopted a new work item to study possible technical conditions under which wireless access systems including radio local area networks (WAS/RLAN) could operate and coexist with existing services in the 6,425-7,125MHz

band, recognising that the work in preparation for WRC-23 agenda item 1.2 will run independently from the work conducted under this work item. National decisions on licence-exempt usage address only limited, local interests, with European harmonisation necessary to facilitate market opportunities.

In November, the Dynamic Spectrum Alliance joined technology and allied groups in a letter to the EU, warning that failure to open the whole band would leave it trailing behind other prominent economies. Based on the new EU telecommunication regulatory framework and new needs and trends, the EU is going to adopt a new Radio Spectrum Policy Programme this year.

**A dynamic future for the Middle East**

The Communications and Information Technology Commission (CITC) National Spectrum Strategy for Saudi Arabia aims to optimise spectrum usage efficiently and effectively by different industry sectors and use cases in the country. Its multi-year strategic strategy and outlook will govern spectrum policy until 2025 and is a comprehensive plan to unlock the potential of spectrum for both established and emerging technologies. It has three core principles: transparency, predictability and adoption of an evidence-based data-driven spectrum policy. CITC has allocated and improved access to more than 23GHz of newly available spectrum for a wide range of uses in the Kingdom. As the Dynamic Spectrum Alliance plans to meet and deliberate with the Arabic Spectrum Management Group this year, it hopes that other Middle East countries and regulators will follow Saudi Arabia's example in opening the full 6GHz band for licence-exempt use. **PRO**

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2022

**Agenda**

**Digital transformation**

**Where do we stand**

Covid-19 did lead to a huge uptake in streaming services, but it also delivered a big blow to film and TV production companies as well as cinema chains, spurring them to transform their operations through digital solutions. What does digital transformation entail from a technology, corporate culture and employee POV, and what opportunities does it create with the emergence of 5G, the deployment of cloud services and virtualisation?

**Cloud migration**

**A luxury or necessity?**

The adoption of cloud services is no longer a luxury but a necessity but how do we address migration, connectivity, budget, integration and interoperability? Industry practitioners will discuss best practices to accelerate cloud adoption.

**IP integration**

**How far in the game are we?**

With many companies in a state of technology debt, where they are struggling with legacy products and processes brought on by building on layers of proprietary equipment over the years, the transition to IP brings them to one central question – where do we begin and how do we make it happen without breaking the bank? Experts will attempt to demystify areas that continue to confound engineering teams and perhaps offer new perspectives to ease the journey to IP.

**OTT**

**Moving FAST in an OTT world**

FAST services have dramatically altered how linear channels are created, distributed, and consumed. Experts will explore how these services will enable broadcasters to experiment with new TV formats, use data to serve different ads to different households and how FAST can potentially help democratise the world of content delivery.

About the

**BroadcastPro Tech Summit**

The broadcast industry has witnessed significant change in recent times with the entertainment experience continuously adapting to accommodate new and changing viewership behaviour, and technologies going through a parallel recalibration and advancement to keep pace with market needs.

This event serves as a platform to monitor and explore these shifts, and better understand how the industry is re-evaluating its strategies to meet growing market demands. The digital transformation journey continues to be on the agenda of several corporate organisations with cloud, IP, remote production and other technologies getting the attention that is due to them. Industry professionals will discuss the market status quo, the challenges they face, the strategies in place and where we are headed.

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# SATELLITE IN FOCUS AT CABSAT 2022

The satellite segment has always been an integral part of CABSAT. Here's a sneak peek into some of the technologies and discussions that will take place within the space and satellite areas of the show

## AsiaSat offers managed services for broadcast and data sectors

### STAND 801

AsiaSat will be back at CABSAT to introduce to the MENA region a number of new initiatives from the operator. In March, it announced plans to expand SAILAS end-to-end managed connectivity service for the maritime sector with a wide range of value-added services that will further increase operational efficiency and safety for vessel operators, and enhance the communication and entertainment experience of crews and passengers onboard.

This new initiative is an important step towards strengthening AsiaSat's capability in delivering end-to-end managed service to support the digital transformation of the maritime sector. The new value-added services will include the addition of video streaming service to SAILAS's portfolio of metered and non-metered data service plans, out-of-band management (OBM) and all-embracing



antenna system solutions, establishing a complete service network crafted to address the requirements of all maritime sub-verticals – fisheries, merchant shipping, passenger boats, yachting and oil & gas.

"We are excited to bolster SAILAS's end-to-end solution offerings with enhanced value-added services, enabling clients to enjoy optimal operational efficiency and provide more diverse entertainment and communication services to their customers. This is achieved through synergising our space and ground solutions

with technologies from some of the best-of-breed solution and service providers," said Raymond Chow, Vice President – Business Development & Strategy, AsiaSat.

"As we continue to build strong partnerships with other technology providers to make SAILAS an optimal choice for the maritime community, we also look for opportunities to collaborate with different channel partners who want to create additional new value and service models for their customers."

Since its launch in Q3 2021, SAILAS has been expanding its maritime coverage, serving a

wide area from the Mediterranean Sea, the Middle East and South Asia to Southeast Asia, passing through major shipping routes across the Suez Canal, the Arabian Sea, the Bay of Bengal, the Strait of Malacca and Indonesian archipelagic waters. Vessel operators can rely on SAILAS to support their access to smart applications and information, including real-time weather data, timely instructions from shore and internet connectivity, with a range of data service plans, from a pay-as-you-go Gigabyte Plan to a value-for-money Standard Plan that offers unlimited data, available to meet the ongoing and seasonal requirements of different maritime verticals.

SAILAS's new, enhanced value-added services embrace three key areas: Video Streaming Service, Antenna System Solution and Enhanced Out-of-Band Management (OBM) solution.

## Spacecom to demo AMOS-17 capabilities

### STAND C8-30

Spacecom, a first-time exhibitor from Israel, will demonstrate its new Maritime and On-the-Move (OTM) services for the Indian Ocean over its AMOS-17 digital satellite, as demand for higher data rates in the maritime sector continues to rise. Its advanced digital AMOS-17 satellite is providing, for the first time, these services throughout its footprint over Africa and the Indian Ocean region.

AMOS-17's Ku- and C-bands' powerful transponders and digital beam management capabilities enable shippers, yachts, fleet owners, corporations, governments, agencies, multinationals and others



to use the satellite's high-powered beams for their Maritime & OTM operations and applications. Spacecom's Ku-band solutions significantly maximise uplink rates to provide HD video upstream broadcast services for everything from leisure to institutional video and security applications.

"Following the Abraham

Accords, we are excited to take part and exhibit at CABSAT," commented Spacecom Senior VP Business Development, Marketing & Strategy, Ofer Asif.

"The MENA region unfolds multiple strategic business opportunities for Spacecom, including our newest market: the maritime sector over the

Indian Ocean. At CABSAT, we will present our solution, our new coverage and will meet with relevant players such as maritime service providers, yacht owners and operators, shipping fleet operators, connectivity integrators, energy and oil & gas offshore and inshore platform operators, and everyone associated with the Indian Ocean's growing maritime sector.

"In parallel, we will promote our connectivity services for other sectors, such as managed services for enterprise and government, telcos and more. Spacecom is pleased to be one of few Israel-based companies to truly participate with an active booth at the show."

## ViaLite to feature RF-over-fibre

### HALL 7, PD-25

ViaLite Communications will return to CABSAT to showcase its small, self-contained IP-rated boxes especially designed for hot, dusty environments. Its new 6GHz Outdoor Module RF over fibre link is IP55-rated, so it can be used outdoors without the need for an additional enclosure, even in harsh environments.

The link, new to CABSAT, covers a wide frequency range from 10MHz to 6GHz (7GHz at 4dB pt), providing the widest RF bandwidth for a product in this format

and covering VHF, UHF, L-, S- and C-bands. It is suitable for use in a variety of applications such as broadcast, satcom, GPS/timing and mil-aero.

With a dynamic range (SFDR) of 109dB/Hz at

1,500MHz and 104dB/Hz at 5GHz, it is also reportedly the widest SFDR RF over fibre product in outdoor-rated module format. The module supports link distances of up to

50km and operating temperatures of -20 to +60 °C. It can also be easily installed as a stand-alone product for temporary or permanent applications. The link can be ordered as a single transmitter or receiver, and there is also a high output power version which offers up to +10dBm with low output harmonics.

The unit is compact and has a metal casing with integrated mounting holes. It is the first module from ViaLite that can be installed outside without the need for an enclosure.





# RSCC to demo satellite capability at CABSAT

STAND D8-20

Russian Satellite Communications Company (RSCC) is participating in CABSAT as the MENA region remains one of its priority markets. It has been providing communications and broadcasting services in the Middle East for over 15 years. RSCC satellites in the orbital positions from 14 degrees West up to 53 degrees East provide stable coverage of the region and are designed for corporate networks and communication services on ships and aircraft.

"CABSAT is a connecting platform for the satellite community, which helps to provide the best conditions for business development, defining strategies and creating partnerships. Two



years have passed since the start of the pandemic, the market is starting to recover, and CABSAT provides an opportunity to meet face-to-face with key industry players. Satellite operators, equipment manufacturers and potential service users from all over the world come to the exhibition. We are

always open to expanding cooperation both with our continuing partners and with new potential customers," commented Alexey Volin, Director General of RSCC.

RSCC will discuss the wide range of satellite solutions it offers, using the capacity of Express-AM8, Express-AM44, Express-AM7 and Express-AM6 satellites. These solutions provide high-quality services in the region for TV and radio broadcasting (as well as TV platforms with the possibility to organise the up-link in Europe), data exchange, internet access and maritime VSAT. It will also highlight a solution that uses the Express-AM series based on maritime VSAT technology, which allows RSCC to provide a wide range of

digital communication and broadcasting services on vessels of various classes and purposes.

"RSCC continues to develop foreign projects and rates high the prospects for satellite communications and broadcasting in the Middle East. Using the unique capabilities of its own space infrastructure, RSCC is ready to strengthen its presence in the Middle East, providing competitive high-quality services in these countries," added Volin.

At CABSAT, RSCC will also assess how the market has changed in the last couple of years since the pandemic and attempt to understand manufacturer demand and what type of commercial products are now being launched in the market.

# Indian company to highlight PoE technology

STAND PD 65

Original Products Pvt Ltd, a first-time exhibitor at CABSAT, will showcase satellite-supported products at the show. With demand for telecommunications equipment in the region and around the world high, the Indian company hopes to better understand the needs of its companies in the region and offer alternative market solutions.

The company will particularly focus on

the benefits of the PoE injector, a device required to connect or attach a non-PoE LAN switch port to a PoE network-enabled device. With the use of a PoE injector, the requirement for AC power lines for IP phones, wireless access points and network cameras is diminished, because LAN cabling delivers both data and DC power.

A PoE injector compliant with IEEE offers 12-70 watts of power. The rules or guidelines for PoE are defined by

the IEEE 802.3 working group. However, it does not require special cabling, though an 8-pin network cabling for Ultra-PoE connections is recommended, as the standard set for all networking pins is eight. Cheaper versions, however, may have four pins.

When connected to a UPS, PoE-powered devices can offer a constant power supply. Connected PoE devices may be remotely started using PoE switches. Notably, the

latest PoE switches are blended with watchdog features and functionality, thus reducing a device's downtime.

"We want to increase the reach of our products in MENA and the African continent, basically connecting people, creating customers and building business," said a company spokesperson. "We are looking for experienced distributors in MENA and the African continent for distributing our products on a large scale."

# Norsat and Hytera team up to present satcoms solutions

STAND E8-21

Norsat will co-present its latest satellite communication solutions with parent brand Hytera at CABSAT 2022. Making their debut at the show, Norsat and Hytera will bring a wide range of satellite products as well as professional mobile radio products featuring DMR, LTE and iMESH technologies, with a special focus on radio over satellite solutions that can enhance connectivity between



organisations, world-wide teams, headquarters and employees in the field.

"The potentials in the combination of satellite network and professional

mobile radios are huge," said Amiee Chan, President and CEO of Norsat.

"Norsat is one of the few brands on the market that can tap the potential to the

fullest with unmatched compatibility between Hytera radio terminals and Norsat satellites."

The team hopes to woo both end users and potential distribution partners to its stand. Norsat and Hytera have been providing the MEASA region with best-in-class satellite and radio solutions for decades. They have served clients from public safety, energy, transportation, utilities, commercial and other industry verticals.

# C-COM to feature new comms solutions

STAND 705

Canadian company C-COM Satellite Systems will feature two products at CABSAT, the ManPack and the Ka-74G Ka-band antenna.

The iNetVu MP-100-MOT ManPack is a fully motorised, auto-acquire, 100cm carbon-fibre one-case backpack antenna. This C-COM product has achieved significant success in the field, with more than 250 systems sold since its introduction. Weighing only 22.8kg (2-Axis) or 24.5kg (3-Axis), this robust and lightweight system will point to any programmed satellite in 60 seconds with just the push of a button on the NEW iNetVu 8020 controller. Highly portable, including an

advanced Wi-Fi-enabled software GUI, the multi-segment ManPack can be easily hand-carried by one person and assembled in less than five minutes without any tools.

The iNetVu FLY-74G Flyaway Antenna is a 74cm highly portable Ka-band, self-pointing, auto-acquire system configurable with

the iNetVu 7710 controller, providing fast satellite acquisition within minutes anytime, anywhere. The antenna works seamlessly with the world's emerging commercial satellites and can be assembled in 10 minutes by one person. Featuring the versatile Skyware Global 3W XRF transceiver with the ability

to be tailored to individual Ka-band requirements depending on deployment location, this system is approved for use on Gilat networks and is compliant with Eutelsat's Konnect HTS Ka-band service.

Dr Leslie Klein, President and CEO of C-COM Satellite Systems, said: "Cabsat is the premier trade show in the MENA region for satellite communications. We have been participating in this event for many years, as it gives us the opportunity to meet our valued integrators/resellers and end users in the region and provides an excellent venue to promote our products. CABSAT is a good platform for us to meet industry peers, including our suppliers."





# GVF and partners promote innovation in space and satellite learning with SBQ

GVF training courses and certifications are the satellite industry's established global standard. GVF, now celebrating its 25th anniversary, has for 21 years provided satellite Earth station/terminal installer training and certification, covering operation, installation and maintenance of VSAT, marine and mobile/SNG terminals, in addition to general and specialised satcom theory.

The GVF-SatProf portfolio includes 30+ courses. Globally, more than 20,000 students have learned, practised and been evaluated on their knowledge and skills with online, self-paced, interactive, simulator-driven training modules, with hands-on skills testing, supplementary instructor-led training and mentored classes supported by GVF examiners and regional training centres worldwide.

In this silver anniversary year, the GVF-SatProf partnership has expanded to include Space & Satellite Professionals International (SSPI). The three organisations, with an aggregate 80 years of experience in space industry education, have launched the new online industry qualification, the SBQ – the satellite industry's first comprehensive non-technical programme and curriculum designed to:

- Fill critical gaps in



- understanding of the space and satellite business, increasing the individual's value to employers and growing the individual's career in the long term.
- Stimulate creativity on the job through learning how individual or company specialisations fit into the broad trends of the space and satellite industry.
- Build business and financial skills to supplement technology expertise, or technology understanding to

- support business and financial experience.
  - Enable understanding of long-term technical and market trends shaping the near future of the industry.
- The space and satellite industry has grown to a mature, fast-expanding and complex business, essential in communications, data and digital transformation and indispensable to global economic activity. SBQ satisfies the need of new and established companies and employees in commercial space to

learn about all aspects of the business, enabling industry professionals to become space business-qualified. SBQ is based on individual courses, full modules and a dedicated certification path, created to meet space and satellite industry demand for a broad range of skills: engineering, finance, marketing, sales, advanced manufacturing, legal/regulator, government relations, information technology and human resources. Those skills are put to work in manufacturing, launch, fleet

operations, ground segment operations and service delivery. The complexity of doing business in space requires that specialisations be narrow and expertise high within them.

SBQ's non-technical education is designed to improve the knowledge and performance of existing employees, increase the marketability of those seeking a job in the industry, and provide employers with an inexpensive way to increase productivity and enhance employee retention in a hyper-competitive labour market.

Specialised employees need a broader understanding of the industry, from how their customers make money to how laws and regulations shape engineering decisions. Traditionally, people have



built that understanding through on-the-job experience or high-cost graduate-level education. The SBQ programme shortcuts the process, and obtaining certification will demonstrate a comprehensive understanding of the industry.

SBQ is structured as a series of courses

with exams, leading to certification in the focus areas of Satellite Communications and Broadcast Business, Earth Observation, Navigation, Science Business, and Launch and Spacecraft Business. Courses are self-paced, containing interactive tutorials, video lectures, animations and graphics. In-course testing

validates comprehension and reinforces learning, and each focus area concludes with a comprehensive certification exam.

Course content is at the concept and business level, rather than depending on knowledge of mathematics, physics or engineering. Students are assumed to have a college-level business, liberal arts or engineering education, and they will cover the fundamentals of launch, design, manufacturing, services, financing and other key issues. They will also address leadership development and the impact of space and satellites on the world.

*Martin Jarrold (pictured above) is Vice President, International Programme Development at GVF.*

## SIG to host conference sessions at CABSAT

Satcoms Innovation Group (SIG) is working for the first time with CABSAT this year to develop its conference sessions. The entity is an Associate Partner of Satexpo and will run sessions on 5G, the future of cloud-enabled satellite networks and small sats. 5G networks are being rolled out across the globe, promising better connectivity for consumers and a wealth of potential applications. While they compete with the satellite sector, satellite networks may be

vital to keep 5G running smoothly. 5G has also been proven to cause interference to C-band networks. As roll-outs continue, many fear that this will become an insurmountable problem. The session will look at what 5G means for satellite: if it is all that it promises in terms of connectivity rendering satellites obsolete, if satellites will have a vital role in enabling 5G technology, and the impact on interference and managing it.

On the second topic,

satellite operators are going from mhz sales (buy, sell, lease bandwidth for point-to-point or point-to-multipoint) to bits – ethernet – point-to-point connectivity. There is an expectation of instant connectivity; however, satellite involves long coordination processes, and this transition is a challenge. There will also need to be a shift in the way services are managed and delivered, adopting a model much more akin to mobile service provision, giving users access to manage their

own services if operators want to compete in this new world. The discussion will explore the above. "Industry events such as the SatExpo Summit are crucial in keeping conversations going around satellite industry growth, business innovation and industry challenges. Our panel discussions bring together leaders in the satcom industry to share information, learning and thoughts for the future," commented Helen Weedon, SIG Managing Director.





## HOW TO AVOID SATELLITE CROSS-LINK INTERFERENCES FOR A HIGH-QUALITY SERVICE



In a world where connectivity is becoming mainstream, there are still nearly three billion people – 37% of the world's population – that have never used the internet, according to the United Nations. Moreover, according to International Telecommunication Union (ITU), 96% of the three billion people who have no access are in developing countries.

The pressure to bridge the digital divide has led to a race for satellite providers, who are fighting to gain more market share with the goal of providing a faultless, high-quality service. The market is getting larger, according to Euroconsult; 250 satellites will be launched annually this decade, 70% of them for commercial purposes. This means that the need for satellite internet is totally feasible.

There are three main solutions to provide connectivity through satellites: consumer broadband, with data transfer rates faster than 265kbps; cellular backhaul, which includes 3G, 4G and 5G; and rural connectivity, which is Wi-Fi hotspots backhauled over satellite links, typically in remote or isolated areas.

Due to the dependency on technology, end users demand wider coverage and capacity, as well as network reliability and resiliency. Therefore, service providers need to be aligned with these market needs, improving their quality of service. This is the stage

at which unmanaged interferences come up – the frenetic activity carried out on the ground produces cross-link interferences that sometimes are challenging to detect, and not easy to fix without degrading the service quality.

Monitoring and controlling ground stations is the responsibility of telcos; it is common to see links interfered with unintentionally because of the activity that is carried out. The most common problem is when the downstream hub carrier experiences interference from GSM, 3G, 4G, 5G or small cell towers close to the antenna, thereby degrading the service it is providing. In many cases, there are authorised users that are damaging the content.

End users are tight with their connectivity needs and rely on the service provider to ensure fast and secure communications while also being responsibly aligned with telcos. Therefore, they must rely on technologies to cancel potential cross-link interferences in order to ensure a reliable and secure connectivity. This is particularly the case where WRC 23 is affecting most of the satellite frequencies.

Telcos offer Earth observation (EO) data or managed satellite services to the service provider, which in turn offers them to end users such as corporations or institutions based on the SLA. Moreover, EO is also impacted by interference events such as 3G, 4G, 5G and jamming.

Service-level agreements (SLA) state the contracted conditions for a given set

of EO data to be delivered, or for a given set of satellite communication terminals to be provided with connectivity. The SLA typically includes expected delivery rates or capacity throughputs together with service availability conditions, and may also include continuity requirements in case of safety-critical services. The SLA achievability is therefore directly linked to the possibility of detecting and eliminating interferences and jamming events. Telcos commonly offer help desk support to service providers to handle any service incidence related to their subscriptions.

The reality is that the end customer perceives the quality of the service directly from the service provider; therefore, it is their responsibility to ensure that the service is aligned with the needs of the end user. Regarding interference, customers require technologies to ensure security and a highly available network, especially in the government non-defence arena. Another challenge is that service providers risk interference from cellular networks without the ability to mitigate these interferences, and the risk of losing the satellite in telemetry links.

There are technologies in the market that enable the active cancellation of interferences in cell backhaul, Wi-Fi hotspots, EO and more applications, with real-time interference cancellation in the ground and/or space assets. **PRO**

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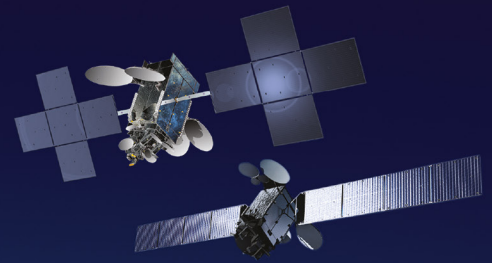


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