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Executive Summaries of Market Trends and Opportunities in Key Market Segments and Regions Worldwide

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VSATs for Government Applications

VSATs for Goverment Applications

by Virgil Labrador

Very Small Aperture Terminals or VSATs for short, have been widely adopted for network and connectivity applications globally by virtually every major industry including retail, enterprises, banks, financial institutions, transportation, logistics, utilities, mining, oil & gas and government agencies and the military, among others. If you have ever used an ATM at a bank or paid at a pump at a gas station, your transaction most likely went through a VSAT network. According to most estimates, there are currently over 5 million VSAT terminals deployed worldwide and the number of terminals are forecasted to more than double in the next decade.

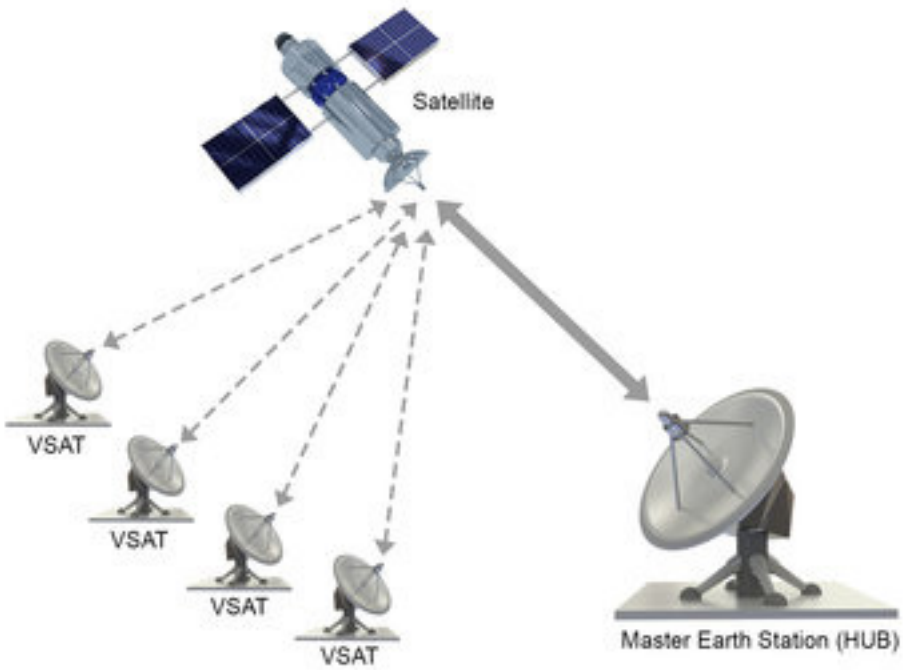
The VSAT market is estimated to be valued at US$ 13.95 billion in 2025 and is projected to reach US$ 22.23 billion by 2035, a compound annual growth rate (CAGR) of 12.4% over the forecast period according to The Business Research Company.

The growth in the VSAT market is driven by increasing connectivity needs in maritime, aerospace, oil & gas, and government and defense sectors. Of these sectors, the government segment has the potential for the highest growth in the next few years. From 2025–2030, the market will rise to approximately US$ 23.8 billion, adding US$ 7.7 billion, or 40% of the total opportunity, fueled by increasing adoption of broadband services in remote industrial operations and enterprise networks according to Future Market Insights (FMI). From 2030–2035, the market will increase by another US$11.5 billion, accounting for 60% of incremental growth, as satellite constellations expand and high-throughput satellites (HTS) gain traction for low-latency applications. Annual increments will grow from USD 1.3 billion in early years to US$ 2.9 billion by 2035, indicating accelerated adoption in emerging markets and defense modernization programs. Companies investing in flexible VSAT platforms, software-defined networks, and Ka-/Ku-band capabilities will capture significant value in this US$19.2 billion growth window, especially as demand for global connectivity and cloud integration continues to rise in remote and offshore environments according to FMI.

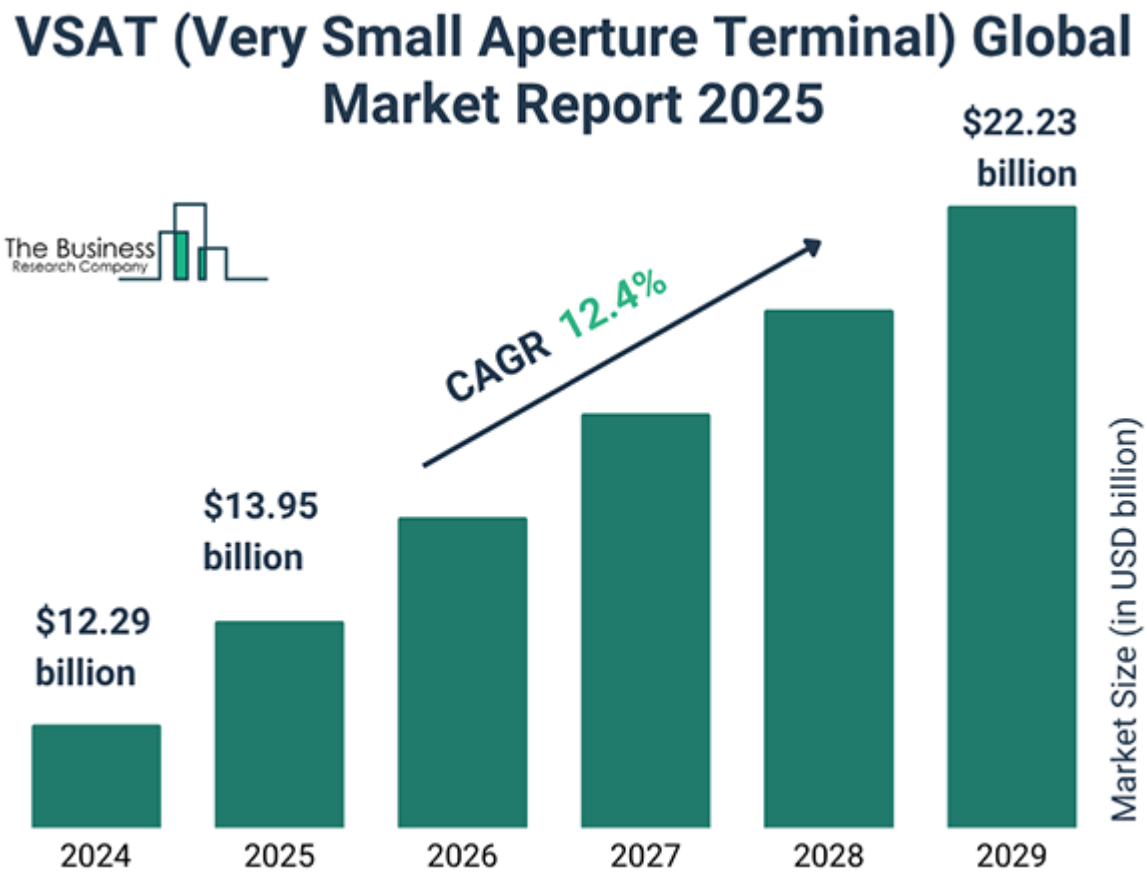
How VSAT Works

A VSAT network is a satellite communication system typically comprising of remote terminals and a central hub or teleport, which manages the network. The terminals consist of a dish antenna, a modem, and a set of equipment that facilitates two-way communication with the satellite. VSAT technology enables the transmission of data, internet, voice, and video at high speeds, making it ideal for areas where traditional wired communication infrastructure is limited or nonexistent.

VSAT networks can be one of two topologies: a Star or a Mesh network. The star network is the most commonly used topology for both unidirectional and bidirectional networks providing much greater flexibility. This network allows transmission of information in both directions but



VSAT Network Star Topology (image courtesy of EEWEB)



cannot be transmitted directly from one VSAT to another. All information is routed through the hub station. See the case study on page 8 for an example of a star network solution.

In a mesh topology, there are multiple paths for data transmission as each terminal is connected to at least two other terminals, ensuring built-in redundancy. Mesh networks can be complicated to manage compared to star networks and would require more investment in equipment.

VSAT networks have been widely adopted primarily due to its ability to provide a uniform level of services to many disparate sites spread over large geographic areas. With a VSAT network you can be assured of the same level of service and reliability using uniform equipment from point to multipoint, even beyond national borders, across continents. There doesn't even have to be any infrastructure in the remote site. VSATs can be installed almost anywhere. VSAT networks are a very cost-effective way of connecting various remote sites compared to other terrestrial networks such as cable or fiber. VSAT networks are also highly scalable, making it easy to expand the network as the demand for connectivity increases.

Government Applications

The cost-effectiveness, scalability and reliability of VSAT networks for connecting multiple sites provide distinct advantages for the government market. As mentioned earlier, the government/defense segment is one of the fastest growing segments of the VSAT market.

Some of the key applications of VSATs for the government sector include the following:

- Broadband Access. Hard to believe but in this day and age there are still almost four billion people, nearly half the world's population, that still don't have internet access according to the International Telecommunications Union (ITU). Governments all over the world are developing programs that will enable high-speed internet services to rural areas, providing access to essential services such as healthcare, education, and economic opportunities.

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Jarod Lopez, Executive Director-Marketing and Business Development-Es'hailSat

Jarod Lopez is an experienced senior executive with over 30 years of leadership experience in leading multi-cultural and multi-functional teams in Asia, Middle East and Africa, with the ability to ensure all functions of the organization are aligned to meet the strategic objectives. As Executive Director of Marketing & Business Development at Es'hailSat, Jarod leads the Business Development, Marketing, Product Development and Corporate Communications teams to create new business opportunities, establish partnerships, open new markets, develop products/services, and position Es'hailSat as a premium brand in the global satellite industry.

How do you see Es'hailSat's position in the key markets that you serve?

As the national satellite operator for the State of Qatar, Es'hailSat occupies a strategic and steadily growing position within our key markets across the Middle East North Africa (MENA) region. We do this by providing reliable, high-quality satellite communication solutions tailored to the evolving needs of government, enterprise, and broadcast customers. Our state-of-the-art infrastructure, such as our Tier-4 certified 50,000 sqm Teleport facility and high-powered GEO satellites Es'hail-1 & Es'hail-2 together with our commitment to service excellence have enabled us to establish strong partnerships and a trusted reputation in the Middle East, North Africa, and beyond. We are recognized for our agility in responding to market demands, our focus on robust security and national sovereignty, and our ability to deliver resilient connectivity in mission-critical environments. Through ongoing investment in technology and a deep understanding of regional requirements, Es'hailSat continues to strengthen its presence and deliver value across the sectors we serve.

Jarod Lopez

Specifically for the government VSAT market, give us an overview of your service offerings in this segment?

In the government VSAT market, Es'hailSat delivers a comprehensive portfolio of services designed to address the unique demands of public sector clients. Our offerings include secure, dedicated satellite connectivity for government agencies, supporting applications such as confidential communications, emergency response, mobility services, and remote site connectivity. We leverage advanced VSAT technology to ensure robust network reliability, high data throughput, and scalable bandwidth options—enabling critical command-and-control oper-

ations, field deployments, and real-time information sharing across dispersed locations. Our network architecture is engineered with multiple layers of security and encryption, meeting stringent national and international standards to safeguard sensitive data. This is evident in our multiple certifications such as ISO 45001:2018 certification for Occupational Health and Safety Management Systems and ISO 20000-1:2018 for IT service management systems. Subsequently, this has been followed on by ISO 14001:2015 certification for Environmental Management Systems and ISO 9001:2015 for Quality Management Systems. Building on these capabilities, we provide tailored network management, proactive monitoring, and 24/7 technical support, ensuring mission-critical government operations receive uninterrupted service and rapid response. Es'hailSat's deep understanding of governmental priorities allows us to adapt service levels and solutions to each client's operational environment, empowering agencies to operate with confidence in any scenario.

What differentiates your services from your competitors? Why would they choose Es'hailSat over other options?

Es'hailSat's government VSAT services stand apart from competitors through a combination of technical innovation, robust security, and client-centric flexibility. Our satellite solutions are purpose-built to exceed the rigorous standards demanded by government customers, integrating multiple layers of encryption and compliance with both national and international security protocols. For example, our Es'hail-2 satellite has inbuilt anti-jamming capabilities which has already proven to be popular with public broadcasters across the MENA region. We differentiate ourselves by offering highly resilient connectivity that maintains operational integrity even in challenging or remote environments—supported by our state-of-the-art infrastructure and a commitment to uninterrupted service.

Furthermore, Es'hailSat's bespoke network management and proactive technical monitoring ensure that government agencies receive not just connectivity, but a partnership focused on reliability and rapid response. Our teams work closely with each client to customize solutions that match specific operational needs, whether for emergency response, field deployments, secure communications, or mobility initiatives. This adaptability

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empowers agencies to remain agile in dynamic scenarios, confident that their data and missions are protected at every stage.

Clients choose Es'hailSat over other providers because of our proven track record, deep regional expertise, and our dedication to service excellence. Our focus on fostering long-term relationships, understanding nuanced governmental priorities, and delivering tailored support distinguishes us in the marketplace. Ultimately, Es'hailSat offers peace of mind, knowing that critical operations are backed by a partner invested in their success.

What requirements are your clients demanding for your government VSAT products and services and how are you meeting these requirements?

Es'hailSat's government customers consistently demand solutions that prioritize robust security, exceptional reliability, adaptable bandwidth, and seamless performance in mission-critical scenarios. The requirements encompass secure data transmission protected by advanced encryption standards, uninterrupted connectivity across geographically remote or challenging environments, scalable network architecture to accommodate evolving operational needs, and compliance with stringent national and international regulations regarding confidentiality and data sovereignty.

To meet these demanding specifications, Es'hailSat employs a multilayered approach. Our VSAT infrastructure is engineered with state-of-the-art encryption and security protocols, ensuring the protection of sensitive communications against any potential threats. We provide resilient connectivity backed by a Tier-4 certified Teleport facility coupled with redundant systems

Es'hailSat's 50,000 square meter teleport located on the outskirts of Doha in Qatar recently received Tier-4 Certification from the World Teleport Association (WTA). Tier-4 is the highest level of excellence recognized by the WTA. (image courtesy of Es'hailSat)

and proactive network management, guaranteeing high uptime and rapid recovery in the event of disruptions. Bandwidth options are tailored to each agency's requirements, allowing for scalability as operations expand or change—whether supporting emergency response, field deployments, or the secure transmission of government data.

Additionally, Es'hailSat's dedicated support teams offer 24/7 monitoring and technical assistance, empowering government agencies with immediate response, multi-lingual support and expert guidance. By deeply understanding the operational environment and priorities unique to the public sector, we are able to customize our service levels and solutions, delivering confidence and continuity for every mission. With a steadfast commitment to compliance, innovation, and client partnership, Es'hailSat ensures that governmental clients' needs are not only met, but anticipated and addressed with precision.

Can you cite an example of a successful implementation of VSAT service for a government client?

A strong example of Es'hailSat's capabilities can be seen in a recent project for a government entity that sought to enhance secure connectivity across remote onshore and offshore locations. By deploying a private mobile VSAT network using advanced Ka-band technology and a centralized hub, the initiative enabled high-availability communications—including real-time video, secure TETRA radio, and IP-based data—across multiple fixed and mobile sites. The modular, rapidly deployable system featured robust encryption, redundant hardware, and environmental protections, ensuring uninterrupted, secure operations even in harsh field conditions. This solution not only bridged critical connectivity gaps but also empowered field teams with reliable, scalable, and user-friendly communications tailored to mission-critical scenarios.

Anything else you would like to add?

Looking ahead, Es'hailSat remains committed to pioneering the next wave of government VSAT innovations by harnessing emerging technologies such as non-geostationary satellite systems (NGSOs), AI-driven network optimization, and advanced cybersecurity defenses. As the demands of governmental agencies evolve, we anticipate integrating multi-orbit architectures to deliver even lower latency and enhanced global reach. Our investment in research and collaboration with technology partners will ensure that Es'hailSat's government clients stay at the forefront of secure, resilient, and intelligent satellite communications—empowering their missions in an increasingly interconnected and complex world.

- Education. In many countries, particularly in developing regions many of the schools are situated in the more remote areas. Traditionally, access to education has been limited by factors such as infrastructure, geographic isolation, and socio-economic barriers. Satellite technology can level the playing field by breaking some of these barriers. Connecting schools in remote areas enables institutions to transmit lectures, courses, and educational resources directly to students who might otherwise have limited or no access to such materials.

- Telemedicine. Lack of access to healthcare and medical services in rural and remote regions is a major issue in many countries. VSATs can provide crucial communication between remote specialists and local medical staff engaged in on-the-ground healthcare. With high-speed connectivity, test results, diagnostic images and videos can be transmitted enabling rapid diagnosis and assistance. Connecting these remote areas will also provide access to vital health information that can aid government agencies in planning health strategies and allocating resources to areas that need it the most.

- Disaster Response. Natural disasters such as earthquakes, hurricanes, fires and floods, all too results in disruption of communications services on the ground. Mobile VSAT installations can be used to set up local WiFi hotspots, enabling first responders and Non-Governmental Organizations (NGOs) to communicate with each other and the outside world, facilitating relief efforts. Those Wifi hotspots, can also be used by residents impacted by the disaster, to communicate with concerned family and friends.

VSAT networks can be relatively cost-effective to install in remote areas where there are no other communications infrastructure, thus providing vital access to to information and other services.

- Defense. Tech Insights forecasts that global military VSAT expenditure will approach US$ 1.9 billion by 2031, a ten-year CAGR of 3.8%. Combat aircraft will be the largest segment in military VSAT expenditure. This growth is fueled by increasing bandwidth demand amid increasing air to air and air to ground network connectivity and uptake of software-defined digital and solid-state technologies.

Managed Network Services

Designing, installing and managing a VSAT network involves meticulous planning and requires a high level of technical expertise. It is vital that one should choose carefully when looking for a service provider for VSAT network services. The key qualities to look out for include: experience, technical expertise, reliability, customer service and support, among others.

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Es'hailSat's network architecture is engineered with multiple layers of security and encryption, meeting stringent national and international standards to safeguard sensitive data.

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CASE STUDY

Private VSAT Network Expansion for Remote Connectivity

Enhancing Connectivity with Value-Added Services

Es'hailSat, Qatar's national satellite operator, delivers secure, reliable VSAT connectivity tailored for government needs, enabling mission-critical communications, high availability, and robust coverage across even the most remote locations. Es'hailSat's service portfolio for Government customers comprises of Telecom and Value-Added Services listed in Figure 1.

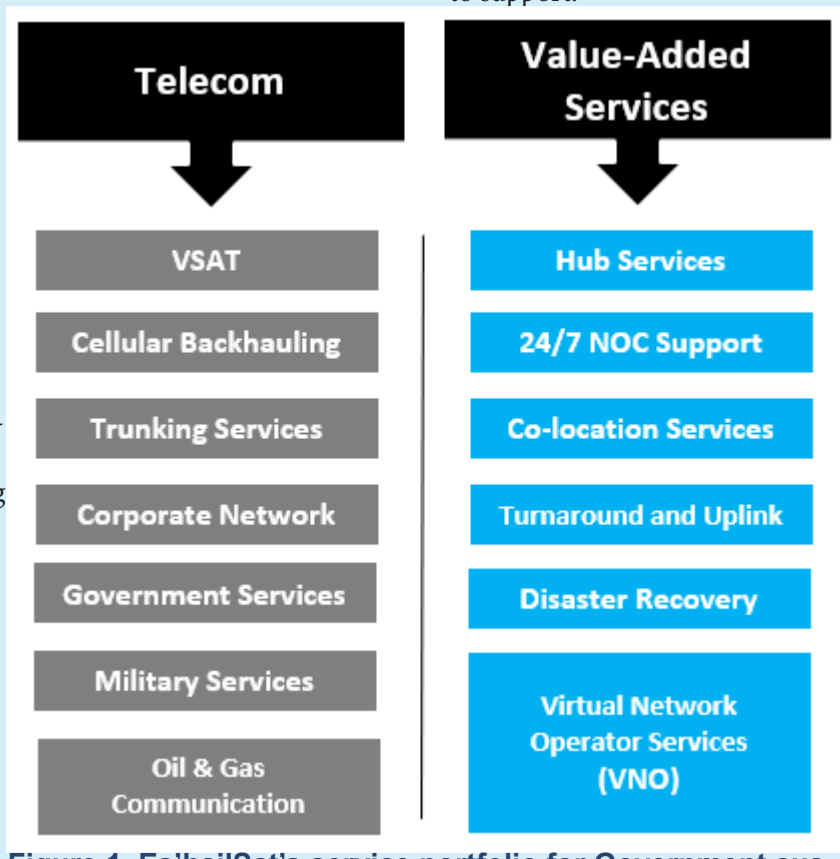


Figure 1. Es'hailSat's service portfolio for Government customers comprises of Telecom and Value-Added Services

Overview

A government entity initiated a strategic project to expand its private satellite communication infrastructure, aiming to enhance connectivity across remote onshore and offshore sites, specifically remote islands with no other connectivity options available. The initiative focused on deploying a mobile VSAT (Very Small Aperture Terminal) network to support critical communication services, including video, voice, and data, in areas lacking terrestrial infrastructure. The project leverages Ka-band satellite technology and a centralized hub to ensure secure, resilient, and scalable communication.

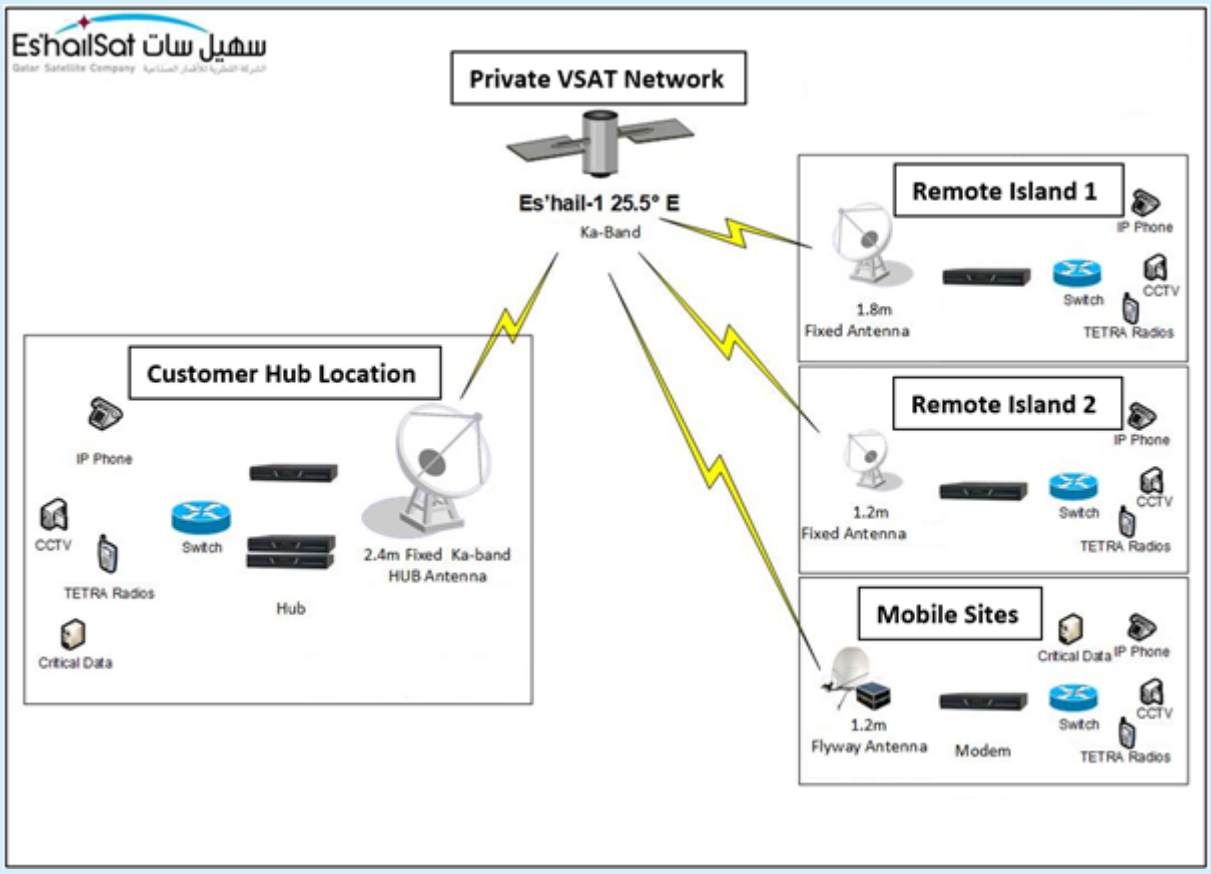
Objectives

The primary goal was to establish a robust and secure communication link between a central hub and multiple remote sites—both fixed and mobile. The network needed to support:

- Real-time video surveillance and conferencing
- TETRA radio traffic for secure voice communication
- IP telephony and data applications
- Inter-site communication among mobile units
- High availability and encryption standards
- Rapid deployment and ease of use in field conditions

Technical Architecture

The network architecture follows a point-to-multipoint (STAR) topology, with a centralized hub operated by the end user to securely operate & manage traffic to and from remote terminals. The system operates over the Ka-band, utilizing a regional satellite beam that provides broad coverage across the Middle East and North Africa (MENA) region.



The central hub is equipped with high-power amplifiers and redundant low-noise block converters (LNBs) to ensure uninterrupted service. It integrates a DVB-S2X/TDMA platform capable of supporting multiple mobile terminals simultaneously. The remote terminals include both fixed and mobile units, with mobile sites using lightweight, quick-deploy flyaway antennas.

Deployment Strategy

The project was rolled out in two phases:

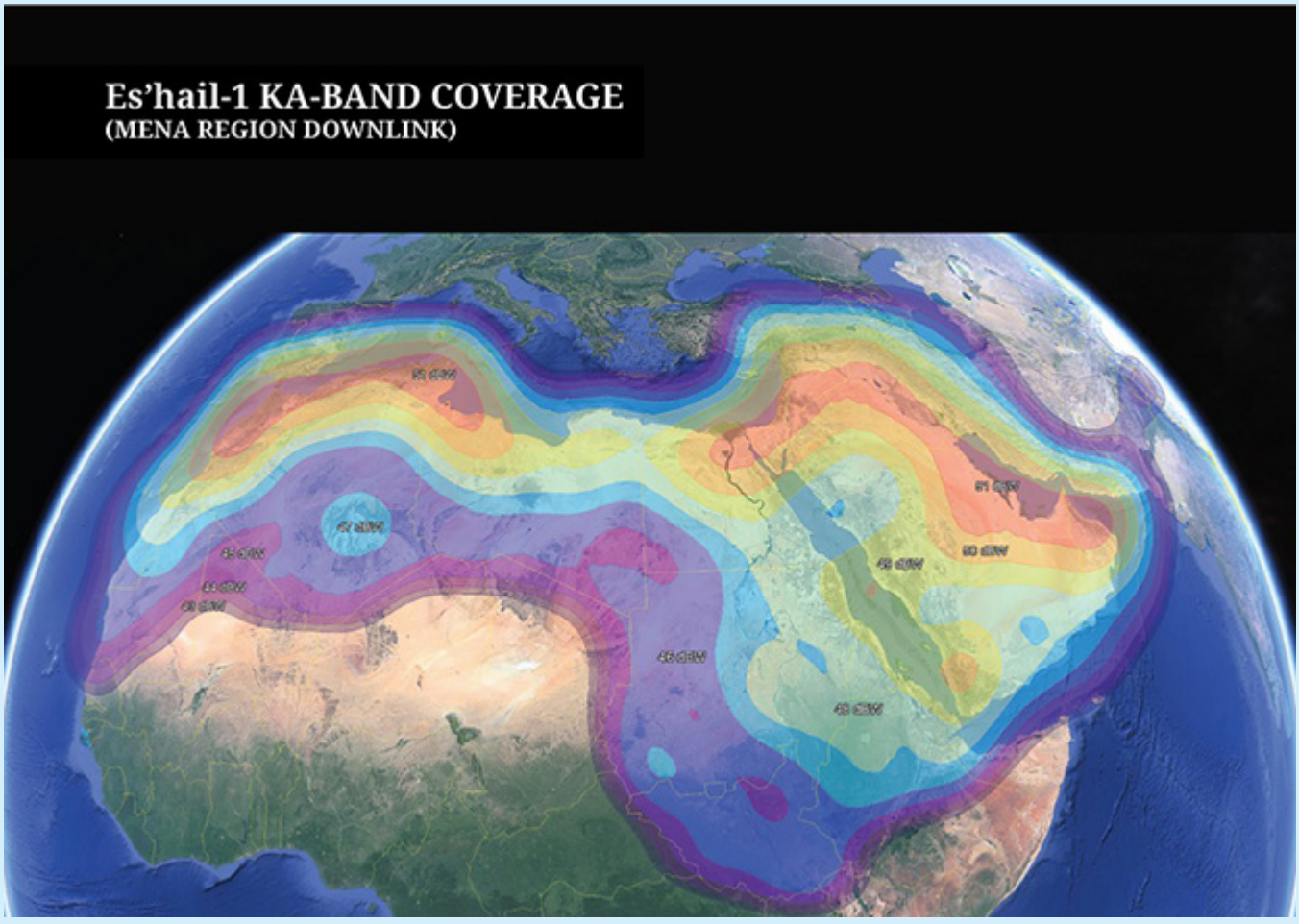
1. Fixed Site Integration: Two existing fixed sites were upgraded with modern modems and integrated into the new network. These sites serve as stable communication anchors and are equipped with 1.2m and 1.8m antennas.

2. Mobile Site Expansion: Six mobile units were introduced, each equipped with 1.2m flyaway antennas. These terminals are designed for rapid deployment and can be operated with minimal technical expertise. Two antenna options were offered: one with automatic satellite acquisition via a mobile app, and another with manual alignment assisted by a smart device.

Each mobile site was able to support a bandwidth of up to 50 Mbps downlink and up to 10 Mbps uplink, sufficient for simultaneous video, voice, and data transmission.

Key Features

- Mobility and Flexibility: The use of flyaway terminals allows for rapid setup and teardown, making the system ideal for emergency response, temporary deployments, or shifting operational needs.
- Security and Reliability: The network employs AES 256-bit encryption and redundant hardware configurations to maintain secure and continuous operations.
- Scalability: The modular design supports future expansion, with options to activate additional mobile sites or increase bandwidth as needed.
- Environmental Resilience: Equipment was housed in protective enclosures to withstand high temperatures and harsh field conditions.



- Self Reliance: Es'hailSat offered comprehensive training to the end-users so they can operate the system on their own.

Impact

The deployment of this private VSAT network significantly improved operational capabilities on remote islands. It enabled real-time coordination, enhances situational awareness through video feeds, and ensures uninterrupted communication for field personnel. The system's flexibility and ease of use have reduced the logistical burden of deploying communication infrastructure in challenging environments.

Conclusion

This project exemplifies how modern satellite communication solutions can bridge connectivity gaps in remote and mission-critical scenarios. By combining advanced satellite technology with user-friendly deployment tools, the initiative has delivered a resilient, secure, and scalable communication network tailored to the unique needs of remote operations.

For more information on Es'hailSat's service offerings go to: www.eshailsat.qa

Es'hailSat will be exhibiting at the IBC 2025 in Amsterdam, the Netherlands from September 12-15, 2025. Visit their stand at: Hall 1, booth # F.68

The company has multiple certifications including ISO 45001:2018 certification for Occupational Health and Safety Management Systems and ISO 20000-1:2018 for IT service management systems. Subsequently, the company received ISO 14001:2015 certification for Environmental Management Systems and ISO 9001:2015 for Quality Management Systems.

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Es'hailSat

Es'hailSat, a Qatar-based satellite communications company currently operates two satellites, Es'hail-1 and Es'hail-2, covering the MENA region. The company's main hub is a 50,000 square meter state-of-the art teleport located in Doha. The teleport has recently been awarded Tier 4 certification from the World Teleport Association (WTA). Tier-4 is the highest level of excellence recognized by the WTA.

The company is well on its way towards becoming a global satellite operator with the planned launch in the next few years of the Es'hail-3 satellite, extending the company's coverage beyond the MENA region.

Es'hailSat's VSAT services provide high-speed, resilient communication via Ku-band and Ka-band satellites, ensuring secure data transmission for government operations in remote, maritime, and mobile environments.

Among the key advantages Es'hailSat offers to its VSAT clients include:

- Excellent satellite footprint across the MENA region.
- Disaster recovery readiness with two satellites.
- Data Security. Supports encryption standards from IPSec VPN to Quantum-Safe Cryptography. Es'hail-2 satellite provides greater capability for anti-jamming protection.
- End-to-End Managed Service with 24/7 Support. The offering includes hardware provisioning, installation, network monitoring, and proactive maintenance, supported by certified field engineers and round-the-clock technical assistance.
- 24/7 dedicated VSAT Operations team andNetwork Operation Center.
- Customizable Bandwidth and Service Level Agreement (SLA) Options. Government clients benefit from flexible bandwidth plans and SLAs tailored to mission-critical needs, with the ability to scale or reassign bandwidth from a secure pool.
- Flexible Service Plans. Dedicated vs. shared bandwidth, on-demand allocation.
- SLA compliance tracking and reporting.
- Integration with Terrestrial and Cellular Networks. VSAT solutions are designed to integrate seamlessly with existing telecom infrastructure, supporting applications such as cellular backhaul, disaster recovery, and military-grade communications.
- Strong & strategic partnership with local telecommunication operators. This facilitates the integration of satellite communication with the terrestrial services.
- Operational Efficiency and Cost Optimization. Through optimized engineering design, Es'hailSat ensures high quality of service and low contention ratios, enabling significant cost savings without compromising performance. Ensuring predictable performance for high-priority government missions. Offers cost-saving models, including bandwidth pooling across agencies and seasonal scaling.

All of the above, are vital considerations when evaluating a VSAT service provider.

Virgil Labrador is the Editor-in-Chief of Los Angeles, California-based Satellite Markets and Research which publishes a web portal on the satellite industry www.satellitemarkets.com, the monthly Satellite Executive Briefing magazine and occasional industry reports called MarketBriefs. Virgil is one of the few trade journalists who has a proven track record working in the commercial satellite industry. He worked as a senior executive for a teleport in Singapore, the Asia Broadcast Center, then-owned by the US broadcasting company CBS. He has co-authored two books on the history of satellite communications and satellite technology. He holds a Master's in Communications Management from the University of Southern California (USC). He can be reached at virgil@satellitemarkets.com

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