

Gaining the Operational Advantage

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How do you translate innovative satcom technology into an operational advantage? This is a key question for many Asian countries in the face of COVID-19 and increasing regional tensions. In this article, ST Engineering iDirect's Head of International Government Strategy, Koen Willems sets out a roadmap towards information assurance, seamless operations, agility, maximum situational awareness and strategic advantage and demonstrates how speed of innovation equals successful operations when executed in a rigid and reliable way.



Despite a turbulent and completely unprecedented 12 months with economies hit hard by the COVID-19 pandemic, defense spending has continued to increase in the Asian region. The Military Balance report, produced by the Center for Strategic and International Studies, noted that global defense spending increased by 3.9% to US\$1.83 trillion despite the economic downturn that has affected countries across the world.

Geopolitical tensions in the Asian region are stoking this increased defense spend. Countries such as China, India, Australia, New Zealand are looking to increase their capabilities, but so are smaller countries such as Vietnam, Singapore, the Philippines, Bangladesh Indonesia and South Korea in response to territorial tensions and to increase their overall security. However, governments are also looking to create more opportunity for social inclusion, to aid government-run businesses and also to bolster Universal Service Obligation (USO)-funded projects to grow state infrastructure and to respond to social needs – something that has been magnified significantly through the COVID-19 pandemic.

Governments must be prepared, both in peacetime and wartime, and therefore the requirement to put the appropriate systems into place is perennial. Surveillance, imagery, communication and navigation capabilities and the ability to connect headquarters to regional command centers, surveillance centers and outposts are essential. Then there is the capability to support different operations that are both fixed and mobile such as UAV platforms, missile systems and forces operating on land, at sea and in the air.

The Government and Defense market has always relied on satellite communications, and this is only set to increase in the future. Mordor Intelligence projects a CAGR of 6.9% in the period between 2020 and 2025. Satcoms are used across the breadth of the defense industry, right across the world. From surveillance and tracking to remote sensing and disaster recovery, satellite is essential in enabling government and defense organizations to see the bigger picture and to access connectivity in the most remote and hostile regions of the world.



The commercial satellite sector is a critical source of bandwidth, products and services for Defense users who are looking for high performance and efficiency. As nations look to build satellite networks or replace decommissioned satellites, new programs provide the opportunity to adopt the latest satellite and ground segment technologies and find the right mix of capacity types to give them the operational advantage needed for successful missions. Building coverage and network diversity while guaranteeing the latest military-grade security standards offers

nations a high level of redundancy, flexibility and security to meet the needs of a multi-layered, secure and resilient next generation defense network.

Increased innovation

Such a network can lead to information assurance by getting information quicker and at higher quality and granularity and by making sure an adversary has not blocked or intercepted that information. Advanced security standards, specialized enclosures, national waveforms and other improvements have been created for defense organizations to better their operations. The commercial satellite sector has also undergone an immense transformation, with highly efficient waveforms for greater performance, very high throughput satellites (VHTS), new non-geostationary (NGSO) constellations, network integration across access technologies and other key innovations. Defense agencies must harness all these innovations to ensure operational advantage at all times. They must plan now for their next-generation, secure and resilient network that will guarantee success in their most critical operations.

In order to gain an operational advantage, a flexible, multi-layered, secure network must be established. This can be achieved through the adoption of innovative and emerging satellite and ground segment technologies to create the most effective mix for different missions.

Dynamic Coverage: Connectivity Anytime, Anywhere

Coverage must be dynamic enough to meet the diverse needs of regions and global deployments and this could involve a combination of sovereign and allied satellite capacity on commercial and military satellites to facilitate different connectivity requirements. With dynamic coverage, military organizations can ensure critical operations run smoothly, whether they require low bandwidth at a fixed location or high-bandwidth rates on the move.



When planning their capacity, military network operators should look for a satellite platform that can handle dispersed operations' network complexity with a mix of capacities and global

connectivity to fixed, on-the-move (OTM) and on-the-pause (OTP) assets. The ideal platform should allow military network operators to customize their connectivity networks to efficiently optimize bandwidth and prioritize critical applications while ensuring continuity of service to provide a seamless end-user experience.

Providing Maximum Performance and Efficiency for Information Superiority

Information superiority is key in military operations. Massive amounts of data are sent back and forth across military networks to provide instant situational awareness for intelligent decision-making. Bandwidth-hungry applications such as ISR video and sensors consume tremendous capacity on the satellite transponder. Strategic communications — as well as demands from emerging 5G, machine-to-machine (M2M) and Internet of Military Things (IoMT) sensors and devices — will further increase bandwidth consumption. Military network operators will need to employ the latest VSAT and waveform technology advances to maximize throughput and efficiency.

They can do that by making sure their satellite and ground segment technologies work hand in hand. Although considerable focus is placed on the impact of new NGSO satellite constellations, an innovative VSAT platform is also essential to ensure ongoing adaptability to changing environments and to achieve higher spectral efficiency and throughputs at maximum service availability.

Agility: One Platform for Multiple Applications

Military leaders want better, quicker, more detailed and continuous information to make informed decisions, maneuver more swiftly and always gain the tactical upper hand. This operational superiority can be best achieved by combining network performance with flexibility: in other words, by deploying anywhere, anytime and by connecting concurrent operations to a centrally managed satellite network.

A truly agile network can respond to changes in operations quickly and effortlessly. This means a network operator can quickly groom capacity and reconfigure their satcom network for quick redeployments with the latest innovative features onboard the VSAT platform. Software-defined modems increase flexibility by supporting over-the-air upgrades, seamless compatibility for new capabilities and easy configuration for new operations.



Security and Resiliency

The defense sector in particular is a prime target for both cybersecurity threats and intentional and unintentional signal interference. With the digitalization of the battlefield has come increased risk. Security systems must therefore have the capability to predict, detect, prevent and mitigate the mix of threats that could hamper operations.

For interference detection, a network management system, spectrum monitoring and geolocation services can identify potential threats. A spectrum monitoring solution can further detect any anomalies by pooling together bandwidth and comparing current conditions against a defined carrier plan. Geolocation can determine the latitude and longitude of an interfering signal and provide actionable intelligence by isolating and characterizing the source of interference.

When a security threat occurs, a proper mitigation response is needed. Signal excision technology and network diversity can help users swiftly leverage another network capacity to ensure persistent communications.

For prevention of future threats, transmission security (TRANSEC) and information assurance capabilities can ensure that systems remain resilient. TRANSEC technology keeps communications, and ultimately military operations, safe and secure as they transmit sensitive data over the airwaves.

Finally, prediction of future interferences and threats can be done by evaluating and understanding network activities, looking at historical data and ensuring rapid response to adjust for any inconsistencies.



Joint Operations Support

For military organizations, it can be essential to share intelligence and information across government organizations, with partners and with allied governments during joint operations. Interoperability is a key enabler for the conduct of effective, collaborative, multiservice military operations across a wide range of scenarios.

Pooling and sharing satellite platforms built around a centrally managed network system can provide more flawless connectivity to regional or global operations across different nations' military agencies during a joint operation. Interoperability can be achieved when different nations use a common waveform standard (such as DVB-S2X) or the same military waveform (such as the European Protected Waveform).

Ease of Use

Expertise for satellite communications is becoming less common among military agencies in several nations, and not every operation can afford to send a satellite communications engineer on every deployment. However, with each layer of complexity, the VSAT networks that many military organizations are building stand at an increased risk for security breaches or

mistakes that could create satellite interference and potentially hamper operations. In most cases, the human factor is the weakest link in the security chain.

The quicker a terminal is up and running, the quicker deployed military personnel can focus on their core operational tasks. Terminals optimized for size, weight and power (SWaP) for ease of portability as well as rapidly deployable flyaway terminals are ideal for OTM and OTP applications. Remote commissioning tools allow a warfighter to point and set up the VSAT terminal through a comprehensive graphical user interface (GUI) and automated pointing procedures available on a PC or mobile device. After the terminal is pointed accurately, the network, autocommissioning and authentication management will take over automatically and provide internet connectivity in a matter of minutes. This process ensures each terminal performs optimally, thus maximizing efficiency and reducing interference and implementation risks.

Ready to evolve

At ST Engineering iDirect, we are pioneering a future that will see a multi-layered security and resiliency networking platform. Our platform can connect to different sources of satellite capacity whether they are sovereign or allied military bandwidth, governmental or commercial capacity or services, regardless of orbit and enable multi-layered security and resiliency to provide redundancy in case of interference or jamming, paired with the latest security technologies.

With so much evolution happening within and outside of the satcom industry, technology providers must ensure that they provide the high performance, highly secure defense networks that are so critical today, but to have one foot firmly in the future to ensure that we are agile and ready to evolve with our customers' networks whenever they are ready.

Koen Willems has +20 years' experience working in different technology industries. Before joining ST Engineering iDirect (Europe) CY n.v. (formerly known as Newtec) he was Product Marketing Manager for Europe at the electronics giant TOSHIBA. Currently Koen holds the position of Head of International Government Market & Strategy with focus on the global government, defense and humanitarian satcom markets at ST Engineering. In this role Mr. Willems is in charge of developing and defining the strategy for the government and defense market worldwide for ST Engineering as well as supporting large programs. More recently Koen received the degree for 'High Studies in Security and Defence' at the Belgian Royal Higher Institute for Defence as well as the degree for the SERA program (European Session for Armament Officials) which focusses on European defence acquisition regulation, challenges and procedures at the French National Institute of Higher Defense in Paris.