The Always-On Vehicle:
How Hybrid TN-NTN Connectivity is Powering the Future of Mobility

by Markus Fritz

The vision of a seamlessly connected vehicle, one that maintains high-speed data, critical safety alerts, and operational telematics regardless of location, is transitioning from an R&D dream to a commercial and safety imperative. This demand for seamless, ubiquitous connectivity is colliding with a hard reality: terrestrial networks (TN), no matter how advanced, will never cover 100% of the globe due to economic and geographical constraints. The answer emerging from the collaboration of automotive giants, telecom leaders, satellite innovators and innovative space agencies is not a choice between ground and space, but a fusion of both. Hybrid Terrestrial-Non-Terrestrial Network (TN-NTN) connectivity, built on open 3GPP standards, is poised to become the definitive architecture for the next era of mobility.

Desirability: Defining the Sovereign Need – From Dream to Reality
.

The "why" is driven by a powerful combination of consumer demand, safety regulation, and strategic autonomy. Modern vehicles are increasingly software-defined platforms, reliant on over-the-air updates, real-time navigation, emergency call functionalities and audio/video streaming services. As the 5G Automotive Association (5GAA) notes, connectivity is the backbone for everything from emergency calls and hazard warnings to fleet diagnostics and in-car entertainment. A breakdown in connectivity is no longer just an inconvenience; it can mean a disabled safety feature or a stranded autonomous vehicle.

For BMW – "No connectivity is not an option".

EDITORIAL

Reaching for Space

One of the articles in this issue (on page 8) is the very informative guide to selling space technology to the government market by our contributing editor, Bruce Elbert. Bruce has written many insightful articles for this publication over the years, which continues to have relevance to today's challenges in the global satellite market.

Some of the articles by Bruce have been updated, expanded and compiled into a book, *Reaching for Space*, published by our parent company Synthesis Publications LLC. The book, released this month, is more than just an instructive compilation of essays on satellite engineering, it draws from Bruce's over 50 years experience in the industry as an engineer, program manager, senior executive, consultant and educator, expert witness and mentor to countless budding industry professionals, including myself. He has worked with the leading companies in the industry such as Comsat and Hughes and on some of the most significant satellite projects such as Indonesia's Palapa satellite system. This wealth of industry experience and knowledge is heavily reflected in this book.

The book is available on our website at **satellitemarkets.com/books** or on Amazom at **https://a.co/d/05wdAxjp**

Virgil Labrador
Editor-in-Chief

This need for "anywhere, anytime" coverage takes on a geopolitical dimension. In China we see Geely, the automaker building its own NTN Connectivity constellation via Geespace, and in the US Tesla will likely build its Space-based connectivity on Starlink Roam

Automotive NTN Deployment Roadmap – D2D Service Integration

for in-motion use-cases. Looking at Europe, the push for sovereign, resilient communication infrastructure, highlighted by initiatives like the EU's IRIS², is not merely about commercial preference but seen as a strategic necessity. Reliance on non-domestic satellite constellations for critical connectivity introduces vulnerabilities. Consequently, a sovereign hybrid network model, where space-based components are integrated under regional oversight, is gaining traction as a core element of digital and industrial policy, ensuring that a continent's mobility heartbeat does not depend on a single, external source.

Feasibility: Architecting Interoperability with Open Standards

The feasibility of this hybrid model hinges on one critical factor: interoperability. The satellite industry's historical challenge of proprietary,

bespoke solutions is being overcome by the wholesale adoption of 3GPP standards. By aligning NTN development with 5G and, looking ahead, 6G roadmaps, the industry ensures that a vehicle's modem can hand over a session seamlessly between a terrestrial tower and a satellite overhead without the user - or the application - noticing.

The 5GAA has been instrumental in driving this technical and operational alignment. Their detailed technical report outlines a clear NTN deployment roadmap for automotive, forecasting a phased introduction of services:

• From ~2027: Narrowband services (<400 kbps) for emergency calls (NG eCall), remote commands, and safety information via 3GPP Release 17.

• From ~2029: Wideband services (<10 Mbps) for HD map updates, teleoperated driving support, and software-over-the-air.

• From ~2030+: Broadband services (>10 Mbps) for advanced in-car infotainment and cloud-based applications. Although according to some Auto OEMs, Broadband service may be initially offered rather as an add-on or after-market service.

This standards-based approach has catalyzed tangible, high-profile partnerships, moving from MoUs to integrated solutions:

• Live Demonstrations: The 5GAA tech demos in Paris (May 2025) were a watershed moment. Attendees witnessed a BMW vehicle send emergency alerts via Skylo's network over Viasat satellites and experienced seamless TN/NTN switching for voice services orchestrated by Deutsche Telekom.

• Industrial Alliances: Strategic consortia are forming to deliver end-to-end solutions. For example, BMW Group, OHB System, and Deutsche Telekom

INTEGRASYS
Building success from innovation

DRIVING SATELLITE INNOVATION

Shaping the Future of Satellite Networks

ENTERPRISE MANAGEMENT & CONTROL (EM&C)
Integrate 20+ Systems for Resilient, Secure Connectivity

MULTI-ORBIT ORCHESTRATION
GEO • MEO • LEO • HEO – Seamless Integration & Automated Regulation.

ADVANCED SPECTRUM & THREAT MITIGATION
Ensure Network Superiority for Government, Defense & Commercial Operators.

SATELLITE x GovMilSpace

BOOTH 1707

D2D Service Integration and Spectrum Choice

D2D via IMT Spectrum

Pros:
- Works with standard smartphones
- Higher bandwidth potential
- Leverages existing mobile ecosystem

Cons:
- No global rules yet (WRC-27 pending)
- Higher risk of interfering with cell towers
- Requires carrier partnerships

D2D via MSS Spectrum

Pros:
- Clear, existing regulatory path
- No interference with ground networks
- Already proven (e.g., Apple Emergency SOS)

Cons:
- Requires special satellite chipsets in phones
- Low bandwidth (e.g., SOS/text)
- Limited to premium devices

have partnered to develop and demonstrate secure, sovereign satellite connectivity for future vehicles, directly linking automotive innovation with European space systems engineering.

• Strategic Investments: Automotive players are securing their technological access. BMW i Ventures' strategic investment in Skylo signals a deep commitment to integrating robust satellite IoT connectivity into future models.

• Software Integration: The ecosystem is maturing, with tier-1 suppliers integrating NTN directly into automotive-grade platforms. Cubic Telecom's connectivity platform and Harman (Samsung) with its 'Ready Connect' Telematics Control Unit are embedding NTN capabilities, making satellite connectivity a configurable software service for OEMs like Volkswagen Group, which has announced plans to equip its new Scout SUVs with integrated satellite connectivity.
• NTN NB-Voice becomes reality: A

consortium including BMW, HARMAN, Qualcomm, Viasat, and Fraunhofer successfully demonstrated a live bi-directional voice call over satellite using Narrowband IoT (NB-IoT) networks. This test validates the capability of Non-Terrestrial Networks (NTN) to keep vehicles connected and maintain critical services in remote areas beyond the reach of terrestrial infrastructure.

Similarly, partnerships like AST SpaceMobile with Vodafone, Lynk Global or OQ Technology with multiple MNO partnership contracts are proving the core concept: standardized, direct-to-device (D2D) satellite connectivity is almost operational today.

The Critical Path: Spectrum Access and the D2D Advantage

A pivotal technical and regulatory discussion centers on spectrum access. For the initial wave of automotive

NTN until at least 2032, D2D technology using existing vehicle modems is the most pragmatic and cost-effective path. Here, two primary spectrum pathways emerge, each with distinct geographical advantages:

• MSS Bands (S-band/L-band): This satellite-dedicated spectrum is particularly suitable for regions with dense borders and complex regulatory landscapes, like Europe and Southeast Asia. Its primary advantage is the avoidance of cross-border terrestrial interference. A satellite beam over France can serve a vehicle without causing harmful interference to a terrestrial network in Germany, simplifying coordination. As noted in 5GAA's analysis, this makes MSS bands ideal for providing consistent, sovereign coverage across patchworks of small nations.

• IMT Terrestrial Bands: This approach, where satellites operate as "cell towers in space" using spectrum

licensed to Mobile Network Operators (MNOs), shows great promise in large, contiguous markets like the US, or China. It leverages existing device hardware but requires intricate, country-specific agreements with MNOs and careful management to avoid interfering with ground networks, a challenge more manageable within a single large regulatory domain.

The choice is a strategic one: MSS offers regulatory simplicity and sovereignty for fragmented regions, while IMT offers potential hardware economies of scale in large, unified markets. The automotive industry, through 5GAA, is actively submitting refined antenna and terminal parameters to 3GPP (Release 19 and beyond) to optimize performance for both pathways, ensuring vehicles become first-class citizens in the NTN ecosystem.

Viability: Validating the Sovereign Economic Model

The ultimate question is of viability: Is there a sustainable business model? The evidence points to "yes". The value is captured across the chain:

1. For Automotive OEMs: Connectivity becomes a reliable, always-on utility, transforming vehicle capabilities and enabling new revenue streams from software and services. It mitigates the reputational risk of stranded vehicles and is fast becoming a competitive necessity.

2. For Satellite Operators: It opens the vast, high-value automotive market of hundreds of millions of units - moving beyond niche backhaul and direct-to-home. It has the potential to provide a foundational, recurring revenue stream for LEO and Multi-Orbit constellation networks.

3. For Mobile Network Operators: It allows them to offer a truly seamless "ubiquitous coverage" service tier, enhancing their value proposition without the prohibitive cost of building terrestrial infrastructure in ultra-low-density areas. And it offers an extra network layer of connectivity and resilience when terrestrial networks might be down – due to natural disasters.

The willingness to pay is embedded in the vehicle's value. As connectivity shifts from a premium feature to a standard safety and operational requirement, its initial cost will be absorbed into the vehicle's architecture, much like airbags or ABS once were. In addition, Auto OEM and Service Providers are going to deliver additional Value-Added Services to increase the overall ARPU of connected cars over the lifetime of the vehicle. The partnerships forming today are not just technical trials but commercial negotiations, structuring the revenue share models that will power this hybrid network economy along the value-chain.

Strategic Outlook

The convergence is undeniable. The satellite industry is no longer just providing a separate, standalone service; it is becoming an integrated, vital layer of the global telecommunications fabric, with the automotive sector as its first mass-market anchor tenant. The successful demonstrations, the clear 5GAA roadmap, and the flurry of cross-industry partnerships confirm the trajectory.

The journey to ubiquitous connected mobility will be built on the triad of desirability (sovereign, resilient service), feasibility (3GPP-standardized hybrid networks), and viability (shared-value economic models). For the satellite industry, this represents a historic pivot from serving the few in remote areas to enabling the essential for everyone, everywhere. The road ahead is hybrid, and it is being paved right now.
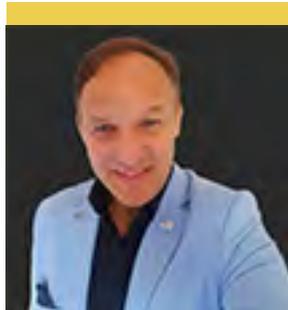
Markus Fritz is the Managing Director & Owner of **ADVISORIO**. a premier consultancy serving global leaders in telecommunications, space, automotive, smart mobility, and ICT. Markus advises on growth strategy, market development, partnerships, business models, and M&A, guiding corporations, scale-ups, public institutions, and think tanks in commercializing innovation. With 25+ years of executive leadership at SES Astra, Eutelsat, and Arabsat, he directed international commercial strategy, marketing, and strategic partnerships. A former board member of Digital Europe and ZVEI, and SAMENA Council Ambassador, he shaped policy and interoperability and open standards in the ICT industry. He can be reached at: markus.fritz@advisorio.com

If You Want to Sell Your Space Technology to the Government – Here's How

by Bruce Elbert

Technology developers and startup companies abound in the space that we call the space industry. The drive at this moment is to move into the government sphere where there are many new requirements and what appears to be ample budget to reward those entities that have a unique capability to offer in satisfying the evolving missions of defense and security. This is not a new idea and it worked in reverse after previous wars where government contractors sought to transform themselves into commercial product and service producers outside of what was familiar and rewarding to them. Post-WW2 examples include Raytheon and Boeing in the US, Mitsubishi and NEC in Japan, and Messerschmidt and Siemens in Germany. But right now, our industry is disrupted by the huge footprint of Low Earth Orbit (LEO) satellite constellations and interest in near and deep space missions akin to what was more common in the 1960s and 1970s.

In the last few years, governments have been trending toward more investments in civil and military space-related infrastructure. Many programs and organization changes are publicly known, like the following gathered from an Internet search:

• Golden Dome - a comprehensive missile defense shield using space-based sensors and potential interceptor technology.

• Next-Gen Overhead Persistent Infrared (OPIR): SBIRS was a foundation program going back several decades. With new technology, OPIR focuses on advanced missile warning and tracking, including high-altitude and polar-orbiting satellites.

• The Space Development Agency (SDA) is deploying hundreds of small satellites in low Earth orbit (LEO) for missile tracking (Tracking Layer) and data transport (Transport Layer). Key launches are scheduled for late 2026, although some aspects are recognized to have been pursued aggressively without adequate technology readiness (discussed later).

• Evolved Strategic SATCOM (ESS): A major constellation being developed to replace the Advanced Extremely High Frequency (AEHF) system, providing secure, survivable communications for strategic nuclear command and control.

• Protected Tactical SATCOM (PTS): A program transitioning toward commercial-based designs to provide jam-resistant tactical communications to warfighters.

• Geosynchronous Space Situational Awareness Program (GSSAP): Maneuverable "neighborhood watch" satellites that conduct close-up inspections of other objects in geosynchronous orbit.

• In-Space Servicing & Maneuver (ISAM): Multiple missions are planned for 2026 to demonstrate on-orbit satellite refueling and repair.

• Commercial Augmentation Space Reserve (CASR): Moving to full-scale operations in 2026, this program establishes pre-negotiated contracts to surge commercial satellite capacity during wartime.

These are the big names but you don't need to garner all or a major section of one of these to profit from government business in space. Still, they point to the climactic change we are experiencing where space is more strategic than it's every been and that character is not likely to change for a considerable period.

Today we especially have the backdrop of threats worldwide related to cybersecurity, deadly unmanned combatants like drones and robots, and more sophisticated surveillance for government and military applications. There are also challenges from other sectors where companies are scrambling to repurpose or develop new products and services for the gov/mil market. How best can they effect this transition?

To address this question, we need to understand the two sides of this equation – who has what to offer the government, and who and what within the government is the
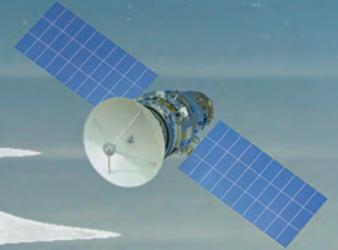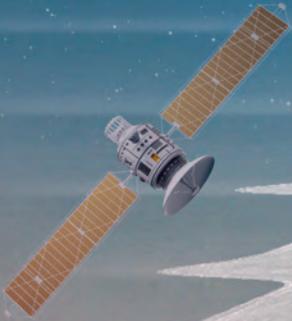
most appropriate target for this marketing move? We will need good and achievable answers to both, but it's vital to bridge the divide for sustained business. The former (who and what) is the marketing strategy and the latter (how) is the business strategy. A key is the scale of business involved with the marketing strategy – just how big is the size of market that you might address in the government sector? A relatively small group with a space technology at a relatively high technology readiness level (TRL) will probably need a prime contractor to adopt and further develop a more comprehensive offering. A large organization that already knows much of the how could provide an integrated package or even a system by partnering with a prime but more logically would seek this status on their own. This means that the would-be prime has to find the right government entity and make itself both known and responsive to it.

The Generic Entry Strategies for Small and Large Technology Firms

How are government/military requirements different from commercial clients? The government is the largest buyer of space technology and thus worthy of attention when seeking good customers. I call this a generic entry strategy in line with what Harvard Business School Professor, Michael E. Porter, describes in his 1980 seminal work, Competitive Strategy -Techniques for Analyzing Industries and Competitors. The challenge of any entry strategy is to get known and to have a practical and effective business strategy to put your capabilities into the hands of these buyers. The Internet is a great tool to identify major technology users as it is the practice of government to broadcast their program plans and intended strengths. Just look at the bevy of senior Space Force officers on the program for Satellite 2026 to be held in Washington, DC. But there are always gaps and challenges for these buyers because they don't necessarily know what they need and they can't develop the solutions internally. Geoffrey A. Moore addressed this major problem in his classic of the 1980s, Crossing the Chasm. His chasm was for consumer directed technology as he advised several Silicon Valley ventures. And the chasm that he sought to cross was between the early adopters who liked to experiment with something new (I did this myself in 1980 with an 8502 processor that ran Microsoft BASIC in

"...The government is the largest buyer of space technology and thus worthy of attention when seeking good customers...."

ROM) with the mainstream buyer who must first grasp what is on offer and how it can be acquired without experience or training. Recall the epic Apple Computer Super Bowl commercial from 1984 and their tag line for the Macintosh, "the computer for the rest of us".

So, I am assuming that you have something unique to offer that could fit well into someone's technical program or business strategy. The approach I suggest at the generic level is to consider (1) the size of your organization or offered resource and (2) whether you hope to sell directly to a government department or through a larger organization that I will refer to as a prime contractor. These alternatives are explored in the strategic grid in the next page.

Each of these boxes has major consequences for the potential seller of technology for government application.

Column I - The small technology provider:

• (SDG) – A small technology provider will have difficulties selling directly to the government because of a lack of familiarity on both sides as well as addressing overhead and complexity of government transactions. Recently, the US War Department established innovation departments (the Space Development Agency, the Defense Innovation Unit, et al) that have significant budgets to develop a technology or system that isn't available from known qualified suppliers. There is also a set aside of funds to go to "small businesses" which are for-profit, US-based, independently owned, and not dominant nationally.

• (STP) – This is the common mode of selling through a prime. Characteristically, small technology providers have unique devices and services which the major prime contractors need to satisfy a particular function not developed internally or previously located on the market. They perform "make versus buy" analyses to value whether to develop the needed capability or purchase it from a qualified source. Said qualification is often a barrier to adopting technology from the outside, even if it appears to meet the need better than internal or external alternatives. Done right, STP can satisfy a critical need at an affordable cost,

	I. Small Technology Provider	II. Large Technology or Systems Provider
Sell Direct to the Government	(SDG) Very specific organization and mission, possibly a demonstration. Unlikely to be met by Big Picture Systems	(DTG) Major procurements – the domain of defense industry. Commercial "Off the Shelf" possible.
Sell Through a Prime Contractor	(STP) Needed by primes without specific capability. Solves a problem, saves development resources	(PWP) Partnering with other provider for scale and possible buying/selling power

Strategic Grid for Generic Entry Strategy

producing a win-win.

Column II – the large technology or systems provider:

• (DTG) – Historically, the government and especially the US War Department has gone with a major provider in the form of a defense contractor or aerospace company as with new aircraft platforms like the F35, or GEO satellites like Wideband Global Satcom (WGS). It's interesting that the former followed the traditional contracting style with detailed requirements down to the unit level and a full panoply of testing and validation demands. The government also introduced the risk-reduction strategy of "fly before you buy". The latter procurement was an Air Force GEO satellite program in 1999 under the original pejorative title of Wideband Gapfiller to be more of a commercial contract with Hughes Space and Communications (now Boeing Satellite). In the same sense as the F35, the program expanded into a full scope of 12 satellites with still more on the way.. The contracting overheads and pre-contract processes are daunting for a new entrant and few attempt this except in circumstances to be discussed below.

• (PWP) – It is not uncommon for a large provider to engage with another large provider in a kind of joint venture to gain the respect of the government buyer. A good example is MILSTAR, where Lockheed Martin engaged with Hughes Space and Communications to supply an advanced GEO satellite that would guarantee communications under any circumstance, even nuclear war. It will also

work at a lower level if the government selects a prime who in turn subcontracts with another prime for either the same kind of need or to "share the wealth" by splitting the work between competent competitors.

Moving Ahead into the Digital Age

This is the digital age in that almost everything new has a digital processor, memory and a network connection. Of course, digital technology has been with us since Touring built the first cypher decoder in 1943, the year after I was born. The war that we fought in the 1960s and 1970s in Southeast Asia wasn't particularly high tech since much of what we used already existed during WW2 and Korea.

We've come a very long way and I marvel at the iPhone and global coverage satellite networks that overcome the last mile problem. The military continues to rely on digital technology both internal to and external from almost every piece of hardware involved with warfighting. Placing assets in space adds another dimension, so to speak, and the current emphasis on communications and earth observation are cases in point. What is within the iPhone can assist the individual soldier, the combat unit such as a company or squadron, and the wide variety of combined forces that place the most effective capabilities where they are needed. That said, the technology that the government needs may already exist or the lack of it can be critical for current and future conflicts.

If we assume that our group has such a technology in hand or our reach, we first need to consider the generic strategies that I've introduced above. That's the kind of effort we see in the past where the new entrant into this field plans and conducts its operation. A good example is how RCA Americom ventured into providing satellite-derived telecom services to the Federal Government, which involved satisfying functional and financial bureaucratic requirements driven by law and regulation. They established a government services subsidiary, employing former military staffers as well as contracting specialists from parts of the parent company already suppling equipment to the govern-

ment. While I have no direct knowledge, it is what SpaceX would need to do as they offer advanced LEO resources to the government, e.g., Starshield. According to SpaceX,

"Starshield leverages SpaceX's Starlink technology and launch capability to support national security efforts. While Starlink is designed for consumer and commercial use, Starshield is designed for government use, with an initial focus on three areas: Earth Observation with sensing payloads and delivers processed data directly to the user; Communications Starshield provides assured global communications to government users with Starshield user equipment, and Hosted Payloads Starshield builds satellite buses to support the most demanding customer payload missions."

It's interesting that SpaceX chose the Sell Directly to the Government (SDG) strategy rather than partnering with an established defense contractor or telecom operator (e.g, PWP). LEO constellations are the business of mega corporations, especially when dealing with the government. This is key to assuring proper operation, initially as well as over the long haul. Consider that a future conflict that requires these capabilities by its nature has uncertain future timing. Donald Rumsfeld, Secretary of Defense under President George W. Bush, famously said that you go into war with the military you have. That consists of what's available at that time and in the hands of able troops and leaders, especially when we see that some conflicts last a matter of weeks (or even days) rather than years. The characteristic of the former model was demonstrated by the Vietnam War and the conflicts in Afghanistan and Iraq where there is time to remodel and adapt to the evolving needs. However, the latter offers the possibility of a quick resolution such as the 12 Day War that halted Iran's nuclear program.

On the small company scale, I witnessed an interesting presentation at the Satellite '23 show in DC by Aalyria of their SPACETIME computation environment for managing complex orbital and terrestrial resources. The technology originated in Google for the defunct Google Loon project in South America, subsequently spun off inside Aalyria. Six months after Satellite '23, Aalyria demonstrated how SPACETIME could offer multi-orbit services to fixed and mobile users who require a guarantee of connectivity no matter their circumstances. The government could find this useful today and, in the future, but the question remains as to the nature of the buyer, for example, acting as integrator for an appropriate government capability. Now that the government knows of SPACETIME and has seen it in action, the right prime contractor could take SPACETIME to the next level and potentially buy the company to gain competitive advantage. This is the role of STP strategy.

But STP is the mainstay of the component market, such as optical communications terminals (OCTs), electric thrusters and even complete communications payloads. Several companies offer OCTs for integration on large and small satellites based on technology proven in custom space missions, even cubesats. To date, none has really crossed the chasm between limited production and mass adoption. The possible exception is SpaceX, which developed their own OCT and probably flown thousands by now.

Michael Porter identifies two contrasting business strategies – Cost Leadership and Differentiation Focus. The latter was addressed nearly 50 years ago by Hy Silver in Los Angeles-based seminars on proposal strategy. He taught the importance of customer knowledge, particularly government customer knowledge, as the decision is usually a committee vote and based on consensus. Thus, they evaluate proposals using a set of criteria or Figures of Merit (FOM) that compare material aspects of what basically meet the same need. He explained that if your offer is best technically and lowest in price, you're expected to win. If you have only one in your favor, then you might win. But if you are poorest technically and highest in price, expect to lose. Low-cost leadership is powerful in basic commodities and some types of products, even launches. But differentiation focus is generally the approach in a particular application where you want your offering to stand out above the alternatives. The government buyer could accept that you don't have to have the lowest price if there is credible value.

At his seminar, Hy Silver showed an image of a "typical" government evaluator who sits there saying, "I don't know your company and I don't know how well you perform". That's something that he addresses in his course where you must answer such questions posed by the government in a clear and compelling way. I was working for Hughes Aircraft Company at the time and we had an excellent technical reputation but also a reputation for arrogance. When asked if we could overcome these issues

in a proposal, Hy simply said, "with your history of technical success, I could spin gold". I saw that happen when Hughes won Pioneer Venus, a program that should have gone to a company already doing business with NASA but the Hughes proposal that came out of the Hy Silver methodology proved its worth. The head of NASA phoned Dr. Bud Wheelon, president of Hughes Space, congratulating him on winning. It was said that Bud couldn't believe his ears and might have dropped the phone.

Selling through a prime is the easiest way to offer your unique product to the government. This is because the prime is already established as a government supplier, including the myriad certifications and staffing to handle acquisition rules, accounting requirements and importantly, security requirements. Even if the overall program is classified, your product can still stay outside of security as long as you meet a number of basic requirements, especially export controls under the ITAR. The prime contractor can handle all of this but you need to listen and follow direction. A good prime will carry you forward, advise you where you must make adjustments, and stand by you throughout the engagement and ultimate final delivery. My father who was in the printing business said that the most difficult sale is when you deliver your product.

Who and How to Develop Your Government Market Entry Strategy

The people who devise marketing strategy must work closely with those that set company business strategy. In a small company, the chief marketing professional, CTO and CEO would be there at all times and participate heavily. As the organization gets larger, there is a trend to have marketing professionals to act for the principals. But, there is a danger here because customers for any of the above business structures want to connect with people who know the product inside and out. It's no place for the traditional "glad hand" who is supposed to open doors and escort the technical types. This is a layer with a high impedance and a lot of random noise. A payload engineer on a new spacecraft for the prime contractor is more interested in a proven device that meets requirements; information about that is best provided by an experienced counterpart at the prospective supplier under (SWP or PWP).

It's worth noting here that a new entrant into this sector needs proven technology or at least high confidence in its ability to get there. We apply the concept of the Technology Readiness Level, popularized by NASA and now incorporated throughout government procurement circles. At the highest level:

"TRL 9, which signifies that a technology has been fully flight-proven or successfully deployed in its final, operational form. At this stage, the system has passed all tests, and the technology is ready for full commercial deployment."

In my past experience, you had to prove to the buyer that your technology met this standard through documented experience and by actual performance data over lifetime and operating conditions. Anything less opens up risk that the device or subsystem will not perform as expected for the entirety of the mission.

Indeed, it takes the smartest and most knowledgeable staff at critical customer meetings and in preparation of the proposal. I've said in the past, "you can't beat the experience." You find these superstars inside your organization, not amongst high-ranking military retirees. Yes, send them to "smile school" like Hy Silver and Dale Carnegie, but give them the budget they need, keep in contact with them, and back them all the way.

Bruce Elbert is Contributing Editor of the *Satellite Executive Briefing* and the Founder and President of **Application Technology Strategy LLC**.(www.applicationstrategy.com) He is a satellite industry expert, communications engineer, project leader and consultant with over 50 years experience in communications and space-based systems in the public and private sectors. Areas of expertise include space segment design and operation in all orbit domains, systems architecture and engineering, ground segment systems engineering, development and operation, overall system performance improvement, and organizational development. He can be reached at: bruce@applicationstrategy.com

A Bulgarian Teleport is Ranked One of the Fastest Growing Teleports by the WTA

Vivacom, part of United Group, has been recognized for six consecutive years by the World Teleport Association's (WTA) as one of the fastest-growing satellite teleport service providers for business customers worldwide.

The Bulgarian operator is featured in the WTA 2025 Top 3 list, which ranks the fastest-growing teleport operators based on revenue from business services.

Vivacom moved up in the rankings over the last several years where it consistently made the Top 10 Fastest Growing Teleports since 2020, reaching 3rd place globally in 2025. The company was also nominated as the Independent Teleport Operator of the Year twice in that span of time.

Vivacom's Director-Broadcasting Services, Vladimir Rangelov, who was the recipient of the WTA's Executive of the Year Award in 2023, said "It is a great recognition for us to be among the top three fastest-growing operators in this business worldwide. This is proof that our strategy of delivering very reliable and secure services, strong customer focus and continuous investment in infrastructure, backed by the professionalism of our team, is the right formula for building a globally recognized business."

Rangelov highlighted customer support as the company's main competitive advantage. Vivacom offers 24/7 support, fast issue resolution, very short service activation times, flexibility, additional services, and excellent infrastructure. The company prides itself in its focus on their customers and their unique requirements, fast service activation, flexibility, innovative problem solving and always finding the right solution for their needs.

State of the Art Facilities

Vivacom currently operates three satellite ground stations in Bulgaria – Plana earth station near the village of Plana, and two facilities dedicated to low Earth orbit (LEO) satellite communications near Stara Zagora and Dobrich. The company is building two additional ground stations by the end of this year, supporting several international LEO

"It is a great recognition for us to be among the top three fastest-growing operators in this business worldwide. This is proof that our strategy of delivering very reliable and secure services, strong customer focus and continuous investment in infrastructure, backed by the professionalism of our team, is the right formula for building a globally recognized business."

--Vladimir Rangelov,
Director of Broadcasting Services, Vivacom
and WTA's 2023 Executive of the Year

connectivity projects.

Plana teleport, one of the region's largest and most technologically advanced satellite communication facilities, and certified at the highest Tier 4 level, currently distributes more than 700 TV and radio channels to Europe, Middle East, Africa, Asia, and even provides direct connectivity to Antarctica. The ground station is located in a specially selected area with minimum rainfall and excellent interference protection. All equipment is fully redundant and the teleport is connected via protected fiber lines to the main PoPs in Europe.

The teleport's location in Bulgaria provides a strategic location between Europe, Asia, Middle East, Africa and Latin America. "The geographical location of our Plana teleport allows us to provide uplink and downlink services to satellites from 40° West to 90° East. We provide access to one of the most popular satellite positions covering Europe,

Vivacom's Plana teleport, one of the region's largest and most technologically advanced satellite communication facilities, and certified at the highest Tier 4 level, currently distributes more than 700 TV and radio channels to Europe, the Middle East, Africa, Asia, and even provides direct connectivity to Antarctica.

Africa, Asia and Latin America.. We can quickly and easily add new uplink or downlink services and provide the signal at our major PoP's in Europe like Frankfurt, London, Paris and many others," said Rangelov.

Growth-Oriented Strategy

The company continues to pursue a growth-oriented strategy that is in keeping with current trends in the industry. It continues to invest in upgrading its infrastructure with the latest, state-of-the-art facilities and looking to provide new and innovative services.

In 2025, the company launched a project for the transmission of TV channels in Asia via the Apstar satellite at 76.5°E in C-band for one of its major clients. It is currently building three new low Earth orbit (LEO) satellite communication sites for international projects.

Having secured leading positions in the Eastern European region, Vivacom is now expanding the number of TV and radio channels distributed to Africa across several major satellite platforms. The company continues to strengthen its partnerships with some of the world's largest satellite operators and content providers, including among others, Disney, Eutelsat, Radio France International, National Geographic Channel, Viasat, Endurosat, Leaf Space, and many more.

"We have won key deals for the distribution of TV channel packages in several regions. We are also developing several projects with one of the world's largest satellite operators, Eutelsat, including Inflight connectivity, maritime, and fixed connectivity services in Europe and Africa", Rangelov added.

The satellite services industry has undergone significant changes over the past years, with Starlink dramatically reshaping the global market by delivering affordable high-speed internet to large parts of the world. The transition from traditional satellite broadcasting to internet-based video solutions for the transmission and distribution of TV channels is also continuing, which makes huge impact for the satellite services.

"Despite these challenges, thanks to a strong strategy, deep market expertise, excellent customer support, and flexible, tailor-made solutions for each client, we are one of the very few companies in the world reporting revenue growth in this business," Rangelov added.

From Fragmentation and Complexity to Simplicity

by Elisabeth Tweedie

Many years ago, video distribution was a relatively straight forward operation. Video went from the camera, to the studio for immediate or delayed linear broadcast transmission. Non-live programs would probably incur some editing and packaging prior to transmission.

Things haven't been that simple for many years. Video distribution is now a multi-faceted process, involving many layers of technical and business complexity. Content owners are faced with a fragmented infrastructure and many diverse options when it comes to monetizing that content.

A Distribution Ecosystem in Overdrive

Video contribution may arrive from multiple sources, and be distributed in multiple formats at varying times. It may be a linear or on-demand transmission. It may be transported over the air terrestrially, or by satellite or may be streamed over-the-top (OTT), and it may be viewed on multiple devices; TVs, laptops, tablets or mobile phones, all of which require different formatting. Advertisements, which will vary by region and even by individual may be inserted.

But the complexity doesn't end there. There is no such thing as a "one size fits all." Localization is a given. Linear programming needs scheduling for different channels and time zones and the electronic program guides (EPG) need to be created in multi-languages for multiple platforms. For OTT distribution, adaptive bit rates are needed to accommodate different internet speeds and device capabilities. When content is distributed to different countries, subtitling in multiple languages may be needed. Compliance with local copyright laws, licensing agreements and content restrictions is essential.

Monetization: The Strategic Imperative

However, the physical distribution to the viewer is only one piece of the equation. Once there, the quality needs to be monitored, so return feeds need to be established with service level agreement-(SLA) based alerts and automatic fault detection.

Most importantly, the content owner needs to be able to monetize the content. This could be through subscription services, but now it is increasingly likely to be through the insertion of advertisements.

Subscription Video-on-Demand (SVOD) remains dominant, but growth is shifting. Advertising-supported Video-on-Demand (AVOD) is expanding at nearly double the rate of SVOD. Free Ad-Supported Streaming TV (FAST) is projected to grow even faster through 2030. Although total revenue from Advertising supported Video-on-Demand (AVOD) is significantly less than revenue from Subscription Video-on-Demand (SVOD), it is growing at nearly twice the rate, (CAGR of 13% vs 7%). Free Advertising supported Streaming TV (FAST) is projected to grow even faster with a global CAGR of 16.5% between 2023-30. Programming may be global, but ad insertion is not, it will almost always be local and in some cases, personal; so tags need to be inserted into a video stream to facilitate this.

A new way of content monetization is through the insertion of QR codes creating a direct interactive experience

iKOSYSTEM: A Unified Approach

iKOSYSTEM, an innovative new service from iKO Media Group (iKOMG), redefines how content owners manage their distribution ecosystem. It is a centralized partner portal providing secure access to all subscribed iKOMG services through a single dashboard and login.

iKOMG provides advanced teleport and cloud services for broadcasters. Our teleports transmit over 40 satellites with SRT fiber optic network and IP delivery. From the initial stage of channel creation to distribution, and further into content delivery, monitoring, and monetization, our solutions encompass every need. We utilize cutting-edge technology and our rich industry experience to ensure superior quality and efficiency. Our commitment to innovation drives us to continuously improve and provide exceptional services, ensuring our clients have access to the best in broadcasting solutions.

From playout and monitoring to EPG creation, broadcast, OTT, FAST distribution, and viewer engagement tools — the entire workflow is accessible within one operational environment.

iKOSYSTEM has eight Integrated Modules:

•   iKOBMS – Broadcast Management System with centralized scheduling, metadata control, rights-aware automation, and multi-time-zone support.

- •   iKOCLOUD – Cloud-based playout engine with automated execution, redundancy, and integrated monitoring.
- •   iKOPLUS – Multi-location return feed monitoring with SLA-based alerts and automated fault detection.
- •   iKOGUIDE – Multi-language, multi-platform EPG authoring and distribution system.
- •   iKOCLIPS – Instant live clip generation with metadata tagging and multi-platform distribution.
- •   iKOFAST – Complete FAST channel automation including EPG synchronization and monetization support.
- •   iKOOTT – OTT CMS and distribution control supporting AVOD and SVOD monetization and multi-device delivery.
- •   iKOQ – Dynamic QR engagement engine with campaign-level configuration and analytics.

iKOSYSTEM is a professional-grade control interface designed by engineers for engineers. It supports broadcast, satellite, IP, cloud, OTT, FAST, and hybrid workflows with full audit trails and activity logs.

Its modular architecture ensures scalability. As operational needs evolve, additional services can be activated instantly and integrated seamlessly into the existing dashboard.

Video distribution has evolved into a highly complex, multi-platform ecosystem — fragmented across workflows, technologies, and monetization models. iKOSYSTEM brings it all together. By unifying playout, monitoring, metadata, OTT, FAST, monetization, and viewer engagement into a single, secure dashboard, iKOMG transforms operational complexity into centralized control. One login. One ecosystem. Complete visibility.

as viewers are enticed to click through to view more information and even buy the product that is being advertised. Obviously, this interaction needs to be tracked on a per show and/or per campaign basis to measure the effectiveness of this new way of content monetization.

Discoverability: The Hidden Challenge

However, before a content owner can monetize its content, that content needs to be found. This is relatively straightforward with linear distribution where new shows can be advertised as needed. For on-demand content, this is more challenging. Surveys have shown that OTT viewers can spend upwards of 12 minutes searching for content. So the content has to be appropriately tagged and categorized with appropriate keywords across all platforms to facilitate discoverability, Search Engine Optimization (SEO) is as important for video entertainment, as it is for products and services advertising on the web.

Video distribution is complex. There is no one product that handles all of these different options and systems. So, the content owner is faced with "stitching together" products and services to create a distribution system that meets their needs. This means dealing with many different protocols and logins. A time-consuming and challenging task.

One company is out to fix this. iKO-SYSTEM, a new service from iKOMG creates a centralized partner portal for iKOMG customers. It provides a single, secure interface to access, operate and monitor all iKOMG services that a customer has subscribed to. iKOSYSTEM covers the entire ecosystem from playout

"...iKOSYSTEM was developed after listening to customers' complaints about how irritating and time consuming it is to deal with multiple systems and logins. Customers in the beta trial really appreciated how iKOSYSTEM streamlined and simplified daily operations. I'm excited to now be able to offer this scalable, modular system to all our customers..."

--Adir Hadad, VP-Cloud Services, iKOMG

and monitoring, to EPG creation, broadcast, OTT and FAST distribution, as well as providing viewer engagement tools. Everything is available and accessible from one dashboard with a single login. A revolution for the industry.

iKOSYSTEM brings together eight different elements of the video distribution chain. A customer can access any or all of these depending on their needs, from one simple tiled dashboard, with one operational view and one login. If needs change and additional elements are required, these are simply added to that customer's dashboard.

This unified system is a complete game-changer for content distributors. No more messing around with multiple URLs, different credentials and disconnected tools. The secure web-based service can be accessed from anywhere. Centralized control of complex broadcast workflows leads to fewer handovers and faster operational decision making. The modular nature of the system means that additional iKOMG services can be added instantly, so the sys-

tem scales to meet client requirements. This is not a marketing gimmick, it was designed by engineers for engineers. It is a professional-grade control interface supporting broadcast, satellite, IP, cloud, OTT and hybrid workflows with full audit trails and activity logs.

The official launch of iKOSYSTEM is March 2026. Adir Hadad, VP Cloud Services, iKOMG, said "iKOSYSTEM was developed after listening to customers' complaints about how irritating and time consuming it is to deal with multiple systems and logins. Customers in the beta trial really appreciated how iKOSYSTEM streamlined and simplified daily operations. I'm excited to now be able to offer this scalable, modular system to all our customers."

Elisabeth Tweedie is Associate Editor of the Satellite Executive Briefing has over 20 years experience at the cutting edge of new commmunications entertainment technologies. She is the founder and President of Definitive Direction (www.definitivedirection.com), a consultancy that focuses on researching and evaluating the long-term potential for new ventures, initiating their development, and identifying and developing appropriate alliances. She can be reached at: etweedie@definitivedirection.com

Key products and services to be showcased at SATELLITE 2026 in Washington, D.C. from March 24-26, 2026

AvL Technologies

visit AvL at booth # 1807

AvL Technologies, Inc. is a privately held US company specializing in the design, development, and production of mobile satellite antennas and positioner systems. Based in Asheville, NC, AvL offers superior service and support to customers worldwide. With terminals ranging in size from 60cm to 5m, AvL provides efficient, cost-effective solutions for voice, video, and data connectivity without the need for specialized training. AvL supplies commercial organizations and defense agencies with unique, robust terminals that combine rugged packaging, stout wind performance, ease of operation, and customer support at a competitive price. Thanks to state-of-the-art manufacturing capabilities, cutting edge designs and development, AvL antennas are extraordinarily sturdy, efficient and reliable. In addition, AvL is well known for providing adept customization to meet specific needs and requirements.

For more information go to: **www.avltech.com**

ACORDE

visit ACORDE at booth # 2441

ACORDE is a Spanish company with 25 years of experience in the design, development and-manufacture of RF solutions for Defence, Space and Telecommunications sectors. It has a team of experts in highly complex RF projects to offer exclusive technological solutions, adapted to the requirements of the project and the customer's needs. manufactures reliable and field proven solutions such as compact and lightweight BUCs (X/Ka) and LNBs/LNAs, introducing new and efficient technologies such as GaN, and versatile approaches such as dual and quad sub-bands integrations. ACORDE offers built-to-spec up to Q/V-band under MIL-STD-810G/461E for ground, naval and airborne platforms.

For more information go to: **www.acorde.com**

AVCOM of Virginia

visit AVCOM of Virginia at booth # 2732

Celebrating its 50th year, **AVCOM of Virginia** has become a global leader electronics technology company with experience in the design, manufacture and support of cost-effective high quality, RF spectrum analyzers, signal monitors, beacon receivers, and test equipment products; serving the commercial and military SATCOM and telemetry markets.

Founded in 1976, Avcom of Virginia is a vertically integrated technology company specializing in the design and manufacture of commercial-off-the-shelf and ruggedized RF spectrum analyzers, satellite beacon receivers, and signal monitoring solutions. With nearly five decades of innovation, Avcom delivers reliable, customizable, and cost-effective products engineered for mission-critical applications across industries such as SATCOM, broadcast, maritime, aerospace, and defense. From embedded solutions built for harsh environments to multi-orbit-ready beacon receivers, Avcom continues to set the standard in performance, integration, and customer support worldwide.

Made in the U.S.A.

For more information go to: **www.avcomofva.com**

Integrasys

Founded in 1990 by a team of senior engineers from Hewlett Packard, **INTEGRASYS** has developed over 30 products designed to address customer needs in Spectrum Superiority, communications, PNT, and intelligence for multi-domain, including space. As a leading software engineering company, INTEGRASYS specializes in advanced software solutions for space and satellite networks, driving innovations in network, and RF and optical technologies.

At Satellite, Integrasys will be showcasing LEOREG, a user-friendly, web-based system designed to empower regulators to monitor and ensure NGSO (Non-Geostationary Satellite Orbit) constellation compliance with ITU (International Telecommunication Union) EPFD (Equivalent Power Flux Density) regulations after launch. It provides comprehensive real-time EPFD verification, improves spectrum efficiency, and minimizes interference.

For more information, go to: **www.integrasys-space.com**
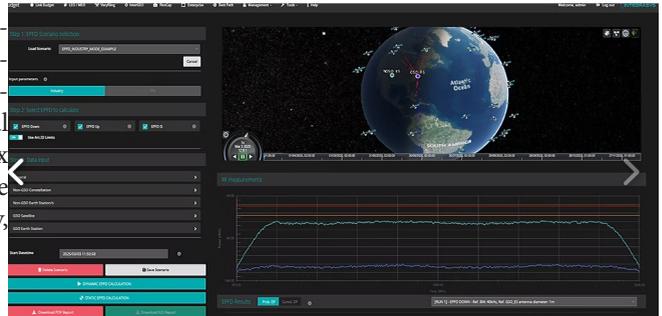
JONSA Technologies

Jonsa Technologies specializes in cutting-edge satellite communication solutions in making high-quality parabolic dish with VSAT, Flyaway and Maritime antenna for over three decades with capability a in designing, inventing and producing with services of OEM and ODM. JONSA VSAT solutions offer high-speed internet access, secure data transmission, and seamless connectivity, regardless of geographic challenges. Key Benefits of Our VSAT Solutions include: **Reliable Connectivity**: Our technology ensures continuous connectivity, even in the most remote areas, minimizing downtime and maximizing productivity. **Scalability**: Whether you're a small enterprise or a large corporation, our VSAT solutions can be tailored to fit your specific needs and scale with your business growth. **Cost-Effective**: We provide competitive pricing models that help you optimize your operational costs while delivering top-tier service. **Expert Support**: Our dedicated support team is available around the clock to assist you with any technical issues or inquiries.

For more information, please visit **www.jonsa.com.tw** or email **saccount@jonsa.com.tw**

Mission Microwave

Mission Microwave Technologies demonstrates revolutionary design for RF and microwave electronics, supporting ground-based, airborne, and space-based applications. Utilizing the latest in semiconductor technology, Mission Microwave's focus is to optimize the size, weight, and power (SWaP) for these critical applications, while providing its customers with the best possible reliability. Mission Microwave sets the 'new standard' for performance and reliability.

For more information, go to: **www.missionmicrowave.com**

Mission Microwave X-, Ku-, and Ka-band GaN BUCs

ND SATCOM: SKYWAN 7X

visit ND SatCom at booth # 1231

At Satelllite 2026, **ND SatCom** will be showcasing its latest SKYWAN 7X –The next generation for defense satcom because every signal counts. Highlights from the new deployable solution geared to military requirements include:

Built for Extreme Conditions
* Meets AECTP defence environmental standards for temperature, vibration/shock, and EMC
* Ensures interoperability and compliance in allied military networks

Cyber-Threat Protection
* Features X.509 authentication standard and end-to-end encryption

Highly Available
* Designed for maximum network availability and reliability with hubless architecture and redundant power supplies

MeshIQ
* Continuously monitors transmission parameters and automatically adjusts to dynamic conditions

For more information, go to: **www.ndsatcom.com**

Orbital Connect

visit Orbital Connect at booth # 1145

Orbital Connect® is a channel partner and authorized distributor of global leading manufacturers of satellite equipment. Our product list includes over 15,000 satellite products and RF components, solutions, and terminals, such as Earth station antennas, fixed and maritime VSAT or receive-only antennas, terminals on the move and on the pause, high-power amplifiers, modulators, de-modulators, redundant systems, modems, RF products and matrices, RF over fiber solutions, LNBs, BUCs, BDCs, LNAs. In addition to our product offerings, Orbital Connect provides satellite connectivity services across various frequency bands, utilizing the networks of the industry's largest satellite operators.

For more information, go to: **www.orbitalconnect.com**

RF-Design

visit RF Design   at Hall 1, booth # 1418

For more than 28 years **RF-Design** is developing, manufacturing and marketing technology leading satellite ground segment products and solutions offering a wide range of premium class RF-distribution, RF-over-Fiber, RF amplifying and RF monitoring systems. High-quality products, many years of know-how, flexibility and the ability to customize products to individual customer requirements as well as a unique customer-oriented service approach have made us a respected partner in this demanding industry worldwide.

Meet us in Washington at Satellite 2026 (Booth 1418) and learn more about our latest products such as the high-performance and compact "Satellite Transponder Monitor stm3G", our innovative space-saving handheld Extended L-Band and Broadband "Ecoline Fiberlink", the modular flexible and secure "Fiberlinkplus CompactLine" system, the switch matrix system "FlexLink S9E", and the dual RF power meter "PwrM70G". We look forward to talking to you personally about your individual requirements.

For more information, go to: **www.rf-design-online.de**

SatService GmbH

For nearly 30 years, **SatService (a Calian company)**, based in Steißlingen, Germany, has been a trusted name in satellite ground segment solutions. As a leading system integrator, manufacturer, and technology provider, we deliver high-performance hardware and software tailored to the evolving needs of our clients and partners. Our mission is to provide competitive, customer-centric products and turnkey system solutions that set the standard for quality and reliability. What sets SatService apart is our unique blend of deep system engineering expertise and innovative, field-proven technologies. Our sat-nms product line is trusted worldwide by satellite operators, teleports, broadcasters, and communication service providers. It includes Advanced Monitoring & Control (NMS/M&C) systems, precision Antenna Control Units, high-performance Beacon Receivers, flexible RF-over-Fiber solutions and a wide range of other mission-critical products. From single components to fully integrated systems, SatService is committed to helping our partners and clients achieve seamless operations, superior performance along with long-term and sustainable success.

For more information, go to: **www.satservicegmbh.de**

Terrasat Communications

Precision Engineering Meets Proven Reliability—Built for Networks Where Failure Isn't an Option.

Mission-critical uplinks rely on hardware that performs the same on day 1 as day 1,000. **Terrasat's** IBUC Smart Uplink Solutions deliver consistent RF power, superior linearity, and long-term stability across demanding C , X , Ku , and Ka band environments.

Each unit is rigorously tested for thermal performance, vibration resilience, RF stability, and environmental durability — ensuring dependable operation in teleports, gateways, government networks, and multi orbit SATCOM systems. Features like secure web-based M&C, intelligent fault detection, and low-power operating modes provide both confidence and control.

Experience field-proven, precision-engineered uplink performance at SATELLITE 2026, Booth #2220.

WORK Microwave

Headquartered in Holzkirchen, Germany (near Munich), and comprised of four operating product lines —Satellite Communication, Navigation Simulators, Defense Electronics, and Sensors and Measurement—**WORK Microwave** leverages over 35 years of experience to anticipate market needs and apply an innovative and creative approach to the development of its technologies while maintaining the highest standards for quality, reliability, and performance. Shaping the Future in Optical Communication, RF Electronics and Virtualized Solutions. Excellence in High Frequency and Digital Signal Processing, WORK Microwave has been a leading developer and manufacturer of RF electronics technologies and products. Known for its quality products, customized solutions, reliability, and world-class customer service, WORK Microwave sets the industry benchmark for innovation in microwave and digital signal processing technologies. All of the company's products are developed and produced in-house, leading to an unrivalled response time to customer needs. For more information, go to: **www.work-microwave.com**

SpaceX Acquies xAI

Los Angeles, Calif., Februry 2, 2026-- SpaceX has acquired xAI, an artificial intelligence firm founded by Elon Musk three years ago, in a deal that combines the two privately held firms into a company with a US $1.25 trillion reported valuation. The combined company is planning am Initial Public Offering (IPO) this year.

Speaking of the deal, Elon Musk said in a post in Spacex' website that the combined companies will "form the most ambitious, vertically integrated innovation engine on (and off) Earth, with AI, rockets, space-based internet, direct-to-mobile-device communications, and the world's foremost real-time information and free speech platform."

Musk added that "in the history of spaceflight, there has never been a vehicle capable of launching the megatons of mass that space-based data centers or permanent bases on the Moon and cities on Mars require. Even in 2025, the most prolific year in history in terms of the number of orbital launches, only about 3000 tons of payload was launched into orbit, primarily consisting of Starlink satellites carried by our Falcon rocket.

The requirement to launch thousands of satellites to orbit became a forcing function for the Falcon program, driving recursive improvements to reach the unprecedented flight rates necessary to make space-based internet a reality. This year, Starship will begin delivering the much more powerful V3 Starlink satellites to orbit, with each launch adding more than 20 times the capacity to the constellation as the current Falcon launches of the

V2 Starlink satellites. Starship will also launch the next generation of direct-to-mobile satellites, which will deliver full cellular coverage everywhere on Earth.

While the need to launch these satellites will act as a similar forcing function to drive Starship improvements and launch rates, the sheer number of satellites that will be needed for space-based data centers will push Starship to even greater heights. With launches every hour carrying 200 tons per flight, Starship will deliver millions of tons to orbit and beyond per year, enabling an exciting future where humanity is out exploring amongst the stars.

The basic math is that launching a million tons per year of satellites generating 100 kW of compute power per ton would add 100 gigawatts of AI compute capacity annually, with no ongoing operational or maintenance needs. Ultimately, there is a path to launching 1 TW/year from Earth.My estimate is that within 2 to 3 years, the lowest cost way to generate AI compute will be in space. This cost-efficiency alone will enable innovative companies to forge ahead in training their AI models and processing data

at unprecedented speeds and scales, accelerating breakthroughs in our understanding of physics and invention of technologies to benefit humanity.

This new constellation will build upon the well-established space sustainability design and operational strategies, including end-of-life disposal, that have proven successful for SpaceX's existing broadband satellite systems. The capabilities we unlock by making space-based data centers a reality will fund and enable self-growing bases on the Moon, an entire civilization on Mars and ultimately expansion to the Universe," Musk concluded..

Rocket Lab Acquires Optical Support, Inc.

Long Beach, Calif., Feb. 26, 2026- Rocket Lab Corporation (Nasdaq: RKLB) announced it has completed the acquisition of Optical Support, Inc. (OSI), a manufacturer of custom, high-precision optical and optomechanical instruments. OSI's advanced lenses and optomechanical systems are critical enablers for national security and commercial satellites, and are key subsystems used in Rocket Lab Optical

Systems' high-performance payloads for space protection, space domain awareness, missile warning, tracking and defense. OSI delivers end-to-end solutions from concept design and prototyping to full-scale production including CNC machining, optical alignment, cleanroom assembly, and testing.

As a key supplier to Geost, which was acquired by Rocket Lab in August 2025 and now forms part of Rocket Lab Optical Systems, Rocket Lab has extensive experience working with the OSI team, providing a high degree of trust and familiarity with their technology and capabilities.

The transaction further cements Rocket Lab's position as a disruptive vertically integrated prime contractor enabling critical defense programs including the Space Development Agency's Proliferated Warfighter Space Architecture (PWSA), while ideally positioning the Company to deliver capability for next-generation initiatives like Golden Dome and space science missions, including Mars exploration. OSI's extensive capabilities in optics and optomechanical systems span a variety of industries and have enabled groundbreaking programs including NASA's James Webb Space Telescope, Sphere Las Vegas, and US Government Defense and Intelligence missions.

Rocket Lab founder and CEO, Sir Peter Beck, says "Optical systems play a large and vital role in gathering critical data for the most impactful space missions of today and the future, from deep space exploration and Earth observation to national security. The high performing technology behind many of those missions comes from the team at Optical Support, Inc. Welcoming them to Rocket Lab's portfolio of advanced space systems is a strategic commitment to further strengthening our vertical integration for programs like the PWSA, while ensuring we can serve the expanding needs of the commercial and wider government constellation market."

Michael Savard, President of OSI, adds: "Optical Support, Inc. has been enabling some of the nation's most critical missions for more than 20 years, and now as part of Rocket Lab we are excited to take our technologies further. Rocket Lab's track record of acquiring best-in-class space systems technologies and successfully scaling them to meet the growing needs of commercial and national security markets has been proven multiple times over. We look forward to teaming up to do the same for advanced lenses and optomechanical systems."

Based in Tucson, Arizona, OSI will be integrated into Rocket Lab Optical Systems, the company's payload arm which is also based in Arizona and was established in August 2025.

Applied Aerospace Acquires Vestigo Aerospace and its Spinnaker™ Product Line

Huntsville, AL, February 24, 2026--Applied Aerospace & Defense announced its acquisition of Vestigo Aerospace known for its innovative product line of Spinnaker™ deorbit systems. Spinnaker™ drag sails are designed to deorbit satellites and launch vehicle components operating in low Earth orbit. They enable space system operators to comply with new licensing and regulatory requirements intended to mitigate the growing problem of orbital debris. Prior to the acquisition, Vestigo trusted Applied as a critical supplier of advanced materials for thin-film polymer sails and the deployable booms used in its products.

The Spinnaker™ product line offers drag sail configurations that are sized to deorbit a broad range of satellites and spacecraft components up to 1,000 kilograms in mass. Spinnaker™ can reliably and cost effectively deorbit objects in 5 years or less from altitudes up to 800 kilometers and in 25 years or less up to 1,000 kilometers. Spinnaker™ offers lower mass and cost than traditional propulsion-based deorbit techniques. By saving station keeping fuel, Spinnaker™ enables satellites to extend their mission life. As easily integrated hardware, Spinnaker™ enables satellites without propulsion systems to operate at altitudes above 500 kilometers, where a proactive deorbit solution is required.

Vestigo Aerospace founder and CEO Dr. David Spencer joins Applied Aerospace & Defense as the company's new vice president of deployable systems. Prior to Vestigo, Dr. Spencer served as a planetary mission designer, system engineer, and mission operations manager at NASA's Jet Propulsion Laboratory (JPL). He also previously served as an associate professor of aeronautics and astronautics at Purdue University.

"We are proud to join the Applied team and look forward to accelerating the evolution of Spinnaker™ as a proactive and scalable solution for deorbit compliance, " said Dr. Spencer.

Massimo Vimini Appointed SVP of IKOMG

Pfaffikon, Switzerland, February 5, 2026--**iKO Media Group (iKOMG)**, a provider of premium end-to-end broadcasting and teleport services, has announced the appointment of **Massimo Vimini** as Senior Vice President, Digital Innovation and Monetization.

In his new role, Vimini will lead iKOMG's global digital monetization

Massimo Vimini

strategy, focusing on accelerating revenue growth across broadcast, OTT, FAST and CTV platforms. He will work closely with commercial, technology and content teams to develop scalable, data-driven monetization models that support both iKOMG and its international customer base.

Vimini brings more than 18 years' experience building and scaling digital media, OTT and advertising platforms across Europe. His background spans AVOD, FAST channels, CTV advertising and advanced yield management, alongside experience as a co-founder of an independent OTT platform — giving him a highly pragmatic, ex-

ecution-focused approach to growth.

As broadcasters and media owners adapt to shifting audience behaviour and increasingly fragmented distribution environments, monetization has become a critical focus. iKOMG's global portfolio provides end-to-end capabilities to help customers unlock the full value of their content and audiences, generating revenue across broadcast, OTT, FAST and CTV platforms. The appointment of Massimo Vimini further enhances this portfolio, strengthening iKOMG's ability to deliver practical execution, innovative solutions and scalable monetization strategies at every stage of the customer journey.

Commenting on his appointment, Massimo Vimini, SVP Digital Innovation and Monetization at iKO Media Group, said: "iKOMG sits at a very strategic intersection between broadcast, OTT and digital innovation, which is exactly where monetization opportunities are accelerating. At this stage of my career, I wanted to focus on building something impactful at a global level — shaping strategy, execution and long-term value. iKOMG offers that opportunity, with the scale and ambition to truly lead in this space."

Shmulik Koren, co-founder of iKO Media Group, said: "Massimo's appointment marks an important step in strengthening iKOMG's digital and monetization capabilities. His deep expertise across AVOD, FAST and data-driven advertising, combined with his entrepreneurial mindset, will be instrumental as we continue to evolve our offering for broadcasters and media partners worldwide. As

broadcast and digital continue to converge, Massimo will play a key role in building an integrated monetization ecosystem that delivers sustainable growth, innovation and measurable value for our customers."

Vimini's appointment reinforces iKOMG's continued investment in innovation to support customers navigating a rapidly evolving monetization landscape across broadcast, OTT and FAST. By building specialist teams and scalable, data-driven capabilities, iKOMG is focused on being a trusted long-term partner, with further developments to be announced in the coming months, according to the company.

Eutelsat Network Solutions Names Gen. Jim Slife as New Board Member and Elects Jill Singer Chair of the Board

Houston, Tex. , February 4, 2026 Eutelsat Network Solutions announced the appointment of retired U.S. Air Force Gen. **Jim Slife** to its Board of Directors and the election of **Jill Singer** as Chair of the Board. Eutelsat Network Solutions is a wholly owned, independent U.S. proxy company and subsidiary of satellite operator Eutelsat. Eutelsat Network Solutions is the tradename of OneWeb Technologies Inc.

"Jim Slife brings unparalleled experience in global defense operations, acquisitions and strategic planning, while Jill Singer provides extraordinary experience and leadership to our board at this pivotal moment for Eutelsat

Network Solutions," said President & CEO Ian Canning. "Their combined expertise strengthens our mission to deliver trusted, resilient connectivity to the U.S. government and allied partners worldwide."

Slife joins the board as Chair of the Proxy GSC. He brings expertise from his more than 35 years of service in the U.S. Air Force. He concluded his distinguished career as Vice Chief of Staff, the service's second-highest-ranking officer. In that role, he helped shape Air Force strategy and oversaw a $215 billion annual budget supporting more than 600,000 personnel.

Slife has also held senior leadership positions across the U.S. Special Operations Command. He has played a central role in executive leader development, succession planning and global engagement, and was responsible for managing the executive development and preparation of 228 Air Force general officers for roles of increasing responsibility.

Jill Singer, a nationally recognized leader in government technology and national security, currently leads AT&T's business activities for the U.S. Department of State, the U.S. Intelligence Community and the White House. She oversees a global workforce delivering strategic technology solutions and professional services focused on network transformation, infrastructure modernization, wireless communications and advanced technical capabilities.

Singer succeeds the late aerospace and defense leader Pamela Drew, who was board Chair through the merger of Eutelsat America Corp. and One-

Web Technologies Inc. This decision recognizes the valuable contributions Jill has made during her four years of service on the Board.

"We are also deeply mindful of the legacy of Pamela Drew, whose leadership, commitment and vision guided us into our current era as Eutelsat Network Solutions," said Canning.

Singer's more than 30 years of government and industry experience include serving as Chief Information Officer (CIO) of the National Reconnaissance Office, Deputy CIO of the Central Intelligence Agency and Director of the Diplomatic Telecommunications Service at the U.S. Department of State. Her non-profit background includes service on the Board of Trustees for the University of West Florida and the Governing Board of the International Spy Museum.LaMastus brings more than 30 years of experience in satellite communications, telecommunications, and global connectivity solutions. He has held senior leadership roles at PanAmSat and Intelsat and is widely recognized for his expertise in building high-value partnerships, launching new market offerings, and aligning business strategies with emerging technology trends.

Global Invacom Appoints Craig Bowley as Chief Commercial Officer

Singapore, January 26, 2025--The **Global Invacom Group** has appointed **Craig Bowley** as Chief Commercial Officer to drive forward the company's ambitious plans for growth.

An experienced leader in the global satellite industry, Bowley has had a

long career at ST Engineering iDirect where he held the position of Senior Regional Director, Government and Defence, EMEA before becoming Regional Vice President, Europe and rising to Regional Vice President, EMEA. In his various roles at the company, he led teams that were agile and responsive and able to adapt to the changing satcom business environment. His collaborative and strategic approach and close collaboration within the organization and with customers and partners resulted in future-focused sales strategies, product development and marketing initiatives that helped position ST Engineering iDirect at the forefront of the industry.

In his new role as Chief Commercial Officer, Bowley will spearhead Global Invacom's growth and development aligning the company's com-

Craig Bowley

-mercial strategies to exceed customer requirements and expand market presence. As the satellite sector continues to evolve to meet swiftly changing world dynamics, he will focus on capturing new revenue opportunities and further strengthen its market position.

Bowley, said: "I am thrilled to take on this new opportunity with such a well-established and respected company as Global Invacom. I have always been passionate about harnessing innovative strategies and cutting-edge technologies to drive sustainable growth and achieve market leadership. I am looking forward to bringing my skills and experience to this role and working with such as strong and talented team."

Gordon Blaikie, Chief Executive Officer at Global Invacom Group commented: "We are delighted to welcome Craig to the Global Invacom family. His leadership, extensive knowledge of the satellite industry coupled with his experience in taking products to market and opening new opportunities will be invaluable to the future of the company. We are looking forward to a new and exciting chapter under his commercial leadership."

Steve Richeson Appointed VP of Growth at Sat-Lite Technologies

January 15, 2026, White Oak, Tex.--Sat-Lite Technologies, a manufacturer of satellite ground station antennas, today announced the expansion of its sales and go-to-market organization to better serve its rapidly growing global customer base. As part of this strategic growth initiative, Sat-Lite has appointed industry veteran Steve Richeson as Vice President of Growth.

In this newly created role, Richeson will lead business expansion with OEM partners and top-tier system integrators, build strategic alliances,

Steve Richeson

and advance initiatives that sustain long-term growth across Sat-Lite's defense and commercial sectors.

The company also promoted Chris Callow to Vice President of Sales in recognition of his leadership and contributions to Sat-Lite's success. Callow's deep industry knowledge and customer relationships will continue to strengthen Sat-Lite's delivery of innovative, reliable, and high-performance solutions to partners worldwide.

New applications driven by LEO constellations, Earth observation, electronic warfare, and signals intelligence are creating tremendous opportunities," said Darin Beakley, President of Sat-Lite Technologies. "Our customer-facing team, led by Chris and Steve, will ensure we deliver the dedication, responsiveness, and engineering excellence our customers expect as we expand into these dynamic market segments."

Richeson brings decades of experience in the satellite communications industry, including leadership roles at Mission Microwave, Advantech Wireless, Exelis, Harris Corporation,

EchoStar, Scientific-Atlanta, and others. He played a key role in Mission Microwave's global growth and ultimate acquisition. Richeson holds a bachelor's degree in Electrical Engineering from Georgia Tech and an MBA from Georgia State University. He is a Registered Professional Engineer and Senior Member of the IEEE.

Sat-Lite's customer-focused culture and reputation for supporting top SATCOM system suppliers set it apart in the industry," Richeson said. "I'm excited to help drive the next phase of growth alongside this exceptional team."

Founded in 2006 and headquartered in White Oak, Texas, Sat-Lite Technologies develops high-performance, configurable satellite antenna systems for commercial, government, and defense applications worldwide.

Ovzon appoints Martin Eriksson as CTO

Solna, Sweden, January 20, 2026--**Ovzon** announced the appointment of **Martin Eriksson** as the company's new Chief Technology Officer (CTO) effective immediately. He will also be a member of Ovzon's Group Management.

Martin has been with Ovzon since 2008 and has held a number of senior technical positions. In recent years, he has served as Space Systems Manager, where he played a key role in Ovzon's first satellite design, production and launch as well as product and project leader for the Ovzon On-Board-Processor program. Martin holds a Master of Science in Physics and Mathematics from Stockholm University, as well as a PhD in Theoretical Physics.

TRACKER 3700:
Any Orbit, Any Network, Anywhere

Orbital Connect® is a channel partner and authorized distributor of leading global manufacturers of satellite equipment. Its product list include over 15,000 satellite products and RF components, solutions, and terminals, such as Earth station antennas, fixed and maritime VSAT or receive-only antennas, terminals on the move and on the pause, high-power amplifiers, modulators, de-modulators, redundant systems, modems, RF products and matrices, RF over fiber solutions, LNBs, BUCs, BDCs, LNAs. In addition to their product offerings, Orbital Connect provides satellite connectivity services across various frequency bands, utilizing the networks of the industry's largest satellite operators.

Precision Tracking for High-Throughput Ground Stations

As Low Earth Orbit (LEO) missions continue to expand across Earth observation, maritime surveillance, and satellite IoT networks, the performance of the ground segment has become a decisive factor in overall system efficiency. Orbital Connect is seeing demand for tracking systems that combine mechanical precision, operational reliability, and high data-rate capability.

TRACKER Gateways and User Terminals have been selected by LEO/MEO constellation operators, government agencies, and EO and New Space service providers based on proven performance and reliability, robust design suitable for all environments, low total cost of ownership, and Cobham SATCOM's ability to meet demanding implementation schedules.

Cobham SATCOM has helped lead development of EO and New Space through its proven TRACKER 3700 EO and 6000 EO series of cost-effective, easily configured, and highly reliable satellite tracking systems. TRACKER EO systems are in wide-scale operation and have become a leading choice for:

- Mission-critical satellite search and rescue organizations
- Marine traffic and monitoring services
- Earth Observation and imagery companies
- Emerging satellite IoT and M2M providers

The TRACKER 3700 EO is modular and easily configurable, whether for receive only or transmit/receive, in the widely used S/X band or other single or dual-band combinations. Three-axis tracking with protective radome allows operation in the harshest environments and ensures accurate tracking at all times, with

TRACKER 3700 EO

optimum signal quality, uninterrupted passes, low power consumption, and high reliability.

For operators balancing performance with site constraints, the 3.7-meter aperture offers an optimal combination of gain, structural robustness, and manageable infrastructure requirements. This makes the system particularly well aligned with commercial EO networks, government programs, and emerging LEO constellation operators seeking reliable ground reception without the larger footprint of 6-meter class systems.

The TRACKER 3700 EO can be configured for C Band, Ku Band and Ka Band, in any combination. Customers can start with a single or dual band system and upgrade to dual or triband if or when required.

The RF architecture offers the most efficient design in the industry, permitting up to almost double the RF power with the same size antenna and enabling higher throughput and margins. The optimized RF performance includes superior cross-pol isolation; full transmit waveguide to keep the Tx and Rx units close to the feed (OMT), minimizing loss while increasing RF performance; and full illumination of the reflector to maximize gain efficiency. Additionally, this RF design allows the user to configure and reconfigure with of a much broader range of leading commercial RF units than competing systems.

The TRACKER 3700 is available in Orbital Connect's online store at:

store.orbitalconnect.com/cobham-satcom-tracker-3700/
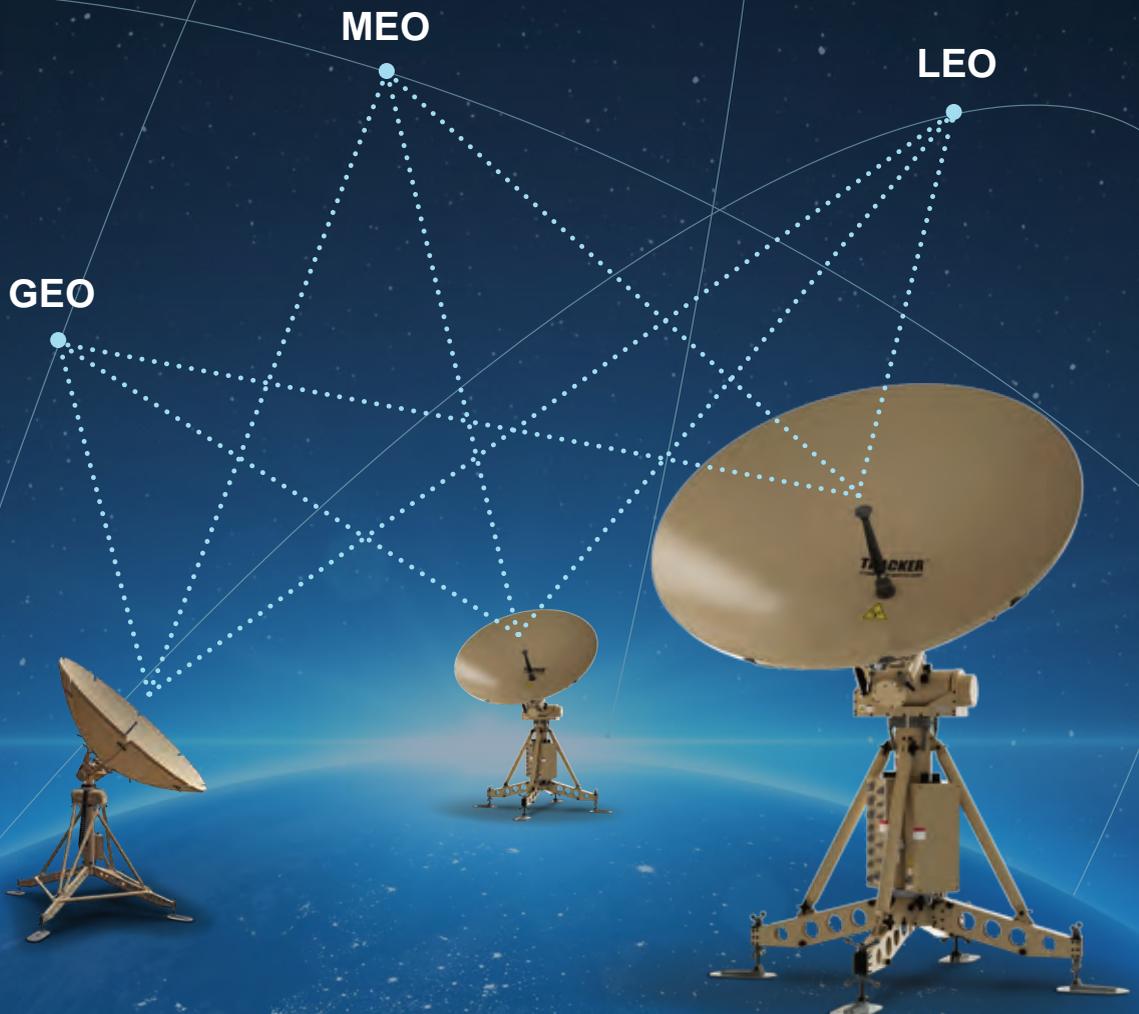
New Report Identifies Major Barriers to Launching a Robust Space Economy

A new report by the Computer & Communications Industry Association's Space and Spectrum Policy Center outlines how reforms to our outdated space launch policy could propel the commercial space economy to new heights. Recent innovations in space technology have created new opportunities for commercial space activities, such as space-based data services, remote sensing, in-space manufacturing, commercial space stations, and lunar activities. While launch companies are introducing new vehicles capable of delivering larger payloads at a higher cadence, they encounter multiple challenges along the way.

In this report, CCIA recommends that the federal government increase investments in spaceport infrastructure and modernize regulations around spaceport development and launch activities.

Highlights of launch constraints:

- 175 of 176 orbital launches from the U.S. occurred at just 3 federally owned spaceports.

- Spaceport infrastructure has been severely underfunded – US$ 1.5 Million in FAA STIM grants have been approved in the last 30 years.

- Launch and re-entry activities are poorly integrated into air traffic management systems. Of the 22 NEPA reviews for active launch and re-entry licences in 2023, 19 were based on previous assessments, and all the reviews found the environmental impacts to be below significant levels.

- The FAA's Part 450 licensing framework is needlessly complex and opaque, and often leads to longer processing times than the framework it replaced.

- A growing number of close U.S. allies are developing their own launch capabilities, but U.S. companies face export control obstacles to gain access.

Karina Perez, Director of CCIA's Space & Spectrum Policy Center said: "The current spaceport infrastructure and the regulatory frameworks are stretched to their limits. By investing in spaceport infrastructure and updating regulations to match the pace of industry, we can create a sustainable, robust, and diversified space economy that will benefit all."

You can access the pdf of full report here: **https://ccianet.org/wp-content/uploads/2026/02/CCIA_**

The Post-Capacity Era of Satellite Connectivity

Novaspace's Capacity Pricing Trends, 8th Edition finds the satellite connectivity market has entered a Post-Capacity Era, where bandwidth is no longer the basis of differentiation. Starlink's vertical integration and cost compression are accelerating this shift, resetting competitive expectations across the sector.

"The market has moved beyond capacity as a differentiator. As supply expands and economics converge, the real battleground is end-user pricing and integrated service delivery," said Grace Khanuja, Manager at Novaspace. "By accelerating this shift, Starlink is forcing the entire industry, and terrestrial MNOs, to rethink where and how value is created."

With global supply rising and cost bases falling, capacity pricing is now on a structural downward trajectory. Data-driven applications face the steepest declines due to low-cost NGSO supply, while legacy video markets confront their own structural pressures as consumption patterns evolve.

In this environment, $/GB has become the defining metric of competitiveness. Starlink's sub-$0.30/GB pricing is resetting industry benchmarks and driving broader adoption of regional pricing, promotions, and flexible service tiers. As satellite broadband approaches cost parity with terrestrial connectivity in rural and underserved areas, competition is expanding beyond the satellite sector itself.

As bandwidth commoditizes, hardware economics and service integration are emerging as the new engines of competitive advantage. The terminal ecosystem – from localized manufacturing to specialized hardware and bundled service – is becoming a strategic priority, blending network, device, and user experience into a unified value proposition.

Global Space Economy Reaches US$ 626 Billion, Marking a New Phase of Growth

The 12th edition of Novaspace's Space Economy Report notes the global space economy is now on a significant growth trajectory, positioned to expand from $626.4 billion in 2025 to $1.01 trillion by 2034, a significant 12% CAGR. While growth continues to be supported by innovation, new business models, assertive government policies and expanding demand for satellite-enabled services, 2025 stands out as a structural inflection point, marking a transition from rapid expansion toward a more mature and structured space market.

The space market is positioned to expand from $236 billion in 2025 to $323 billion in 2034 with space-enabled solutions, such as PNT services, occupying a significant share of the space economy. Defense and sovereignty, however, have emerged as the dominant market drivers in 2025, a dynamic that is expected to persist well into the late 2020s.

"Government space spending reached $138 billion, driven primarily by security, sovereignty, and exploration programs. " says Jan Clarence Dee, Novaspace Senior Space Consultant. "These priorities are reshaping procurement models and reinforcing the potential for commercial actors in national space strategies."

Private investment is also showing signs of recovery in 2025, reaching $9 billion and marking the largest annual increase since the 2021 investment peak. Capital flows were concentrated in late-stage companies, indicating continued access to funding for proven players, while investors remained cautious toward higher-risk early-stage ventures. With a total of 54 M&A transactions completed in 2025, and 16 additional deals pending, focus is on reflecting ongoing consolidation, vertical integration, and portfolio optimization.

The space economy is increasingly being shaped by the impacts of sector maturation, improved financing, and the progressive softwarization of space infrastructure. Commercial activity reached new highs, government initiatives became more assertive, and technology continued to advance. Together, these dynamics position 2025 as a transition year laying the foundation for a more resilient, security-driven, and strategically aligned space economy as the industry moves forward.

SATEXPO

2–4 JUNE 2026

DUBAI EXHIBITION CENTRE, **EXPO CITY**

THE BENCHMARK FOR SATCOM AND SPACE TECHNOLOGY

8,000+
VISITORS

150+
SATELLITE, SPACE &
CONNECTIVITY EVXHIBITORS

70+
COUNTRIES

80+
EXPERT SPEAKERS

50%
OF ATTENDEES ARE GOVERNMENT,
MILITARY & ENTERPRISE
BUYING ENTITIES

Scan the QR Code to
GET INVOLVED

CO-LOCATED WITH

ORGANISED BY

SATEXPOME.COM
#SATEXPO

X in Instagram f YouTube

CABSAT

مركز دبي التجاري العالمي
DUBAI WORLD TRADE CENTRE

WTA's 2025 Top Operators Rankings Underscore the Business Value of Certified Teleports

by Randall Barney

The World Teleport Association's (WTA) 2025 Top Operators rankings offer more than a snapshot of industry leadership. They also highlight a defining trend shaping today's satellite and connectivity marketplace: the growing link between commercial success and certified, standards-based ground infrastructure.

As the only global ranking focused exclusively on commercial teleport operators, WTA's annual list evaluates companies based on total revenue and year-over-year growth. The rankings encompass a wide spectrum of players, from satellite carriers and fiber network providers to systems integrators and independent teleport specialists. By excluding organizations that operate teleports primarily for internal use, WTA ensures the rankings reflect true market competition.

The 2025 rankings are organized into three categories: the Global Top Operators, the Independent Top Operators, and the Fast Operators. Together, they provide insight into where revenue, investment, and innovation are converging across the sector.

This year's Global Top 20 includes industry leaders such as SES, Intelsat, Hughes, Eutelsat, Arqiva, Speedcast, Telesat, Telespazio, and Telstra, along with fast-growing regional and emerging-market players. The list reflects a geographically diverse industry, with strong representation from Europe, North America, the Middle East, Asia-Pacific, and Africa.

The Competitive Benefits of WTA Certification

A common thread among many of these leading operators is their participation in WTA's Certification Program. Most companies appearing across the three rankings operate one or more teleports that have achieved certification, demonstrating compliance with internationally recognized standards for infrastructure, security, redundancy, and operational performance.

WTA Certification has evolved into a meaningful benchmark for customers navigating an increasingly complex connectivity ecosystem. Today's networks integrate geostationary, medium Earth orbit, and low Earth orbit systems, alongside terrestrial fiber, cloud platforms, and software-defined ground infrastructure. In this environment, consistent operational quality is critical.

Certification provides independent validation that a teleport meets defined performance criteria. Facilities are evaluated on technical systems, physical security, cybersecurity practices, maintenance programs, disaster recovery planning, and management procedures. The result is a transparent framework that allows customers to assess risk and reliability before committing to long-term service

11-14 Sept 2026,
RAI Amsterdam

shaping
the future

Register your interest

#IBC2026

show.ibc.org

agreements.

For many top-ranked operators, certification is now a strategic business tool rather than a compliance exercise. Companies such as Arqiva, Speedcast, Telespazio, Telstra, Orange, and U.S. Electrodynamics Inc. (USEI) have built global service portfolios around certified infrastructure. These investments support high-availability services for government, defense, broadcast, mobility, and enterprise customers.

The Independent Top 10 category further illustrates this dynamic. Led by Arqiva and Speedcast, this group consists entirely of operators that do not own satellite fleets or terrestrial backbone networks. Their competitiveness is driven largely by service quality, geographic coverage, and operational credibility—areas directly reinforced by certification.

Similarly, the Fast 10 ranking shows how certified operations can support rapid expansion. High-growth companies such as Telstra, Orange, Planetcast Media Services, e&, and USEI are scaling managed services, hybrid networks, and cloud-enabled offerings. Certification helps these operators establish trust as they enter new markets and onboard new partners.

Futureproofing the Teleport in a Rapidly Evolving Market

Beyond its commercial impact, the certification process contributes to industry-wide improvement. Regular audits encourage operators to formalize procedures, invest in redundancy, strengthen cybersecurity defenses, and address vulnerabilities proactively.

"...Certification provides independent validation that a teleport meets defined performance criteria. Facilities are evaluated on technical systems, physical security, cybersecurity practices, maintenance programs, disaster recovery planning, and management procedures..."

This discipline is particularly important as ground systems become more software-driven and interconnected.

The rankings also reflect the growing importance of global service chains. Enterprise and government customers increasingly rely on multi-region networks supported by multiple teleport operators. Standardized certification makes it easier to integrate facilities into shared architectures, reducing procurement complexity and operational risk.

As satellite operators deploy software-defined payloads and next-generation constellations, the role of the ground segment continues to expand. Teleports are no longer just uplink and downlink sites; they are becoming digital gateways that connect space, cloud, and terrestrial networks. In this context, operational excellence has direct revenue implications.

WTA's 2025 Top Operators rankings suggest that the market is recognizing this reality. Companies that invest in certified, resilient, and transparent operations are consistently outperforming their peers in revenue and growth.

For customers, the message is equally clear. In a crowded and rapidly evolving marketplace, WTA Certification provides a reliable indicator of long-term service capability. For operators, it has become a foundation for differentiation and sustained competitiveness.

As the industry moves toward increasingly integrated, multi-orbit networks, the convergence of business performance and operational standards is likely to accelerate. The 2025 rankings show that, for today's leading teleport operators, certification is no longer optional—it is central to their market position.

Randall Barney is Executive Director for the **World Teleport Association w**hich conducts research into the teleport and satellite industry, provides a unified voice for teleport operators and offers Teleport Certification programs to service providers.

Each year, WTA publishes the world's only rankings of companies that operate teleports for commercial purposes, including independents, satellite carriers, fiber carriers and technology providers, from the data provided by its members and other operators. For more information on the WTA, go to: **www.worldteleport.org**

ATX ENTERPRISE
P R E S E N T S

SATELLITE ASIA

20 - 22 MAY 2026
SINGAPORE EXPO

Asia's largest SatCom stage returns as an anchor event of Asia Tech x Singapore 2026. SatelliteAsia convenes satellite operators, solution providers, government stakeholders, and enterprise users to examine the evolving role of satellite technologies across the region.

This year's conference brings together industry perspectives on integration, scale, and adoption, alongside the commercial, regulatory, and operational considerations shaping the sector. As satellite infrastructure becomes increasingly central to regional connectivity, conversations will also address long-term resilience, security, and responsible growth.

Secure Your Pass

Satellite Markets and Research members enjoy 25% off the Premium All Access Pass.

Use promo code
M P _ S M R 2 5
at checkout.

Key Themes

Satellite Communications

Space & Next-Gen Connectivity

Scaling Infrastructure

Securing Space & Sustainability

Past Sponsors & Exhibitors

EUTELSAT

KACIFIC
the heart of broadband

ses

SKY Perfect JSAT Holdings Inc.

speedcast

ST Engineering

Apply to Sponsor/Exhibit

DIFI and the Digital RF Transition: Progress, Pitfalls and Market Reality
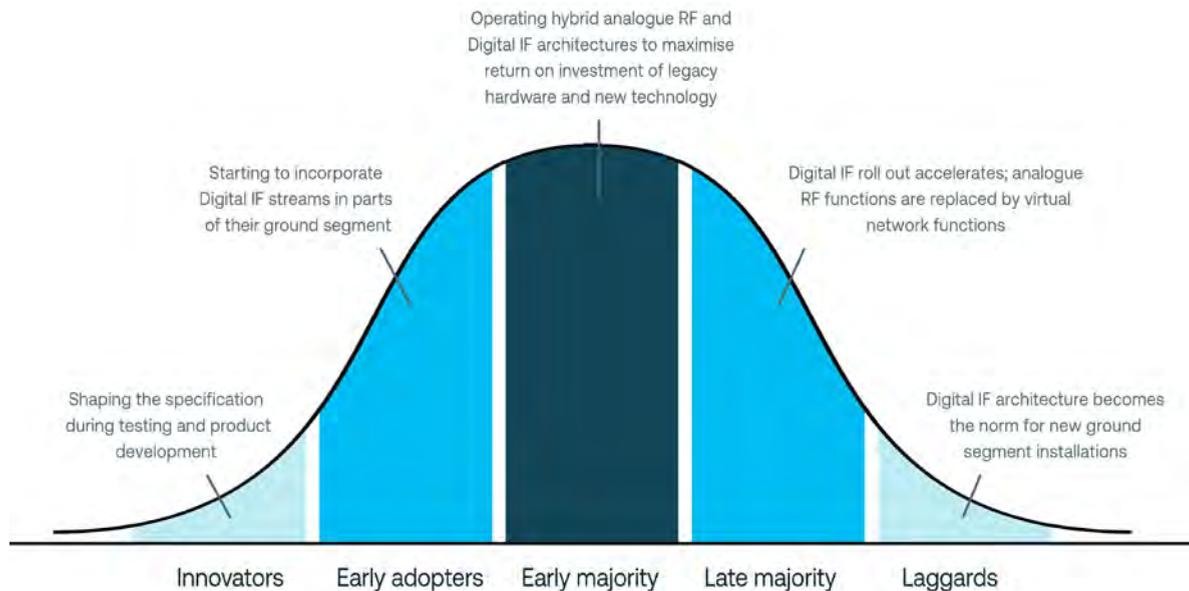
by Kevin Dunne

The satellite ground segment is undergoing a structural transition rather than a simple technology upgrade.

As bandwidth demands increase and ground architectures become more varied, operators are being asked to support multiple missions and orbits from shared infrastructure. In high-density and multi-mission environments, long-established analogue intermediate frequency (IF) chains are increasingly approaching their practical limits. Digitization is widely accepted as the long-term direction of travel, but the pace and maturity of adoption across the industry remain uneven.

plug-and-play integration. In practice, it is best understood as an enabling framework whose impact depends less on the specification itself and more on how carefully it is applied.

The ground segment's digital transition: where are we really?

The pressures driving digital RF adoption are well understood. Higher channel counts, wider bandwidths and the need to support GEO, MEO and LEO systems from shared ground infrastructure place increasing strain on analogue RF distribution. As systems scale, analogue architectures become physically complex, harder to adapt in operation and costly to extend.

Shaping the specification during testing and product development — **Innovators**

Starting to incorporate Digital IF streams in parts of their ground segment — **Early adopters**

Operating hybrid analogue RF and Digital IF architectures to maximise return on investment of legacy hardware and new technology — **Early majority**

Digital IF roll out accelerates; analogue RF functions are replaced by virtual network functions — **Late majority**

Digital IF architecture becomes the norm for new ground segment installations — **Laggards**

Within this context, the Digital IF Interoperability (DIFI) standard has become a focal point for discussions around openness, flexibility and interoperability in digital RF systems. DIFI is sometimes presented either as a decisive break from vendor-locked architectures or as a shortcut to

Digitized IF offers clear advantages. Converting signals earlier in the chain enables greater flexibility in transport and processing, supports the use of commercial networking technologies and allows for more modular system design. In theory, this should make ground segments easier to scale
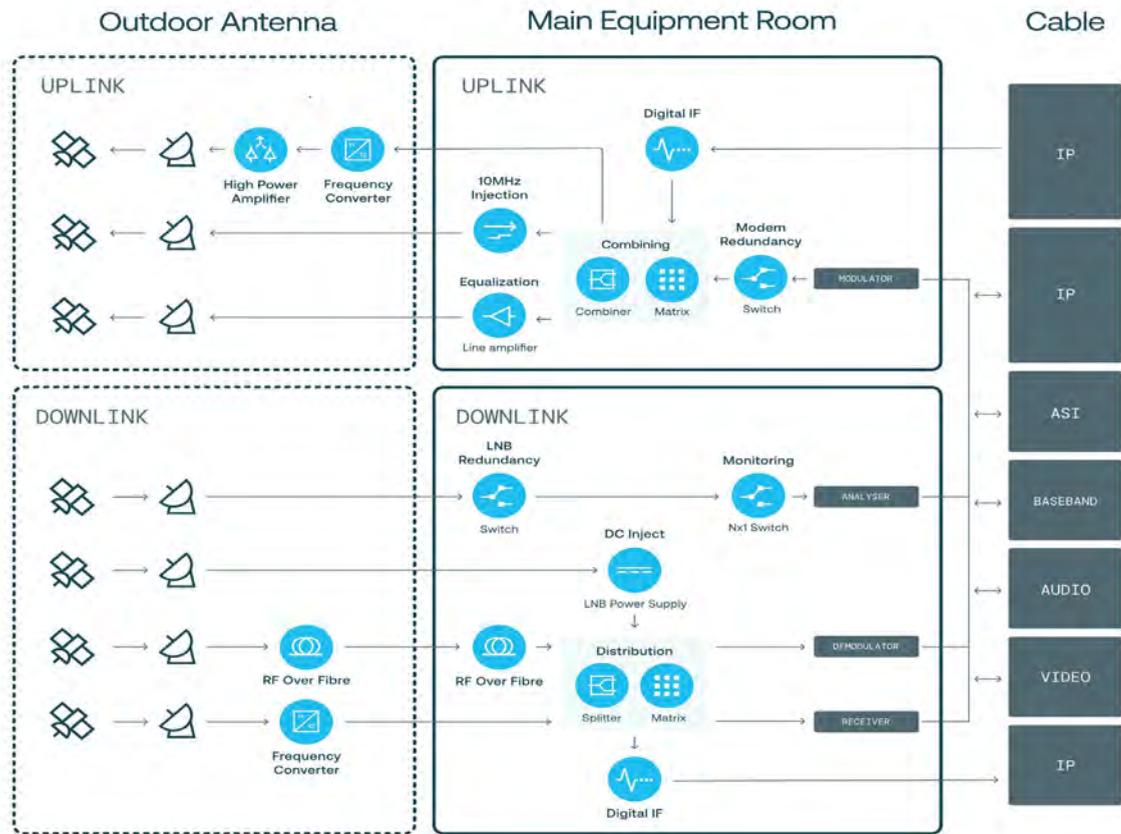
and adapt. In reality, progress has been uneven.

Many operational ground systems today are hybrid, combining analogue and digital elements. In some cases, digital interfaces have been added in isolation, delivering incremental benefits while leaving many underlying system limitations unchanged. In others, proprietary digital implementations have replaced analogue dependencies with new forms of lock-in. This mixed landscape is essential context when assessing what standards such as DIFI can realistically achieve.

Why standards alone do not guarantee progress

The existence of an open standard is often taken as a sign of maturity. Experience across multiple technology cycles suggests this assumption is misplaced. Standards define interfaces, not outcomes. They enable interoperability, but they do not remove the need for informed system design, careful integration work, or teams that are genuinely prepared to operate and support what is deployed.

In performance-sensitive environments such as digital RF, this distinction matters. Timing, synchronization and transport behavior all influence how systems perform in practice. A standard can align expectations at the interface level, but it cannot compensate for weak architectural decisions or unrealistic assumptions about how much work is required to make systems behave as intended. When standards are treated as a shortcut to simplicity rather than a foundation for disciplined design, the risk of disappointment increases rather than decreases.

What DIFI genuinely enables and what it does not

DIFI was developed to address a specific gap in the digital RF ecosystem: the absence of open, vendor-agnostic interfaces for digitized IF. By defining common data structures and behaviors, it enables different parts of the RF chain, from front ends through to transport and processing, to work together across suppliers.

Properly applied, this reduces dependence on vertically integrated RF chains and supports a more modular,

ground

WORK
MICROWAVE

Shaping the Future in Optical Communication, RF Electronics and Virtualized DIFI Solutions

work-microwave.com

multi-vendor ecosystem. It creates the conditions for innovation to occur at different points in the signal chain without requiring wholesale system replacement.

What DIFI does not deliver is automatic interchangeability. Interoperable components can work together, but they are not inherently equivalent. Performance characteristics, timing requirements and implementation choices still matter. Treating DIFI as a universal compatibility layer risks obscuring these realities and underestimating the importance of clarity over who is responsible when performance degrades or integration issues emerge.

The education gap holding back adoption

One of the most persistent barriers to progress is not technical capability but understanding. Many organizations recognize the strategic importance of digital RF, yet lack the internal expertise to specify, procure and integrate systems effectively.

This is particularly visible in procurement. Requests for "DIFI-compliant" solutions are increasingly common, but are often poorly defined. Without a clear understanding of the information being exchanged, performance requirements and responsibility for how the system behaves from input to output, compliance becomes a checkbox rather than something that genuinely improves operation.

In such cases, standards adoption can increase the risk and effort involved in making systems work together rather than reducing it. Expectations diverge, system behavior is misunderstood, and when performance degrades it is often unclear where responsibility sits. Education, both within operator organizations and across the supplier ecosystem, is therefore as critical as the specification itself.

Hybrid architectures as rational risk management

Hybrid analogue-digital architectures are often described as a transitional compromise. What has become clear, however, is that they are frequently the most rational response to financial, operational and capability risk.

Legacy analogue infrastructure represents significant sunk investment and continues to perform reliably within defined roles. Full end-to-end digitization can introduce cost, complexity and integration risk that is difficult to justify across all missions at once. Hybrid approaches allow operators to target digitization where it delivers the greatest value, while preserving proven analogue elements where appropriate.

This incremental strategy reduces exposure. It allows organizations to build digital expertise gradually, test new architectures in live environments and adapt operational processes without forcing disruptive, large-scale change. For many operators, particularly those supporting diverse missions, hybrid architectures are not a stopgap but a deliberate long-term strategy.

Adoption maturity and what to watch next

Looking at how the market is developing, DIFI adoption remains at an early stage. A small number of organizations are experimenting with open digital RF architectures in controlled environments, often supported by strong internal engineering capability and clear architectural intent.

For the broader market, progress is likely to be gradual. Skills development, organizational alignment and integration experience will shape timelines as much as specification maturity. Hybrid architectures are likely to dominate in the near to medium term, with full end-to-end digitization emerging selectively where operational and commercial conditions support it.

The future impact of DIFI will depend less on incremental changes to the specification and more on how the industry applies it in practice. Reference architectures, shared learning from interoperability testing and clearer guidance on responsibility for overall system performance will all be important.

DIFI provides a foundation, but it is experience, education and thoughtful implementation that will determine whether that foundation supports genuinely flexible, resilient ground segment infrastructure.

Kevin Dunne is the CEO of ETL Systems. With over 20 years of experience in RF Systems for Satellite and Defense communications, he joined ETL in 2023 to lead transformative change. Kevin's vision has led the company through its pioneering Digital IF development program, bridging the gap between traditional RF technology and the evolving cloud-virtualized ground segment. He can be reached at: marketing@etlsystems.com
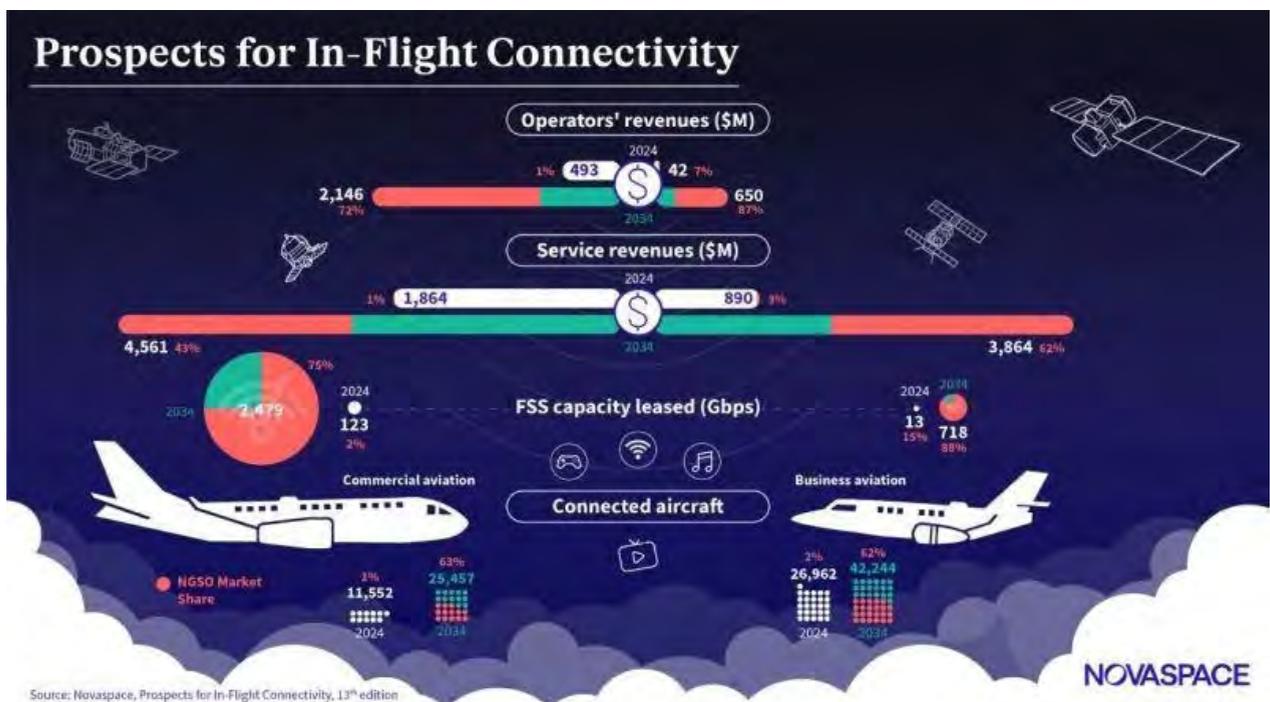
VITAL STATS

Prospects for In-Flight Connectivity

Source: Novaspace, Prospects for In-Flight Connectivity, 13th edition

NOVASPACE