

## MIDDLE EAST



The \$87bn software-defined satellite market could be a game changer for operators, but several challenges remain



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## WELCOME



The satellite industry is going through a dramatic reset that will rewrite the parameters that previously defined it. Traditionally, satellites have been expensive and preconfigured to operate in specific markets. Their lack of flexibility and the inability to reorient capacity or enable the dynamic allocation of resources according to market conditions or changing business landscapes have made sceptics question the future of traditional satellites and if this industry will slowly fade into oblivion for lack of innovation. We couldn't be farther from the truth.

Every article in this issue of *SatellitePro* points to the critical role that satellites play in various industries whether they be in broadcast, in education and digitalisation or in communications. Satellite prevails especially in underserved areas, where other technologies have failed to forge a path.

What, however, is truly giving this industry a fresh lease of life is the addition of the software element to all new satellites in development. Software-defined satellites

(SDS) allow you to redirect capacity and reshape throughput according to the need of the hour, and this opens up a whole spectrum of new opportunities for solution providers, businesses, end users and everyone else in the chain.

With these satellites, solution providers are now going back to the drawing table and revisiting their product offerings. And while there are several challenges that still need to be addressed, all players recognise that software-defined satellites are changing the game. Our cover story paints the whole picture for you.

But if you're looking for additional information and are heading to IBC, you will hear more about opportunities within this space with the newly deployed Eutelsat Quantum or Arabsat's 7A that is now in development among others. See you in Amsterdam.

**VIJAYA CHERIAN**  
Editor  
*SatellitePro* ME



# THE skyflow

NATIVE IP OVER SATELLITE  
ECOSYSTEM

LIVE DEMO  
ib STAND 1.A49  
IBC SHOW - SEPT 9-12

Distance and  
Remote Learning  
Telco Video

Traditional DTH +  
OTT Delivery  
Enterprise video

COLLABORATION PARTNERS



INTEGRATION PARTNERS



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## UAE sets up National Space Fund

### SPACE FUND

The UAE Space Agency has announced the National Space Fund, a new USD 817m national investment and development fund for the space sector. The fund will support new programmes launched to support international and Emirati companies co-operating in space sector engineering, sciences and research applications.

The fund's first investment will be in the development and launch of a constellation of advanced imaging satellites for the Emirates, using the SAR (Synthetic Aperture

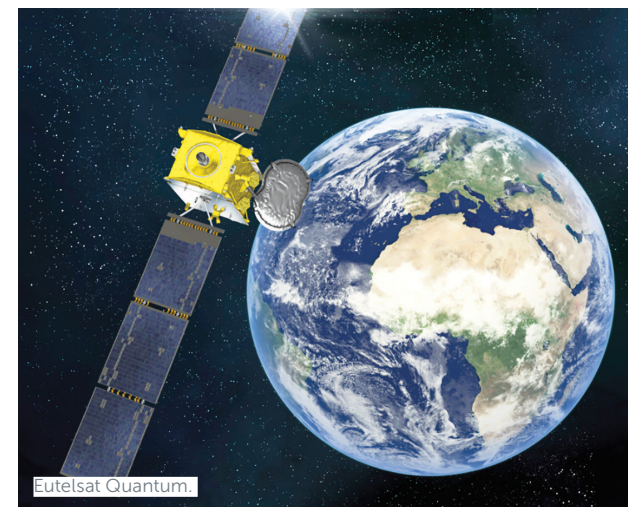
Radar) technology. The constellation is to be named Sirb and will address the need for better environmental and land usage monitoring, data collection and analysis to meet today's global challenges.

The six-year satellite development programme will see the first satellite launch in three years, a much faster time to launch than was possible using traditional earth observation satellite design principles. The Sirb satellites will be built through partnerships between the Emirati public and private sector together

with international players, with submissions being opened for a range of system integration, development and subsystem construction opportunities as part of the constellation development, launch, operation and commercialisation plan.

As well as addressing critical human needs for more wide-ranging data, the Sirb constellation provides a private sector opportunity that bridges the gap between the Emirates Mars Mission and the upcoming Beyond Mars Mission to Venus and the Main Asteroid Belt, due to launch in 2028.

## Eutelsat's software-defined satellite enters commercial service



### NEW LAUNCH

Eutelsat has sold six of its eight beams—used for information and cell communications—to organisations, including

governments and other users. It is expected that the entire satellite capacity will be sold in the coming months. The satellite – Eutelsat Quantum –

was launched on July 30, 2021, by an Ariane 5 from Europe's spaceport in French Guiana. Its beams can be reshaped and redirected to provide information to people on moving planes, trucks and cars in close to real-time.

Eutelsat Quantum is a collaboration under an ESA Partnership Project between Eutelsat and satellite manufacturer Airbus, with significant support from the UK Space Agency. The technologies were developed and manufactured in the UK and Spain, with additional contributions from companies based in Canada, Italy, Norway and the Netherlands.

## Telecom Egypt and Orange Jordan join forces to serve Iraq

### COMMS DEAL

Telecom Egypt has signed a strategic agreement with Orange Jordan to create a terrestrial system connecting Iraq to Europe through Jordanian and Egyptian territories.

The new system will commercially be named "Cairo Amman Baghdad System" or "CAB System". It falls in line with both operators' strategies to extend their footprints to the Middle East market generally, and to Iraq specifically, to provide state-of-the-art telecommunications and connectivity solutions. Integrating the companies' networks will offer reliable, low-latency internet connectivity services through highly resilient, diverse routes to meet Iraq's growing market demand.

CAB System will be ready for service in Q3 2022. Once launched, it claims to be the most advanced, scalable gateway and express route connecting Iraq to Europe using the companies' networks.



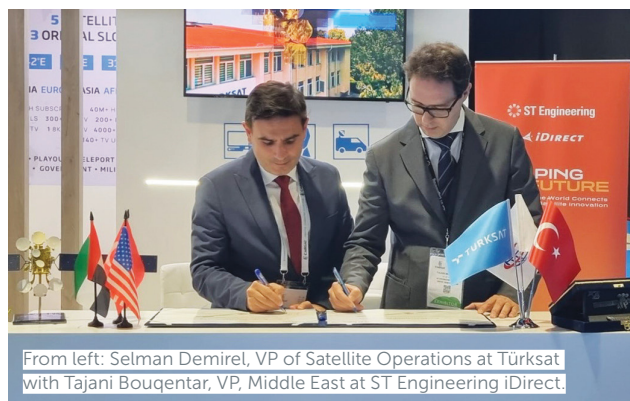
# ST Engineering iDirect and Türksat in major contract for ground systems for 5B

## PARTNERSHIP

ST Engineering iDirect has signed a multi-million-dollar contract with Türksat for the ground systems required to run a variety of services over the Türksat 5B satellite.

ST Engineering iDirect will provide multiple Dialog XIF hubs and 5,000 remotes, enabling Türksat to augment services to various markets including government, enterprise, mobility and cellular backhaul across 30 beams, providing the connectivity from low data rates all the way to very large throughputs of over 1 Gbps for the most demanding applications.

The new installations will ensure that Türksat can run its satellite networks more efficiently, and rapidly



From left: Selman Demirel, VP of Satellite Operations at Türksat with Tajani Bouqentar, VP, Middle East at ST Engineering iDirect.

adapt its existing networks or build new ones through ST Engineering iDirect's Network Management System (NMS) that allows services, capacity, terminals and beams to be scaled in an instant, fully automated and orchestrated way. Based on the latest DVB-S2X technology and Mx-DMA

MRC technology, Türksat can also maximise the benefits of the 5B HTS by leveraging the highest efficiencies and throughputs of the DVB-S2X waveform as well as optimise the return link with Mx-DMA MRC. Both platforms and remotes can provide the flexibility, multi-service capability and scalability

to cater to Türksat's HTS business today and as it expands in the future.

Selman Demirel, Vice President of Satellite Operations at Türksat, said: "The latest satellite of our fleet, Türksat 5B, will greatly increase our current coverage and bandwidth over Ka HTS. This will enable Türksat to extend broadband services over many regions including the Middle East and Africa, as well as major maritime and airtime routes. The partnership with ST Engineering iDirect in this expansion is very important for Türksat to provide seamless, cost-effective and flexible services to current and prospective customer needs in a broad and rapidly improving market."

## Blue Origin sends first Egyptian on suborbital trip

### SPACE TRAVEL

Blue Origin launched its New Shepard suborbital vehicle carrying six people including the first individuals from Egypt and Portugal to space. The NS-22 mission marked the 12th piloted commercial, non-government sub-orbital spaceflight and the sixth for Blue Origin.

The crew included Egyptian engineer Sara Sabry, and Portuguese entrepreneur Mario Ferreira, both the first

people of their countries to leave Earth. Sabry is a mechanical and biomedical engineer, and the founder of Deep Space Initiative, a non-profit group that works to increase accessibility to space research. She is also Egypt's first female analogue astronaut, having completed a two-week simulation of a Moon mission that recreated the extreme conditions astronauts experience in space.

## Tunisia to send first female astronaut to space in 2024

### SPACE TRAVEL

Tunisia will send its first female astronaut to the International Space Station (ISS) in 2024 as part of an MoU between former Roscosmos Director-General Dmitry Rogozin and ambassador to Russia, Tarak Ben Salem. The candidate will also be the first African representative on a long-duration mission to the space station.

Under the agreement, Russia will train the selected astronaut in its training facilities for spaceflights to the space station. She will be selected from a roster of eight female nominees, all of whom are fighter pilot graduates from the Borj El-Amri aviation school, eventually making them the first Tunisian and African astronauts to go into space.

# Yahsat net income up by 50.7% in H1 2022

## REVENUE

With revenue of \$107m in Q2 2022, UAE satellite operator Yahsat's growth momentum continued with a 6.9% year-on-year increase. This resulted in H1 22 revenue growth of 8.1% year-on-year to \$206m. Both Managed Solutions and Mobility Solutions performed well with H1 2022 revenues increasing by 35.1% and 24.1% respectively, the company stated.

As of June 30, 2022, the group's contracted future revenue remained strong at more than \$2.1bn, equivalent to around 5.2 times FY2021 annual revenue representing an increase of 4.1% since the start of the financial year, underpinned by the five-year \$247m managed services mandate awarded by the UAE Government in February 2022.

Musabbah Al Kaabi, Chairman of Yahsat, said: "Against a backdrop of challenging global economic headwinds, we are delighted to record our highest ever first-half revenue whilst significantly growing Adjusted EBITDA and net income. This reflects the strength of our business underpinned by strong contracted future revenue and positive momentum across operating segments. In light of our strong year-to-date performance, the Board of Directors' confidence in future cash flow generation, ability to grow the business



Ali Al Hashemi, CEO of Yahsat.

and financial strength of the company, we are reiterating our commitment to deliver attractive shareholder returns."

Ali Al Hashemi, Chief Executive Officer of Yahsat, added: "Our contracted future revenue exceeds \$2.10bn, equivalent to 5.2 times FY2021 annual revenue. Looking ahead, we remain on track to bring into commercial service our next generation satellite, Thuraya 4-NGS, in the second half of 2024 whilst two new satellites, Al Yah 4 and Al Yah 5, are under consideration for launch in 2026."

For the financial year 2022, the total expected dividend is a minimum of 16.12 fils per share [US Cents 4.39], split into two equal installments payable around October 2022 and May 2023 respectively. This represents a total dividend

payment of \$107m. The company's dividend policy is well supported by its high cash conversion (93.1% in 1H22), robust balance sheet (0.9x Net Debt/EBITDA as of 30 June 2022) and strong discretionary free cash flow (expected to be approximately two times FY2022 dividend payment).

In view of the strong H1 22 performance, the company now raises its projected 2022 revenues to at least \$420m with the upper end of the range unchanged at \$440m.

Infrastructure accounted for approximately 55% of group revenue in Q2 2022, mainly comprising a 15-year long-term Capacity Services Agreement with the UAE Government. Overall revenue remained broadly stable at \$59m.

Managed Solutions, which contributed approximately 22% of

group revenue, continued its performance with Q2 2022 revenues increasing by 41.4%, resulting in H1 revenue of \$39m, an increase of 35.1% year-on-year.

Mobility Solutions, accounting for approximately 17% of group revenue, had another successful quarter with Q2 2022 revenues up 7.8% year-on-year. H1 revenues has exceeded the prior year by 24.1% with strong growth in both service and equipment revenue. The service revenue increased by 6.5% with double-digit increases across several parts of the business including Voice, Data and Inter-carrier. Meanwhile, equipment revenue, which increased by 95%, continued to benefit from the three-year \$86m distribution agreement secured in 2021.

YahClick, which accounted for approximately 5% of group revenue, saw year-on-year revenue slightly down by 4.4% in H1, mainly due to the wind-down in July 2021 of a multi-year, opportunistic capacity deal that contributed \$2m of revenue in H1 21. The business continued to build strong foundations for future growth with the subscriber base in the consumer broadband business growing by 11% year-to-date and by 24% compared to the same period last year, underpinned by expansion across the Africa region.



# MBRSC opens registration for SpaceOps 2023

**SPACE CONFERENCE**

Mohammed Bin Rashid Space Centre (MBRSC) has opened the registration for the 17th International Conference on Space Operations (SpaceOps 2023).

The conference, one of the major events in the space sector, will be held at the Dubai World Trade Centre from March 6 to 10, with the underlying theme “Invest in Space to Serve Earth and Beyond.” The event, the first-of-its-kind in the

Arab world, is hosted by the MBRSC in collaboration with the SpaceOps Organisation.

SpaceOps 2023 will bring together world-class scientists, practitioners, engineers, and leaders in the space industry to discuss the latest research, state-of-the-art technologies, and innovations in the space sector. The most recent advancements in robotics, human elements, earth-orbiting missions, and deployments to the Moon

and Mars, among other topics, are to be discussed in detail at the event.

The event follows the successful International Astronautical Congress, the world’s largest space conference, which was held in Dubai in 2021 and hosted by the MBRSC. Hosting SpaceOps 2023 is part of the UAE’s strategic vision to develop its space programme and strengthen partnerships with space organisations around the world.

# Measat-3d enters commercial service following in-orbit testing



The Airbus and MEASAT teams at the official handover of the MEASAT-3d satellite to the satellite operator.

**NEW LAUNCH**

Measat Global Berhad, Malaysia’s premier satellite operator, has completed in-orbit testing of Measat-3d ahead of schedule following its launch on June 22 from Kourou, French Guiana.

Measat-3d, the company’s latest and most advanced satellite, has now entered commercial

service after its handover by Airbus Defence and Space (Airbus).

Measat-3d, a multi-mission satellite with a planned lifespan of more than 18 years, carries C-band and Ku-band payloads for video and Direct-to-Home (DTH) services and a high-throughput multiple spot beam Ka-band payload

optimised to deliver high-speed broadband internet communications for Malaysia; even for users in the most remote areas of the country. The satellite also hosts a Q/V band payload, the first-of-its-kind in the Asia Pacific region, allowing Measat to study radio frequency propagation effects in high rainfall regions like Malaysia, to enable the design of its next-generation satellites. In addition, Measat-3d also carries an innovative hosted payload for KTSAT which will be used for the Korean Augmentation Satellite System (KASS) to enhance the accuracy and reliability of GPS signals for aeroplanes, increasing airline flight safety in South Korea.

# Sultan Al Neyadi becomes first Arab astronaut to join ISS mission

**SPACE MISSION**

MBRSC has named Sultan Al Neyadi as the first Arab astronaut to join the six-month mission to the International Space Station (ISS). The UAE astronaut will fly to the orbiting lab on SpaceX’s Crew-6 mission, which is expected to launch in 2023.

In April, the UAE announced the launch of the space mission to the ISS, with the Centre signing strategic cooperation in human spaceflight with Axiom Space.

Al Neyadi was selected among several Emirati astronauts to be the first Arab astronaut to engage in a long-term space mission to the ISS. He will join NASA, SpaceX and Crew-6’s mission scheduled for launch in the first half of 2023 from Florida’s Kennedy Space Centre.

During the mission, Al Neyadi will conduct many in-depth and advanced scientific experiments as part of the UAE Astronaut Programme.

# Saudi Arabia and Greece collaborate on data cable project

**PARTNERSHIP**

Saudi Arabia and Greece have announced a strategic partnership between the private sectors in the two countries to build a data cable project linking the East and the West. This partnership comes through the EMC project by the Saudi Telecom Company (STC) in partnership with Greek Telecom Company; the General Energy Company in Greece and the Cyprus Telecom Company.

The project aims to position the two countries as an eastern digital station for Europe to reach the Middle East, the continents of Africa and Asia, and the submarine cable (EMC) comes as part of the strategic digital transformation plan of Greece, and is part of the Kingdom’s ambitions to consolidate its position as a digital hub centre at the regional and global levels by taking advantage of its advanced digital infrastructure, its developed cadres and institutions, and its nice geographical location.

# Strata Manufacturing in deal to produce more parts for MBZ-SAT

**MANUFACTURING**

Mubadala Investment Company’s aerospace unit Strata Manufacturing has signed a new contract with the Mohammed Bin Rashid Space Centre (MBRSC) to produce more parts for the UAE’s Earth-imaging satellite MBZ-SAT. MBZ-SAT will be the region’s most advanced commercial satellite in the field of high-resolution satellite imagery.

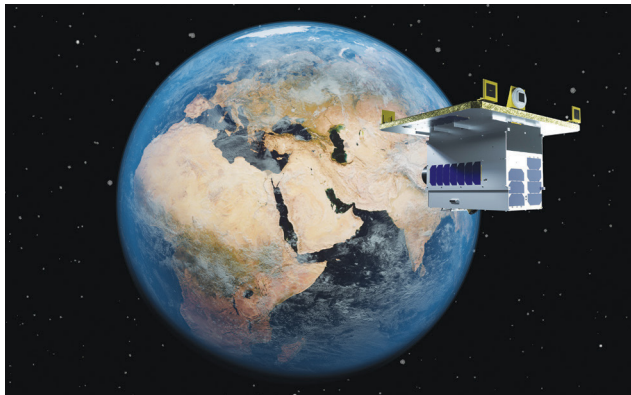
Ismail Ali Abdullah, CEO of Strata, said: “Since its inception, Strata has been keen to deliver aircraft parts of the highest global manufacturing quality, reflecting the international position of the country’s industrial sector as an industry leader. The signing of this contract demonstrates the value of collaboration among national industrial companies. In addition to supporting the

UAE’s aspirations in the space sector, Strata is pleased to be associated with the MBRSC as a trusted partner and collaborator.”

Salem AlMarri, Director General of MBRSC, stated: “MBRSC is dedicated to supporting national private businesses that will contribute to the growth of the UAE’s space industry. We have entrusted Strata to manufacture both mechanical

and flat parts of MBZ-SAT, due to their high-calibre capabilities as manufacturers of a national product.”

The 3m x 5m satellite, weighing in at around 700 kg, will improve image capture resolution by more than double what is capable in the previously launched satellites. It will also increase the downlink data transmission speed by three times the current capacity.



# United Arab Emirates to host World Radiocommunication Conference

**CONFERENCE**

The International Telecommunication Union (ITU) has announced that the next World Radiocommunication Conference (WRC-23) will take place at the Dubai World Trade Centre in UAE from November 20 and December 15, 2023. Held every four years for four weeks, WRC is mandated to update the Radio Regulations,

the sole international treaty governing the use of the radio frequency spectrum and the geostationary-satellite and non-geostationary satellite orbits.

WRC-23 will bring national government authorities and telecommunication regulatory agencies together with representatives of key radiocommunications

users and providers, for crucial policy and technical regulatory discussions at the global level.

The flagship conference will be preceded by the Radiocommunication Assembly (RA-23), taking place from November 13 to 17, 2023 at the same venue.

Over 4,000 delegates are expected to attend WRC-23 and RA-23, from ITU’s 193 Member States.



# SpaceX wins US Air Force contract for Starlink services in Europe and Africa

## CONNECTIVITY

SpaceX has won a \$1.9m contract with the US Air Force to provide internet services to support airlift operations for Europe and Africa. Based on unclassified documents from the US Air Force, Starlink will provide fixed-site and portable services.

For fixed-site services, internet connection will be assigned to an individual 22-km diameter Starlink cell. The connection should only work within the boundaries of the assigned cell.

The contract is for hardware and services in support of military airlift units based at Ramstein Air Base, Germany.

"The general requirement is a commercial satellite internet solution using Low-Earth Orbit (LEO) satellite with available services in Europe and Africa to support the mission of the 86 Air Lift Wing and its tenant units," read the contract.

"The intent of the contract is to provide either first-generation or high-performance satellite

terminals and internet service either static/fixed site or portable/mobile to the terminals enabling users to connect devices to the internet. The expected throughput capability to be delivered by the Starlink high-performance terminal is up to 500Mbps download speed and low latency connectivity. The contractor shall provide internet service support for a period of performance of twelve (12) months estimated to begin 01 August 2022 – 31 July 2023," explained the Air Force contract.

Several other companies are competing to establish LEO, medium Earth orbit (MEO) and geostationary Earth orbit (GEO) satellite internet networks, but Starlink "currently has the most well-established LEO satellite network ... whereas the LEO networks of its competitors are still in their infancy," the document stated.

The expected throughput to be delivered by the Starlink high-performance terminal is up to 500mbps download speed and low latency connectivity.

## Türk Telekom enters into strategic deal with Korea

### COMMS DEAL

Türk Telekom and Korea Telecom have signed an agreement that includes 5G R&D studies and their commercialisation, evaluating joint investment opportunities for start-ups and media content exchange for TV platforms.

In the latter case, content provided by Korea Telecom will be offered to viewers of Türk Telekom's IPTV/OTT platform. The agreement also signals room for further bilateral media content exchange and joint effort to create new media content, depending on Turkish

users' responses.

KT has also agreed to supply its private wireless network technology to set up an enterprise network for Türk Telekom by 2023. The private network infrastructure is expected to help enterprise or government clients enjoy wireless networks with faster speeds, lower latency and enhanced security.

Ümit Önal, CEO of Türk Telekom, said: "We are embarking on an exciting journey with Korea Telecom to implement joint R&D projects ... I believe that this cooperation will yield very successful results."

## SES and Axess team up to cater to mining sector



### CONNECTIVITY

**Teleport operator and satellite services provider Axess Networks has signed a multi-year, multi-million agreement to serve its mining sector users with SES's smart mining service via O3b mPOWER.**

**Under this agreement, the mining sector users will be able to benefit from the cutting-edge low-**

**latency Onshore Energy & Mining mPOWERED connectivity service.**

**SES' Onshore Energy & Mining mPOWERED service will provide the highest throughput available from a satellite system and deliver dedicated and carrier-grade networks to Axess' customers reliably regardless of their remote locations.**

# Etisalat by e& completes MENA 6GHz trial

## SPECTRUM

Etisalat UAE, branded as etisalat by e&, has completed its first trial of the 6GHz spectrum in the MENA region.

In a statement, the company said: "This trial conducted with Huawei Technologies was integral in today's technology evolution as the full speed and capabilities of 5G depend on the mid-band spectrum that secures performance in the long term and adds more capacity if required."

Extending the bandwidth of 5G through the harmonisation of the 6GHz spectrum will provide more bandwidth and improve network performance. On top of this, the broad, contiguous channels offered by the 6GHz range will



reduce the need for network densification and make next-generation connectivity more affordable for all.

Khalid Murshed, Chief Technology and Information Officer (CTIO), Etisalat UAE, said: "5G allows the industry to support national digital transformation goals by providing reliable, high capacity, low latency, and wide-area connectivity to

consumers and industries. The metaverse is opening untapped opportunities with hyper-personalised experiences powered by AI. Telcos will be the entry point to the metaverse because of connectivity but also because the customer wants access to a digital world. The future is powered by AI and analytics, with metaverse playing a role yet to be defined. This kind

of technology disruption will create challenges but simultaneously bring massive prospects to this dynamic industry."

He added: "The trial for 6GHz was influenced by these future market requirements as we foresee significant growth accelerated by these applications. As a digital telco, we focus on our core while curating digital experiences that maximise engagement by building new capabilities across AI and digital to thrive in an increasingly competitive and ever-changing market environment."

The metaverse will require seamless mobility enabled by macro-cellular networks relying on a mid-band spectrum such as the 6GHz band.

## Speedcast inks deal with Algérie Télécom Satellite and Bristow

### COMMS DEAL

Algérie Télécom Satellite (ATS) has signed a reseller agreement with communications and IT services provider Speedcast to expand its business and widen its customer base.

The agreement will provision Speedcast's experience and expertise for ATS' resell, expanding its business in VSAT solutions and services and helping ATS to respond more efficiently to customers' needs.

Speedcast has also

signed a multi-year contract with aviation services provider Bristow Group Inc. to deliver technology upgrades and future-proof more than 40 remote sites across the globe, including Australia, Europe, Nigeria, the United Kingdom, and North and South America.

As part of the agreement, more than 40 onshore energy and search and rescue office bases will receive technology and system

enhancements via Speedcast's Unified Global Platform (UGP) and its advanced, software-defined wide area network (SD-WAN) solution. Additionally, all sites will benefit from equipment upgrades.

ATS has provided satellite services in Algeria for more than four decades and currently operates fixed and mobile satellite networks for cellular, banking, government and other industries across the country.

Headquartered in Algiers, ATS operates a teleport at Lakhdaria and offices around Algeria.

James Trevelyan, Senior VP of Enterprise and Emerging Markets at Speedcast, said: "The company conducted a thorough RFI process before selecting us as their global services partner, and we're pleased to engage in a mutually beneficial opportunity to deliver critical connectivity solutions to customers in this region."



# TRADITIONAL VS IN-FIELD TESTING: WHAT'S BEST NOW?

Within RF ground segments, antenna testing has always been critical to mitigating RF interference. But is in-field testing with drones providing a better alternative to traditional testing methods? Joakim Espeland, CEO of QuadSAT argues in favour of the former

RFI has a detrimental impact on antenna performance, with signals and throughput being negatively affected. The financial and reputational implications of RFI are severe and the ramifications are not limited only to the offending antenna, but its effects can also be seen in neighbouring users of spectrum. Poor quality equipment and user error are often to blame of RFI incidents and, therefore, introducing and maintaining a testing regime is crucial when managing ground segment infrastructures.

to and from testing facilities is inconvenient and costly. Beyond the costs associated with transportation, downtime introduces significant financial implications. For some operators, additional capacity on alternative teleports must be sourced, whereas others, such as those in aviation and maritime, are required to cease operations whilst the antennas are being tested. The financial implications of testing can sometimes deter teleport operators from testing as frequently as they would like to; regular testing is the best way to ensure high-quality connectivity, however, if

it is not viable within a business strategy, it may be neglected.

Beyond cost, a huge issue surrounding facility testing is the lack of environmental context within the tests. We know that environmental factors can have a large effect on antenna performance and testing an antenna within a facility cannot account for these issues. An antenna may perform perfectly within a facility and have issues due to reflectivity, geographical features, such as trees or hills, or even other teleports. To truly understand antenna performance, it must be tested within its own environment.

## The longstanding testing routine

For years, the most popular option within testing has been within designated testing facilities. Antennas are transported to the facility and a series of tests are completed to assess its technical capabilities and current calibration. Repeatability is easily achieved, with testing being performed in anechoic chambers, and operators receive detailed results specifying its performance. This type of testing has provided many operators with an insight into antenna performance; however, does it maximise the potential of testing?

Logistically, transporting antennas



## In-field testing

Historically, there have been substantial challenges facing in-field testing. Intercepting RF signals to evaluate antenna performance would require substantial infrastructures being built to house testing equipment, and testing is often limited due to the constraints of the static test site. Additionally, there could be a need for the construction of multiple structures to house the testing equipment as it may not be suitable for all testing needs. Once again, these challenges are enough to deter operators from performing regular testing on-site; not only are infrastructure costs high, but the results may be limited due to positioning restraints.

New technologies have been required to overhaul in-field testing. Drones are now being used as a low-cost and flexible method of performing in-depth antenna testing on-site. Testing is performed by the drone which mimics the satellite, obtaining results as it collects data from its flight. Each flight can be calibrated depending on each antenna's needs and, as a dynamic solution, it can obtain several measurements, including azimuth, elevation, and raster cuts. The system ensures repeatability, control over the drone during measurements, and data is aggregated through software to deliver results to the operator.

Importantly, environmental factors can be considered within the results; any location-based challenges can be identified, enabling the operators to make changes where necessary. Reflectivity is a huge concern when managing teleport efficacy; it can impact how RF signals are received and negatively affect services being delivered from that antenna. Drones can be utilised to compute a reflectivity map for a test site through retrieving the reflectivity level for multiple azimuth-over-elevation angular pairs. Identifying the source and impact of the reflectivity



Drones can be utilised to compute a reflectivity map for a test site through retrieving the reflectivity level for multiple azimuth-over-elevation angular pairs"

Joakim Espeland, CEO, QuadSAT

enables operators to mitigate its effects through changing the orientation of the antenna, installing displacement equipment or through changing the site configuration. This method is not being limited to existing sites; drones are now being used within site qualification exercises. Building ground segment infrastructures is costly and completing on-site tests ahead of large investments is crucial in ensuring effective ground networks.

Drones are also reducing the ongoing cost of testing through removing the logistical costs associated with relocating antennas, as well as the associated downtime. The reduced costs are also being

paired with receiving more realistic results, with the aforementioned environmental factors being considered. This accessibility allows for rigorous testing regimes to be instated and thus enabling operators to maximise throughput of the antenna and ultimately improve the services they provide their customers.

## Better testing opportunities for the industry

All operators wish to deliver the best user experience possible whilst maximising business opportunities and managing both teleport effectiveness and RFI is imperative to success. As we see networks within the satcom grow, we must instate new technologies to improve in-field testing that are both accurate and cost-effective. With the number of ground segments set to increase sharply, testing regimes are more important than ever, with spectrum becoming crowded and complexity growing within the up/downlinking process. Simultaneously, testing regimes must be feasible within business strategies; with operators having to test multiple antennas, testing methods must be cost efficient otherwise they become inaccessible, potentially impacting not only that operator, but others around them. Environmental factors impact the ground segment massively and testing on-site is hugely important when establishing antenna performance. Drones improve both accessibility and provide a well-rounded picture of performance, whilst providing the same repeatability as that of tests performed in a testing facility. As growth within the industry continues, drones will play a substantial role in ground segment infrastructures with antenna testing enabling operators to deliver the most effective and reliable services possible. **PRO**

Joakim Espeland is CEO of QuadSAT.



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## Summit

The 12th edition of the ASBU BroadcastPro Summit and Awards will be hosted in November, 2022, in association with the Arab States Broadcasting Union (ASBU).

The Summit has, over the years, established itself as one of the region's leading vendor-neutral events aimed at encouraging knowledge sharing and collaboration between professionals in the MENA region. Each of the previous editions of the Summit brought together more than 300 professionals from the MENA region.

This event aims to tackle issues related to the latest trends in the marketplace. It encourages the adoption of similar standards within the MENA to ensure that all broadcasters benefit from collaboration.

The Summit is part of our commitment to bring together industry peers regularly through workshops and conferences to share technology intelligence, debate best practices and standards in the industry, discuss international and regional case studies, and take

home a wealth of knowledge that will enable us to make more informed decisions at our workplaces.

BroadcastPro ME is working alongside the Arab States Broadcasting Union and a board of technical advisors to ensure that we offer a comprehensive one-day learning experience for the industry at the Summit.

The Summit will be designed by professionals for professionals.

### About the

## Awards

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The ASBU BroadcastPro Summit and Awards covers a broad range of categories to reward excellence in various fields across the broadcast workflow, from production and post-production to traditional broadcast and new media platforms.

The Arab States Broadcasting Union (ASBU), an IBC award winner, and the only dynamic pan-Arab organisation involved in establishing and maintaining best practices in the field of

broadcasting, has teamed up with BroadcastPro ME as part of its efforts to tie with a partner that understands the market but also respects the need for integrity and credibility. The winners are selected by a panel of judges from across the MENA region with varying technical skills.

Our partnership with ASBU is designed to encourage greater participation from across the pan Arab market and to ensure that the choice of winners is a transparent and competent process.

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# HOW SOFTWARE CHANGES THE SATELLITE GAME

Software-defined satellites present an \$87bn revenue opportunity thanks to payload flexibility and price advantages.

But challenges around production, ground operations and interoperability must first be resolved, experts tell Keith Fernandez



The world's first satellite that can be fully reprogrammed while in orbit has already been in operation for more than a year. Now industry insiders believe such flexible missions could soon become the industry standard. Eutelsat Quantum, launched from French Guiana last summer, is the first commercial Ku-band satellite to have a fully flexible payload that can be remotely configured by software from end-users' premises – all while in orbit 36,000km above Earth.

Thanks to adjustable antennas, reconfigurable transmission beams and customised electronics, the Quantum can respond to changing demands for data transmission and secure communications in near-real time, repeatedly over its expected 15-year lifespan.

For example, communications channels can be redirected within minutes to reach passengers aboard moving planes, ships, trucks and cars. At the same time, the Quantum's beams also can be easily adjusted to deliver more data when demand surges, an Eutelsat spokesperson says. Power

allocation and carrier frequency management can similarly be defined and modified on the go. Changes can be carried out either by Eutelsat as the satellite operator, or by government and defence users opting to independently and securely control their portion of the payload.

The Quantum represents a new breed of software-defined satellites (SDS) that is being positioned as an industry game changer. As customer demand for satellite services changes and capacity needs expand, the industry is responding by transitioning to software-focused units.

Traditionally, satellites have been preconfigured and assembled to carry out specific tasks in predetermined markets. By contrast, SDS units pair standardised hardware with adjustable software programmes that can be altered while in orbit. New programs can be uploaded from the ground at any time, and only the data of interest downlinked. Consequently, operators can quickly pivot to shifts in the business landscape without having to build and

deploy another unit.

For a rather simplified comparison, consider software-defined satellites like a smartphone whose operating system is constantly being upgraded to perform new tasks (including security enhancements).

Given the sector's long timeframes from construction to launch, switching to flexible, software-defined operations helps extend a satellite's lifecycle and improve environmental sustainability, says Dr Sean Shan Min Swei of the UAE's Khalifa University. The former NASA research scientist is Professor of Practice, Acting Chair of Aerospace Engineering, and Director of the university's Space Technology and Innovation Centers.

He says the ability to upload, reformulate, reformat, reinstall new functionalities and tailor operations to changing needs is becoming critical to satellite operations. "The idea of flexibility or flexible reconfiguration, which has been called software-defined, is now going to be a starting point for every new industry development. While







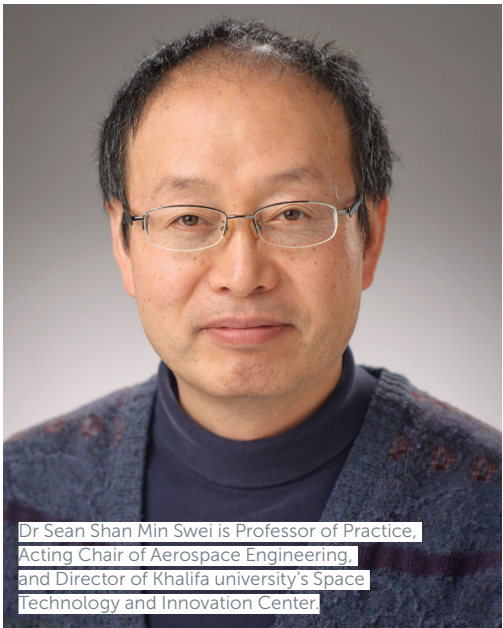
there are many unknowns, over time this is going to become the norm,” Dr Swei says.

Among SDS units’ main benefits are flexibility. “From an operator standpoint, you gain the ability to change your mission. That’s one of the hardest things about space: once you launch a satellite, your mission is defined for the next five to 15 years. You can change some of its functionality, but really, your mission is well defined. Having an SDS means that you can potentially change that,” says Dallas Kasaboski, Principal Analyst at industry market research and consulting firm NSR and a co-author of the firm’s recent Software-Defined Satellites report.

Operators can respond to slow-changing needs like business models and customer demographics, to fast changing needs like moving bandwidth and power around to support the new traffic across a region. In most cases, they can be reconfigured within a few minutes to respond to fluctuations in customer or network demand or to weather conditions, signal interference or other circumstances.

**“The idea of flexibility or flexible reconfiguration, is now going to be a starting point for every new industry development”**

**Dr Sean Shan Min Swei, Khalifa University**



**Revenue opportunity**

The growing SDS market indicates an \$86.9 bn cumulative revenue opportunity from launch and manufacturing operations between 2020 and 2030, NSR estimates.

“Embracing innovations such as software-defined platforms allow operators to enable new business cases and growth opportunities,” says Hussain Bokhari, NSR Senior Analyst, and a co-author of the firm’s recent SDS report. “With enhanced offerings to customers through flexibility options, businesses could minimise CAPEX and increase profits over the satellite life cycle.”

Prime manufacturers focused on or offering flexible SDS options include major names such as Airbus, Lockheed Martin, Thales Alenia Space and Boeing, according to NSR. Kasaboski adds: “We’re also seeing some development from what we call in-house, where operators are developing their own satellites, and they are developing some level of flexibility – such as Amazon, SpaceX, Telesat, which have either partial or potentially fully flexible second-generation offerings.”

Full software definition is still some distance away. The analysts expect to see an industry shift over the next three to five years. “After about three to five years, we expect the pricing to be better understood, the offerings to be more standardised, and to have some flight experience. And then the necessity of the market will drive flexibility, whether operators are hesitant or not, and they’ll be able to reach those needs,” Kasaboski says.

Beyond flexibility and sustainability, price will be a major driver for the switch. As hardware becomes standardised, it drives down manufacturing costs and SDS units can therefore be cheaper than some bent-pipe offerings, he adds.

For now, non-GEO-HTS

constellation satellites will lead the uptake with 95% demonstrating full or partial flexibility as software-defined platforms by 2030. However, with testing still in progress, operator hesitancy sees only 70% of GEO satellite orders to capture this trend in the medium term, NSR forecasts. Most non-GEO constellation satellites will feature some, but not all of the capabilities of a fully software-defined system, while GEO operators evaluate business potential, notes Kasaboski.

**Early movers**

Inmarsat has been one of the early movers in the SDS space, partnering with Airbus OneSat in 2019 to enhance its Global Express (GX) Ka-band network with an order for three satellites. The GX7, 8 and 9 are due to be launched in 2024. Each powers around twice the total capacity of the entire mobile broadband GX network at present.

“These satellites allow coverage, beams, power and bandwidth to be optimised and changed in real-time, delivering capacity where and when the customers need it. This is particularly important for mobility, which has variable demands, such as time of day, hotspots, flight routes, etc. This optimises the use of the payload, as no capacity is left stranded where there is no demand. This is wholly unlike a LEO mega-constellation which has the same amount of capacity over a hotspot as over empty oceans. This pushes the ‘fill rate’ or efficiency of the satellite to close to 100% and lowers the cost per used bit,” says Mark Dickinson, Vice President, Space Segment at Inmarsat. “As these SDSs are generic designs, rather than designed for a specific mission, they can be produced via a production-line approach and hence should reduce the time from order to operations.”

Elsewhere, Thales Alenia Space has been developing Space



**“This pushes the ‘fill rate’ or efficiency of the satellite to close to 100% and lowers the cost per used bit”**

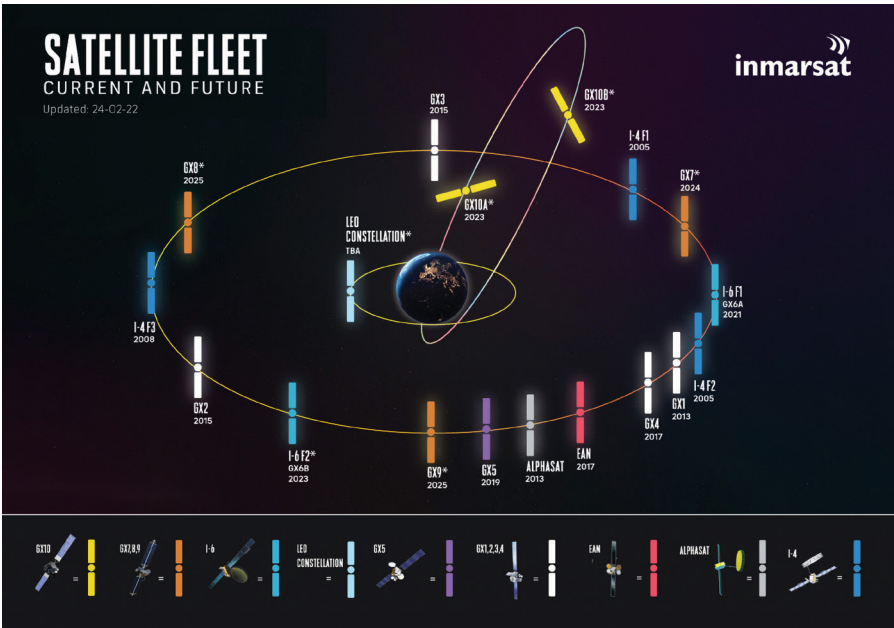
**Mark Dickinson, Vice President, Space Segment, Inmarsat**

Inspire (INstant SPace In-orbit REconfiguration), with a view to delivering a fully flexible SDS solution that allows for seamless telecommunication mission and services reconfiguration, instant in-orbit adjustment to the demand and complete flexibility for video broadcasting and broadband connectivity services while

maximising the efficiency and use of the satellite’s resources.

“Space Inspire is opening a new area for telecom served through GEO in line with global uncertainties and challenges, thanks to the benefits of a deep digital transformation without security or operability concessions,” says Bernard Jacqué, Constellations Solutions Product Line Director at Thales Alenia Space.

He says the trend is a response to changing consumer behaviour as the world transitions to what he calls a VUCA environment, i.e. one that is volatile, uncertain, complex and ambiguous. “Consumers are asking for more and more connectivity of high quality with more and more video content for leisure, for working, for learning, for buying. This connectivity is needed everywhere and at any time. It is a generational trend. Less and less people are spending time in front of their TV screens,” he says. Like other developments in advanced technology, the trend has been accelerated both by the effects of the pandemic and recent geopolitical developments, he adds.







Satcom operators must deal with uncertainties such as an unpredictable rate of transition, enhanced consumer mobility, and ever-changing rules and regulations, he says. Operators can respond by transitioning from broadcast to broadband, providing consumers with connectivity wherever they are: at home, for an enterprise, or in motion, whether on a plane, an automobile or a cruise.

Jacqué says that the impact of SDS is already visible. “Most GEO contracts awarded over the last two years are SDS, demonstrating that SDS is a highly valuable proposition for GEO to complement LEO and MEO projects and to best face future challenges.”

**Ground developments**

But for all their enhanced bandwidth, capabilities, and flexibility, SDS units are wasted if ground systems do not advance to enable those capabilities.

“Traditionally, the ground segment and satellites have been viewed as separate, with the satellite functioning as a fixed ‘bent pipe,’ but with software-defined payloads they need to operate as one synchronised system. For that, the ground needs to change by transitioning from closed, manually controlled hardware, to open, flexible, automated software to match the capabilities and flexibility of the satellites. This involves converting analogue radio-frequency signals to digital packets, virtualising hardware to software, and automating as many processes as possible. With digitised satellite signals and virtualised signal processing, the ground can now operate much more flexibly so operators can maximise the value of these software-defined payloads,” says Stuart Daughtridge, who, as Vice President of Advanced Technology for Kratos, leads

**“With digitised satellite signals and virtualised signal processing, the ground can now operate much more flexibly”**

**Stuart Daughtridge, Vice President of Advanced Technology, Kratos**

the company’s ground segment technology initiatives including the planning for the next generation of ground technology.

Cue greater importance for the ground segment in an SDS world. “Together, the SDS and ground can now operate in tandem as a real-

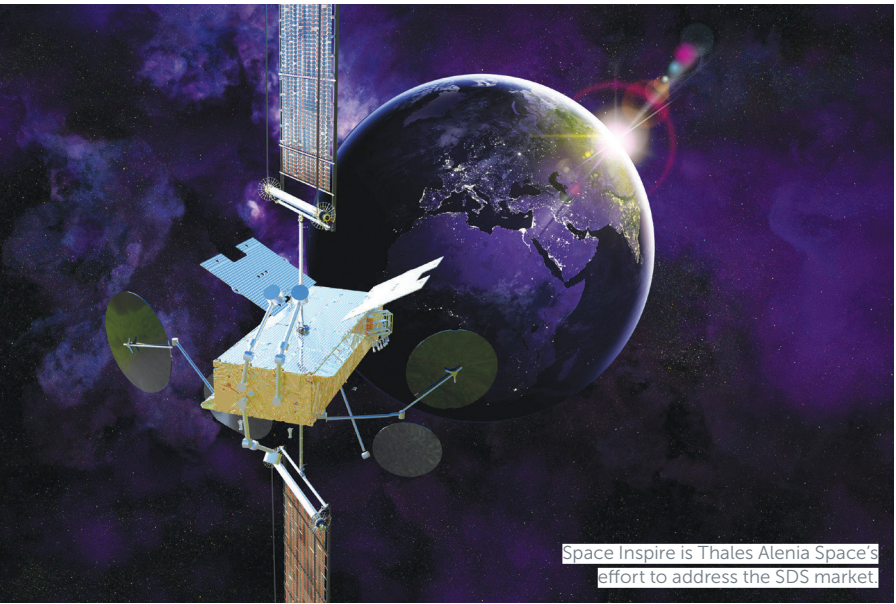
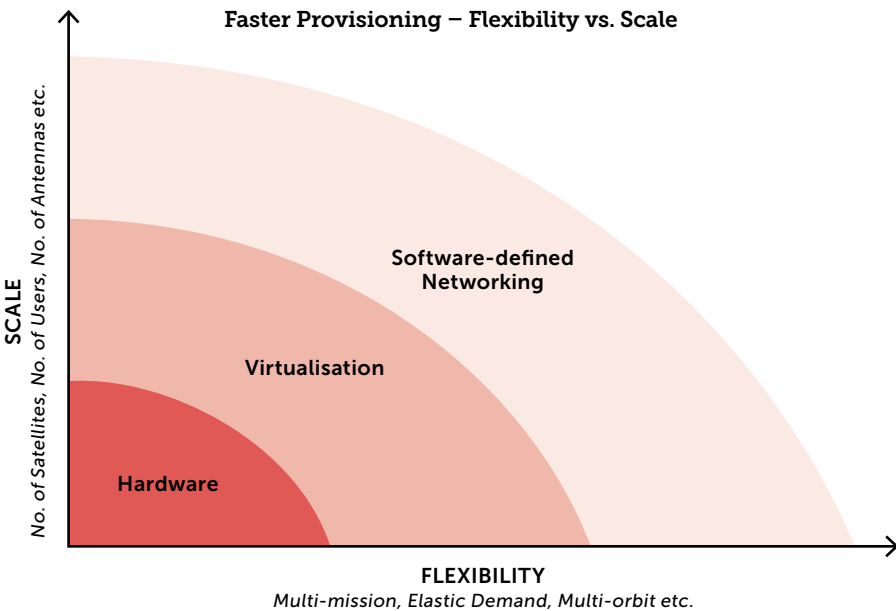
time integrated system, driving coordinated change to instantiate services in minutes – not the hours, days or weeks in traditional systems. Operators can provision more quickly and flexibly, spinning services up and down elastically on-demand in software, driving down the cost per bit,” Daughtridge adds. “Software-defined payloads can provide far more value if they can be more tightly integrated with larger terrestrial networks, which a more dynamic ground enables to further drive growth.”

**Challenges ahead**

Yet, a number of challenges must be addressed before SDS units can truly become the game-changers they are positioned as.

First, with the industry being at the earlier stages of digital transformation and SDS units still being tested, many operators are still in the assessment phase. And development timelines mean an SDS may not be available in time for operators to meet customer requirements.

Kasaboski recounts the case of an operator who had ordered



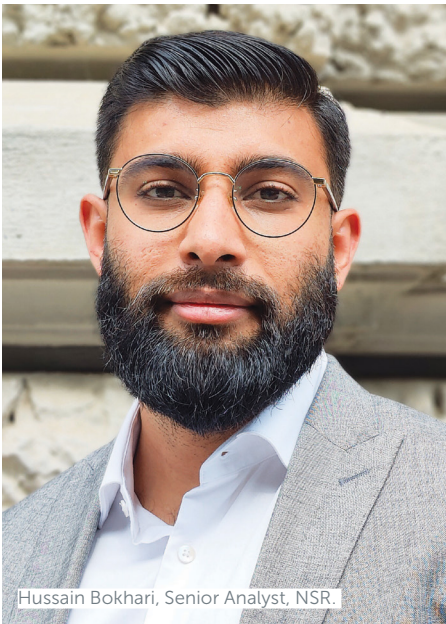
an SDS to replace a failing satellite. However, they ultimately reverted to a traditional bent-pipe satellite. “The timeline was faster. They needed that satellite replaced within the next two years. And the order-to-launch window was shorter for a bent pipe,” he says. “So, the challenge is meeting the customer’s needs, actually interfacing with market integration, and not just responding to pure technological developments.”

Again, the ground segment remains crucial. “One main challenge with SDS units is you have this really flexible satellite that’s actually more flexible than the ground network. And so, it doesn’t matter how flexible your satellite is, if your ground network can’t keep up, it is the limiting factor,” he says.

Kratos’ Daughtridge points to the need for common standards. For the industry to succeed and grow, he says, it needs to embrace the standardisation and interoperability seen in the telecom and IT sectors – which have, in part, propelled their seamless service delivery and growth.

**“Embracing innovations such as software-defined platforms allow operators to enable new growth opportunities”**

**Hussain Bokhari, Senior Analyst, NSR**



For now, the satellite industry is proceeding down this path to interoperability starting with the adoption of digital intermediate frequency (IF). Digital-IF, along with other standards widely adopted by telecom, wireless, and IT, such as carrier ethernet (MEF) and 5G (3GPP), will allow the satellite ecosystem to tightly integrate with these other networks for more seamless, end-to-end service. Similarly, Kratos has created OpenSpace, the industry’s first fully software-defined, standards-based ground platform, Daughtridge says. “Ultimately users don’t care how they connect, whether by satellite or terrestrial,” he says. “They just want service whenever and wherever they are. That’s a role satellite is especially well suited to play – if it can function more like a node in the network rather than a special-use case or separate application. If the satellite industry can more seamlessly integrate with the global telecom grid, it has the opportunity to grow far beyond its current 1% share, creating a rising tide that would lift all boats.” **PRO**





# ARABSAT'S NEW 7A SOFTWARE-DEFINED SATELLITE TO BE DEPLOYED IN 2023

Based on Thales Alenia Space's Inspire platform, the 7A will ensure more efficient use of spectrum and empower Arabsat to offer more flexible solutions to clients



Dr. Badr N. Alsuwaidan, CTO of Arabsat, says the new software-defined satellite will enable Arabsat to offer flexible options to its clients.



Earlier this year, MENA satellite operator, Arabsat, signed a contract with Thales Alenia Space to build Arabsat-7A, a fully flexible Software-Defined Satellite (SDS) based on the Space Inspire (INstant SPace In-orbit REconfiguration) platform by Thales Alenia Space. The contract places Arabsat

in a special league with those geostationary satellite operators that have chosen this technology to transition from traditional bent-pipe GEO satellites to the highly agile and adaptable SDSs, which are expected to change the face of the geostationary satcom industry. The Space Inspire platform will enable seamless telecom mission and services reconfiguration of the Arabsat-7A satellite, instant

in-orbit adjustment to broadband connectivity demand, and superior video broadcasting performance while maximising the effective use of satellite resources.

Arabsat 7A will join 6A and 5A at its data hotspot at 30.5°E. It will replace the bulk of the existing C and Ku-band capacity on Arabsat 5A as this satellite reaches end-of-life to ensure a seamless transition for customers and partners. It will also offer ample high-throughput Ku-band capacity to help the operator expand its services into several verticals to enhance its portfolio of products and solutions over Middle East, Africa and beyond, to parts of Europe.

"Following a lengthy and rigorous evaluation of the various products currently available on the market, Arabsat decided to go with the Space Inspire platform and entrust Thales Alenia Space, whom we have partnered with for well over four decades on several programmes," commented Dr. Badr N. Alsuwaidan, CTO of Arabsat.

"This programme is fully aligned with Arabsat's new transformation strategy, which is aimed at bringing Arabsat closer



Wael Butti, Chief Commercial Officer, Arabsat.

to its loyal customers to ensure sustainable growth for the satcom business in the region as well as partnering with governments and enterprises in various countries to bridge the digital divide and connect the unconnected which has become synonymous with economic prosperity and people empowerment."

Elaborating further, Alsuwaidan said: "With our beams, we can adjust to our customers' needs and tailor our service to their requirements based on where they are and the specific needs they have. On this basis, we can provide more capacity to certain customers in some geographical locations. We can be more flexible and customer oriented. In addition, customer demands change over time, which means there may be times when they require more capacity and other times, when they require less."

With the MENA region undergoing dramatic changes and many areas undergoing rapid development, the need for telecom services is at its peak.

"In Saudi Arabia, places like NEOM and some cities in the GCC are experiencing massive growth.

NEOM, for instance, is seeing accelerated development and requires a lot of services that by default need higher capacity. We are looking to address the requirements in these areas and are working with our partners and service providers to provide more managed service to our customers, alongside traditional services," he added.

Arabsat 7A is expected to replace the bulk of the existing C and

Ku-band capacity on Arabsat 5A as this satellite reaches the end of its life. 7A will offer ample high-throughput Ku-band capacity to help Arabsat expand its services into several verticals to enhance its portfolio of products and solutions over the Middle East, Africa and beyond, to parts of Europe.

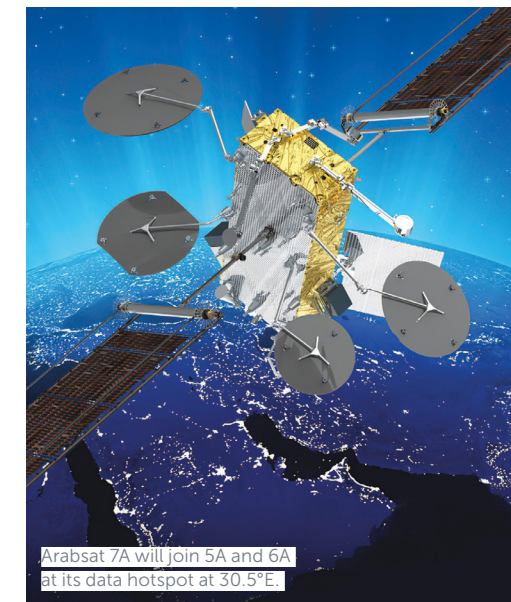
"This satellite ensures more efficient use of spectrum, which is what the ITU regulation stipulates and towards which all of us are working. With it, coverage of the MENA region will include a lot of growing cities and developing areas in Africa, where there is a lot of need for telecommunication services.

One of the reasons why satellites are a better option in rural areas is because terrestrial services require a larger population to justify the cost of infrastructural deployment and time taken to implement.

"Satellite is a more efficient solution, and we serve several different verticals like hospitals, enterprises, oil and gas, industrial areas and so on," explains Alsuwaidan.

Wael Butti, VP, Chief Commercial Officer, Arabsat added: "This new technology will help us to develop several new products but also offer a lot of flexibility to the market. We now know what our clients are looking for something like the 7A, which will play a big role in telecommunications."

Arabsat is also looking to implement a service for 5G backhauling, Butti confided. "This will help the GSM operators here cover the whole country for 5G," he stated, adding that the satellite operator works with GSM operators, VSA specialists and others to ensure that between them, the companies are able to complement each other's services and offer people complete country coverage. **PRO**



Arabsat 7A will join 5A and 6A at its data hotspot at 30.5°E.



# SATCOM EMPOWERS EDUCATION IN EAST AFRICA

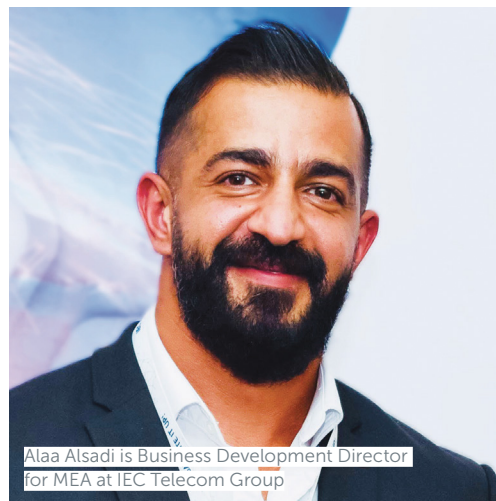
East Africa is in the midst of an unprecedented economic growth, fuelled by digitalisation across all sectors. The key to ensuring continuous progress along this path is affordable satellite connectivity alongside terrestrial networks, and governments are working closely with solution providers to enable this and empower their people



East Africa is well primed for efficacious investments in the education sector, estimated at approximately USD 124m of capital expenditure funding and \$67m of annual operating expenses. According to a study by Ernst & Young, 85% of the education deals in Africa have taken place in Kenya, Tanzania, and Egypt as well as South Africa, Morocco and Ghana.

The African Union's Digital Transformation Strategy 2020-2030 emphasises the importance of digitalising education and post-COVID-19 pandemic era efforts reflect the urgency to digitise education resources and processes in Tanzania, Ethiopia, Kenya, and Uganda, where digitalisation as a policy is high on the priority list for the government, teachers, and education sector professionals.

As a case in point, the Digital Literacy Programme (DLP) by the government of Kenya accentuates several key efforts being driven jointly by the Ministry of ICT and ICT Authority to provide digital devices to primary schools across the country. Currently, 1.2m digital



Alaa Alsadi is Business Development Director for MEA at IEC Telecom Group

devices have been distributed to Grades 1, 2, and 3. These efforts, however, need to be supplemented by affordable broadband connectivity because it is logistically difficult for the Ministry of Education to update device content regularly at 24,000 primary schools. With reliable internet access, learning materials can be updated from a centralised management system. This is where a reliable national communications infrastructure is indispensable.

Affordable satellite connectivity works alongside terrestrial networks

to empower and elevate access to much required resources for remote communities on par with urban areas. It serves the main goal of digitising East Africa with hybrid solutions and a seamless infrastructure, not just for schools, but the communities around the school. While students and education sector professionals can access the most up-to-date learning resources as well as collaborate seamlessly for a multitude of administrative purposes, adjacent remote or rural communities can enjoy the benefits of cost-effective broadband internet services. Satellite connectivity solutions enable integration of the latest technologies with existing government infrastructure, thus, allowing for the provision of e-learning services.

Today, 22.6% of Kenya's communities actively access mobile internet services while 70.7% are covered by 3G/4G, although they are not connected yet. This represents a significant area to increase affordability and digital literacy in East Africa's technology hub.

According to the International Finance Corporation (IFC), 230m jobs in Africa will require digital

skills by 2030. This translates to 650m potential education and training opportunities in an estimated \$130bn market.

Kenya's Digital Literacy Programme, DigiSchool, is an excellent example of supporting students to be prepared for the current digital world. 99.6% of public primary schools in Kenya can now access digital devices. Additionally, Kenya's National Broadband Strategy aims to offer 100% connectivity to all schools at 10Mbps by 2030. This can lead to a potential GDP growth of \$3.3bn.

Satellite communications technology empowers fully remote schools with cost-effective high-speed internet access. Current satcom connectivity solutions reduce the complexity, capital expenditure, and time usually needed to build a terrestrial infrastructure. With heavy investments in ICT and telecom infrastructure, government bodies are expected to save over \$41m in capital. More significantly, it is possible to have active service at remote schools in one day.

Comprehensive school internet kits with value-added services, such as WiFi access points, a network management system, and solar power, create a sustainable, flexible, technological option for as many schools as needed.

Government authorities can remotely control the ICT infrastructure of far-away schools and ensure a better end-user experience across the network. Moreover, such centralised management over satellite technology offers significant resource cost optimisation as well as 24/7 visibility over connected schools and their data consumption. Education sector decision-makers can provide students with secured connectivity that aligns with standard regulations and educational sector policies.

Digital technologies and flexibility



According to reports, 99.6% of public primary schools in Kenya can now access digital devices.

in delivering cost-effective satcom services facilitates tailor-made solutions for the education sector and supports e-learning applications with high-speed internet access, a centralised management system, and videoconferencing. 56% of Kenya's population is young, lending itself to tech-savvy opportunities in e-learning. This is an excellent scenario because it is estimated that individual returns to education are 13.4% in Africa, significantly higher than the world average of approximately 10%.

These improvements in education contribute to significant increases in standards of living, gender parity, and critical social parameters. Remote communities around connected schools can now benefit from high-performance internet access after school hours and during weekends. This was not an easy task commercially and technically with existing plans being based on terrestrial and GSM networks. But, now, this can be achieved over satellite technology.

A school's connectivity services can be utilised as an internet hub for the whole area around the school via internet cafés or long-

range WiFi access points. Such a communications infrastructure is critical to optimising commercial, social, and public processes in a community no matter how remote. While satellite connectivity enables educators to teach via videoconferencing and offers students in otherwise isolated communities with access to up-to-date learning materials, it allows remote workers and offices in these surrounding areas, usually with no GSM coverage, with the ability to access employment opportunities as well as the flexibility of continuing operations no matter where they're located.

On the one hand, offering such secure broadband access to just 23,300 schools in Kenya alone can connect 12.8m community members within a 1km radius of the schools. On the other, it can potentially lead to creating economic opportunities as well as increasing investments in innovative infrastructure and satellite communications in the East African market. **PRO**

Alaa Alsadi is Business Development Director – Middle East & Africa at IEC Telecom Group



# DOES SATELLITE STILL HAVE A ROLE IN BROADCAST?

With the rise in streaming services, growing competition amongst broadcasters and shifting consumer demands, can satellite shake off its reputation as cumbersome and expensive to truly compete and remain relevant to broadcasting, Helen Weedon asks industry experts



→ The broadcast industry is undergoing a process of transformation.

Over the last decade, there has been a gradual change in consumer behaviour as more and more viewers choose streamed video on demand over linear TV.

“Thirty years ago, viewers had a very limited choice when it came to TV, only able to access a handful of channels transmitted via an analogue signal directly into their homes,” says Andrew Bond, Sales and Marketing Director, ETL Systems. “Now this has changed, creating both opportunities and challenges for the broadcasting industry.”

Andreas Voigt, Senior Engineer Service Operations, Eutelsat, and Director of the Satcoms

Innovation Group, reminds us that “broadcasting has been generating significant revenues for GEO operators for years, especially in Europe and consequently remains a massive area of focus for the entire business.”

What does the transition in broadcast mean for these operators and how can they adapt?

## The Rise of New Technology

As new technology comes through that enables content to be transported around the globe at lower costs, this will inevitably challenge satellite's role in the broadcast industry.

Amair Khan, Global Business Development Manager at ViaLite, remarks: “One of the biggest challenges for satellite operators in broadcasting is how they will

compete with technology advances and lower bandwidth costs.”

Joakim Espeland, CEO, QuadSAT, seconds this. “Other technologies are emerging that can get that same content to the right place, often more cheaply.”

Before the pandemic hit the industry, there was already a significant shift towards IP contribution and distribution. The pandemic made this all-the-more important, cutting down on the amount of infrastructure and people needed on site and making it easy to enable remote workflows, even for live production.

Khan highlights the simplicity of other technology: “With new platforms coming online, will these advances in technology be as simple as just plugging in a laptop with an Ethernet

connection so that media files can be sent over a simple broadband connection instead of satellite?”

Simplicity is something that is increasingly important as broadcast is no longer limited to large media companies with huge infrastructure and a large pool of broadcast engineers. Almost anyone can be a broadcaster so the technology needs to be easy to use.

## The Value of Satellite

That said, it is important that satellite still has something these other technologies don't.

“The broadcast market is still substantially big and continues to represent a customer base for satellite operators,” Voigt points out.

“Satellite is unparalleled in terms of its reach and ubiquity, and because of this, it makes it possible for broadcast services to be delivered anywhere, regardless of infrastructure on the ground or relative development of the country. At the same time, its high level of proven reliability means it remains the go-to-choice for that high value content,” adds Espeland.

Satellite also plays an important role within the broadcast industry when it comes to distribution. As Voigt says, “Reaching hundreds of millions of spectators with one transmitter is, and will be, the only truly cost-effective technical solution. As long as linear television sets exist, so will geostationary satellite broadcast – delivering content to Community Antenna TV providers, cruise ships, airplanes or as a Direct To Home (DTH) service.”

Khan adds: “Satellite is well known for the delivery of DTH services and the backhaul of sporting and live events around the world. With the cost of bandwidth becoming cheaper, more and more broadcast-related content can be transmitted around the world and into regions where

cost was a prohibiting factor. Live events and sporting events are becoming standard content now for global audiences.”

## The Future Role of Satellite

There is no doubt that satellite continues to play a big role in the future of broadcast.

According to Espeland: “While there is a need to deliver high-value live content to viewers across the globe, satellite will remain relevant for broadcast. In some cases, where network coverage is not as advanced, satellite will continue to be the only method to contribute and distribute video content.”

Khan agrees: “Satellite will

“In order to remain relevant for broadcast, satellite operators most likely need to more closely resemble an Internet Service Provider”

Helen Weedon, Managing Director, Satcoms Innovation Group



continue to be a significant technology for the transfer of broadcast-related content around the world over the next few years especially with third world countries and urban areas.”

Voigt reiterates the importance of satellite continuing to support broadcast: “Giving up on Broadcast completely or staying in the status quo of today's broadcast technology development is not an option for a successful future of combined services. There are a lot of countries in the world which, as example, want to ensure proper distribution of information in and around their country, regional coverage and worldwide perspective. GEO satellite operators can provide this service via their proven broadcast technology platforms for an attractive price at high availability using proven technology.”

This role will likely look different to how it does today.

Bond says: “Over the next five years, we will see satellites and terrestrial networks working together, with video travelling via satellite and then distributed over fibre to be delivered to the viewer, as we do now. This traditional type of RF signal distribution is not likely to see a significant shift in such a short time frame, but change is on the horizon. As the virtualisation movement we are seeing in pure satellite communications applications reaches the broadcast industry, network architects will turn their attention to converting these signals from analogue to digital and vice versa.”

Many of our members, including ETL Systems, have been involved with the Digital IF Interoperability (DIFI) consortium, which is working towards creating a standardised interoperable digital/analyse interface based on the widely adopted VITA 49.2 protocol. Bond explains: “It will enable broadcasters to move an analogue





Andreas Voigt, Senior Engineer Service Operations, Eutelsat.



Andrew Bond, Sales and Marketing Director, ETL Systems.



Amair Khan, Global Business Development Manager at ViaLite.

signal from one place to another using a digital network. This exciting breakthrough technology will decouple the network operation centre from the antenna, leading to many benefits for broadcasters.”

**Making the Transition**

It is clear that satellite will remain important but only if the industry adapts its approach in a number of ways. Firstly, satellite operators are increasingly looking at new technology themselves. As Khan comments: “This demand for more capacity has led satellite operators to consider using Ka band frequencies between 26GHz to 40 GHz. Although this higher frequency requires higher initial investment in capital equipment, it would soon pay off based on higher bandwidth usage by the operator.”

Of course, this comes with its own set of challenges. Khan elaborates: “Ka band does come with some issues such as rain fade due to the shorter wavelength associated with Ka-band signals. There are ways to eliminate these rain fade issues by either using larger diameter antennas, higher power signals or implementing diverse site

operations between teleports.”

Bond says that “over the next few years, 5G network operators and satcom companies will need to work together to enhance and complement one another’s offering so as to provide the best user experience”.

One of the biggest concerns with 5G is potential interference issues.

Bond suggests ways to avoid this. “Operators should consider installing special bandpass filters in their network. 5G operators may also need to reduce power depending on their proximity to earth stations,” he says.

Espeland also cites the need for satellite to become more cost-efficient.

“Many of the processes that form the basis of satellite are unwieldy and unnecessarily costly. While it is important that satellite continues to be reliable and able to distribute high quality video, the industry needs to embrace innovative approaches that make it more cost-efficient in order to be a competitive force against newer, more agile technology,” he remarks.

Ultimately the satellite operator of the future will look

very different to what it does today. Many of these changes are already happening.

Earlier this year, I moderated a panel session at Govsatcom, where we discussed how service delivery and service management is rapidly evolving and shifting towards automation and cloud-based working. In order to remain relevant for broadcast, satellite operators most likely need to more closely resemble an Internet Service Provider (ISP). For the consumer, it doesn’t really matter how the service is getting to them, just that it is.

As Voigt points out: “The satellite solution of the future will be a combination built from several services, with several links to multiple satellites at a time. As such, the customers can go “Full Speed ahead” with their individual communication requirements, no matter if it is in IP, DTH or a combination of both. IP delivery and DTH broadcast on the device of your choice – the combination of it will make the difference.” **PRO**

*Helen Weedon is Managing Director at the Satcoms Innovation Group.*

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# EXPANDING IOT DEPLOYMENTS WITH COST EFFECTIVE SATELLITE IOT

Fabien Jordan, CEO of Astrocast discusses how access to affordable, global, bidirectional SatIoT can unlock the next wave of IoT innovation



Growing technological sophistication in recent years has enabled IoT deployments to expand significantly, with ease, and at scale. From agriculture to energy, consumer, manufacturing, transportation and medical, integrators and end-users are exploring blended communications solutions, from cellular to LPWAN, including Sigfox, LoRaWan, to Bluetooth and Wi-Fi, to meet an array of business needs.

Seamless, secure integration to an array of cloud services, including AWS IoT, Amazon Kinesis and Microsoft Azure IoT, is ensuring organisations can maximise the value of the IoT data collected. For integrators, an array of innovative tools is accelerating the creation of sophisticated IoT solutions to meet very specific business and operational demands.

Intuitive dashboards are empowering companies to get fleets of IoT devices up and running fast, with rapid access to data, including powerful real-time data visualisation. Furthermore, a range of payment options, including both

CAPEX and OPEX, are supporting the business case for flexible and easy to scale IoT deployments. With 83% of organisations claiming to have improved efficiency by introducing IoT technology, it is little wonder that IoT solutions have the potential to generate USD 4-11tn in economic value by 2025.

Yet these connectivity solutions still provide coverage for only 15% of the world. From agriculture to asset tracking, there is a powerful demand for a truly global IoT solution.

## Truly Global Deployment

The addition of satellite connectivity is a natural next step, creating a complete, blended connectivity solution to support any IoT deployment and deliver complete, global coverage. Until now, however, the cost, complexity and lack of maturity of the satellite solution providers has deterred this vital next step. Many integrators and businesses still perceive satellite as inaccessible, complicated or expensive. This belief is reinforced by the traditional satellite solutions which are not designed for IoT, using unnecessary high bandwidth at a cost that is not affordable for

the majority of IoT use cases.

This perception is no longer valid. The latest generation of affordable satellite IoT (SatIoT) solutions is transforming the business case, allowing integrators to embed satellite within a blended IoT connectivity solution. Organisations can now join the new wave of connectivity providers to make SatIoT more accessible than ever before, meeting huge pent-up demand for IoT solutions that are both global and portable.

## Confirming Satellite IoT Solution Requirements

This is a compelling market for integrators, but how easy is it to embed SatIoT into existing solutions and what are the essential components required to achieve both a powerful client offer and a successful deployment?

For Soracom, which provides global IoT network cellular connectivity to over 20,000 customers around the world in sectors such as agriculture, healthcare, and automotive, the evaluation process, resulting in a partnership with Astrocast, included several key aspects. This

ranged from global coverage, the cost model, the power efficiency of devices connected to the Astrocast constellation to, most notably, the ease of operation when the platform was well integrated with the solution.

- **Global coverage:** From truly remote locations to goods in transit, satellite IoT needs to deliver global connectivity that complements the existing cellular network options.
- **Affordability:** IoT operations are incredibly cost sensitive. Whether a business is looking to deploy ten devices or hundreds of thousands of devices, tiny differences in performance and lifetime will fundamentally change the return on investment (ROI).
- **Power consumption:** Power consumption has a direct impact on device battery life. With devices typically located in remote and inaccessible locations, making replacement or repair impractical and unaffordable, it is crucial to maximise battery life. A low power SatIoT solution will radically extend the life of a device – with batteries typically lasting between five and ten years.
- **Bidirectional communication:** Two-way communication is essential both to underpin innovative IoT applications and enable changes to the way the device operates.
- **Effective integration:** To ensure SatIoT's commercial viability on a platform requires seamless integration, ensuring organisations can gain transparent access to IoT data irrespective of the underlying network.

## Application Development

Integrators can opt for a blended IoT solution, with devices moving between networks as required – cellular first for example, then switching to satellite when cellular is out of range. At every stage, the data automatically feeds through to the



**IoT solutions have the potential to generate USD 4-11tn in economic value by 2025"**

Fabien Jordan, CEO, Astrocast

platform, with its tight integration to a choice of cloud storage options.

## Device Design

SatIoT will require a different IoT device. Solution providers can work with organisations to ensure the correct antenna design – the antenna must be outside and directed towards the sky – as well as supporting integration and certification processes.

## Building on Proven Business Demand

There is significant demand within many industries for IoT deployments across the 85% of the globe that currently has zero cellular coverage. The availability of cost-effective satellite technology provides new opportunities for organisations and use cases.

## Smart Agriculture

Many farmers have already explored IoT to remotely monitor

soil moisture and temperature as part of the move to reduce water consumption while optimising productivity, as well as track animal health and well-being. The challenge, however, has been to achieve effective connectivity to existing terrestrial networks – the addition of a Satellite connectivity to the IoT solution will completely change the business value by offering affordable, reliable connectivity across the globe.

## Automotive Insight

Providers of high-value, ruggedised automotive equipment used in robust and often remote environments such as mining, increasingly rely on IoT to monitor performance. With tyre wear in challenging locations accounting for as much as a third of the operational cost, information about tyre usage and wear can provide vital information to improve maintenance and reduce costs. Ruggedised sensors that can withstand harsh environments are used to track the condition of industrial equipment, including vibration, temperature and tyre pressure.

## Global Asset Tracking

Mobile assets using IoT currently connect seamlessly to an array of networks, providing shipping companies, freight forwarders and freight owners with vital insight about location as well as performance – such as operating temperature. Adding SatIoT to this solution will extend asset tracking across the globe, allowing timely interventions to reduce wastage, improve security and manage customer expectations.

## Conclusion – Collaborating for SatIoT Innovation

The power of IoT to transform operations is indisputable. What has been achieved to date is compelling; but there is so much more that can be achieved. **PRO**





## THE PATH TO 5G IN THE MIDDLE EAST



For years, mobile network operators have lauded the eventual arrival of 5G, praising the potential benefits of faster data speeds, lower latency, and higher capacity for connected devices. But around the world, and in the Middle East, the advent of 5G will not be swift nor immediate, particularly for historically underserved areas. Instead, the path to 5G is the continuation of an ongoing effort to improve connectivity step-wise using the best available technology, including LTE delivered by satellite backhaul -- connecting the RAN or base station to the network core using a satellite link, to facilitate connectivity for even the most rural or remote areas.

The reality is, 5G deployment is likely to follow the same path as previous generations of service: beginning in dense urban areas that are easy for terrestrial providers to address, then gradually expanding to ex-urban and rural regions. Satellite remains the cost-effective and efficient means of serving these areas, as it eliminates the time consuming and costly process of building terrestrial backhaul infrastructure. For many years, satellite backhaul has enabled the expansion of cellular networks -- first 2G, then 3G and 4G -- and it will play a valuable role in the eventual rollout of 5G as well. But, while the promise of 5G is exciting to consumers, particularly in mobile-first parts of the world, network operators are still

working to extend previous generation networks to underserved areas.

In the Middle East, wealthy Gulf countries are leading in 5G deployment. According to GSMA Intelligence, Saudi Arabia currently has 5G coverage for 78% of its population and boasts some of the world's fastest 5G speeds. Yet, the remainder of its population, still suffers gaps in mobile service and does not yet enjoy the benefits of 5G.

Elsewhere in the region, countries are on the cusp of 5G, even in heavily populated areas. For example, in Lebanon, terrestrial providers are just laying the infrastructure to introduce 5G; while in Turkey, 4G is still the dominant technology. The timeline for 5G deployment in the region varies widely across nations and extends well into the late 2020s. Less than 50% of the Middle East currently has 4G coverage to rely on. For now, satellite backhaul continues to help fulfil the vital need for connectivity in underserved regions with 3G and 4G and is ready and able to enable a 5G overlay.

Though mobile consumers may have to wait, the enterprise and government sectors are moving more quickly to implement the technology. Satellite provides distinct advantages for these types of geographically distributed and dynamic networks -- including global capabilities, high security and ability to operate independently from terrestrial infrastructure. Satellite has an important role to play -- from global connectivity

for private 5G networks in urban areas to highly distributed IoT networks, aero and maritime connectivity, or private networks far afield. In the Gulf region, 5G networks incorporating satellite likely will play an important role in the oil and gas industry, through applications like centralised surveillance monitoring, equipment maintenance or production process analysis.

Elsewhere in the private sector, standalone 5G networks present more reliable connectivity, faster data rates and greater scalability, security and network control that will help drive innovation in areas like automation, augmented and virtual reality, and artificial intelligence. By integrating satellite, these private networks can be deployed anywhere globally, including remote or austere locations.

The growing demand for 5G mobile for consumers is undeniable, although progress will not be swift. The continued use of satellite for cellular backhaul will steadily bring the benefits of 4G and 5G to more users around the globe over the next decade, another step in the roadmap to bridging the global digital divide. In the meantime, the intrinsic advantages of satellite connectivity will likely secure it a starring role in the fast-advancing implementation of 5G networks for government and enterprise. **PRO**

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