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Volume 19, Issue 4

Enabling 5G Mobility with Satellite Connectivity

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As the rollout of 5G coverage accelerates to include much of the world's inhabited areas, mobile network operators (MNOs) rely on satellite connectivity to support the development and deployment of the technology. As the next generation of satellite networks takes hold, the advantages of satellite will be even more profound—namely in the ubiquity, resiliency, and mobility of these networks.

More specifically, geostationary earth orbit (GEO) satellites cover large geographic areas from a fixed point approximately 36,000 km above the equator, synchronized with the earth's orbit. GEO platforms cover one area predictably and efficiently, allowing for overlapping areas of coverage to create a network for uninterrupted connectivity. A small network of satellites can, as a result, cover most (or all) of the Earth's inhabited surface (a much more cost-effective solution than terrestrial networks) and provide the ubiquitous coverage necessary for 5G rollout.



Cybersecurity for satellite networks

Space-based systems are the ideal solution for mobile connectivity. Vehicles like ships, planes, and trains are all beneficiaries of the seamless coverage provided, and the advantages only grow within the evolving 5G world.

Intelsat recognizes the importance of a secure network that customers can trust throughout all phases of data transmission, from teleports on the ground to satellites in the sky. In the network industry, the inherent risk of connecting the world is not lost on us.

Last February, an attack on European ground infrastructure left tens of thousands of people without Internet for more than a month. More critically, the cyberattack plunged some of Ukraine's defense communication systems into darkness as Russian forces began their invasion of the country.

Following the attack, the European Union released a joint statement attributing the attack to Russia. Later, a team of researchers determined that the attack was likely caused by a new Russian malware strain known as “AcidRain.”

We believe that it is all operators’ responsibility to ensure such an attack on any part of their network can never succeed. More than ever, cybersecurity must be built to the highest standard.

Cybersecurity is too complex and disruptive to rely solely on internal security reviews, as even the best internal cybersecurity professionals can miss threats that another team can identify. The Service Organization Control 3 (SOC 3) cybersecurity accreditation, certified by an independent auditor, provides unparalleled protection of sensitive communications, keeping customers safe from unauthorized access or jamming. This enables operators to enforce the highest standards of network security laid out by the National Institute of Standards and Technology (NIST).

Also, this new elevated threat level requires a multilayered approach across the entire satellite ecosystem. Simply securing the satellite isn’t enough. As the attack in February exemplifies, all parts of the network, including the ground infrastructure that sends and receives data to and from satellites, are equally critical in creating a safe and secure network.

Creating a safe and secure satellite network

First, an information security program is needed to ensure prevention and restoration throughout the satellite, ground, and network infrastructure to enhance resilience and mission assurance. This program should be centrally managed by the information security team, which holistically reviews information security to ensure confidentiality, integrity, and availability throughout the entire operating environment.

Securing the ground network, which is the framework by which data is transmitted from customers to the satellite, to International Organization for Standardization (ISO) 27001/27002 standards—among the world’s best-known standards for information security management systems—is the assurance of a strict risk management policy put in place to control and address any potential risk.

The 24/7 monitoring operated by teleport activity requires a fully redundant infrastructure. In the event of outages, whether planned or unplanned, at least three paths to most points of presence on the network should be maintained. As data is transmitted to the satellite, Transmission Security (TRANSEC) guidelines outlined by

NIST help prevent interception, As data is transmitted to the satellite, Transmission Security (TRANSEC) guidelines outlined by NIST help prevent interception, disruption of reception, communications deception, or derivation of intelligence to and from our satellites.

An additional safety measure is for satellites to adhere to the U.S. Space Force’s Commercial Satellite Communications Office’s (CSCO) Infrastructure Asset Pre-Approval Program (IA-Pre), which affirms satellites are suitable for mission-critical military use.

As data returns from the satellite to the ground infrastructure, data security should remain a key focus from the point where teleports receive it until it is handed off to a customer data center. Once again, the security standards in place for the ground infrastructure network safeguard information all the way to the customer.

Enabling mission-critical satellite connectivity

These rigorous security standards, practices, and precautions are why mission-critical connectivity can be provided when people and organizations need it most.

On the ground, it allows operators to deploy connectivity solutions in parts of the world where terrestrial infrastructure isn't an option, helping to connect some of the most remote and hard-to-reach areas around the world, from rural parts of the U.S. to South Africa.

Satellite technology also plays a critical role when disaster strikes. In August 2021, when a magnitude 7.2 earthquake struck southern Haiti, terrestrial communication networks in the country suffered severe damage. Terminals were sent to the impacted areas immediately to provide reliable, easy-to-use, high-speed connectivity.

When disaster struck in the U.S. this year with Hurricane Ian, terminals sent to the Ft. Myers area provided Floridians with the network they needed for critical early recovery efforts.

Partnerships with MNOs help service the First Responder Network Authority (FirstNet) to remote areas of the U.S., focused on providing high-speed secured broadband connectivity to first responders and emergency services, ensuring they get the most up-to-date information when they need it most.

In the skies, satellite networks help keep air travelers connected to what's important to them. Satellites power seamless in-flight connectivity no matter where passengers are going, whether flying private or commercial.

At sea, maritime operators rely on satellite connectivity to optimize their operations and improve the passenger experience. Advanced, high-bandwidth applications can be incorporated into the operations of vessels of all types, whether commercial or recreational, allowing them to stay connected while navigating the globe with those onshore at all times.

Powering the future of satellite connectivity

For commercial ships, satellite networks combine the needs of professional shipping companies and the people on board into an efficient solution.

End-to-end solutions such as Intelsat FlexMaritime integrate global fleets with their on-shore operations for 24-hour location tracking, remote monitoring, ship performance diagnostics, software upgrades, and management of cargo deliveries. But the future of connectivity at sea includes connecting everyone on board a ship throughout a cargo ship's journey. Crews get access to unparalleled communication and entertainment on board.

Crews are now able to use high-speed connectivity for document transmission and applications like telemedicine, video conferencing, web browsing, streaming, and social media.

Since the launch of FlexMaritime in 2017, we have become the leading provider of broadband connectivity for maritime passengers and crew. With more than 10,000 ships on our network, Intelsat has proven that we can connect vessels across the globe. Even a sailing adventure to the most

remote parts of the world won't mean a sacrifice in coverage or quality.

Whether on land, in the sky, or at sea, satellite operators are prepared to usher in the next generation of mobile connectivity with 5G. Just as in today's networks, space-based systems will facilitate 5G broadband connectivity to underserved areas where terrestrial infrastructure isn't feasible. The same goes for 5G infrastructure at sea or onboard aircraft.