Mobile satellite terminals ● ●

The battlefield has become increasingly mobile and sophisticated over the last 100 years, necessitating increasingly mobile and sophisticated communications solutions. Satellite continues to play a key role, with advanced, mobile terminals enabling reliable, secure and assured communications.

Amy Saunders, Editor, Global Military Communications

Mobile satellite terminals have proven a game-changing technology in a massive range of industries across the world; whether we're talking about commercial aircraft flying at 35,000ft, shipping vessels in the middle of the ocean, or scientists exploring remote and rural locations, having instant access to information on the go has never been more important, nor more possible.

The first commercial mobile satellite service (MSS) system was brought into being in the 1970s in order to address the urgent needs of the maritime community. In the following decades, as mobile satellite terminals have become increasingly advanced and low cost, and the demand for constant connectivity-on-the-move has skyrocketed, the MSS sector has really come into its own. The oil and gas, disaster recovery, agriculture and remote healthcare industries, among others,

have benefited immensely from this enhanced connectivity. However, it's difficult to highlight a sector that has made better use of mobile satellite terminals than the defence industry.

The mobile battlefield

The battlefield has always been mobile, of course, but it has not always had access to reliable, secure and assured communications on the move. Before the technological revolution, battlefield communications were relayed by messenger, flags, smoke signals, drums or trumpets; such communications were exceedingly simple, such as 'attack' or 'retreat' by necessity, usually required line of sight, and were far from instant. Radio communications, with message sent via Morse code, were introduced in the late 1800s, although security was a clear and common problem.

With the advent of satellite communications systems in the twentieth century, battlefield communications were completely revolutionised. Complex messages could be sent securely between commands and across the globe, without line of sight, extremely rapidly, and whilst on the move. Indeed, with ground forces operating in an increasingly sophisticated and fast-moving environment, effective satellite communications have become critical to mission success.

As warfare has modernised, mobility has become a key element in the battlefield communication sphere. With skirmishes being fought all over the world, and often in remote, rural or unconnected locations, it's important the communications equipment be highly mobile, necessitating small, lightweight terminals. The commercial satellite sector has proven invaluable in advancing mobile satellite terminal technology, pushing capabilities to the very limit as efficiently as possible, much to the benefit of the defence industry.

Market developments

In such a vital market, many major satellite industry players have developed mobile satellite terminals to meet the exacting military standards; Hughes, Norsat, ST Electronics iDirect, Cubic, Cobham Satcom, Intellian, Get SAT, SpaceBridge, UHP Networks, Intelsat General Corporation, C-COM Satellite Systems, DataPath, General Dynamics, ND SatCom, etc. New products are being launched all the time, each boasting of technological advances, smaller form factors, lighter weight profiles, higher speeds.

In July 2019, Get SAT introduced its new Nano SAT-H, a very small and lightweight Ka-band terminal with an integrated BUC. The new terminal meets the requirements of military, defence and security markets that need full broadband communications – voice, video and data – in a minimum sized package to empower decision making on the constantly changing battlefield.

The result of Get SAT's development of micronized technologies, Nano SAT-H is an ultra-portable lightweight, low-profile terminal optimized on-the-move solution. Replacing a truck load of equipment, the terminal, weighing only 3.6kg including an integrated BUC, LNB and ACU, provides autonomous operation for transmission and reception of high bandwidth data-rates with any L-band satellite modem.

"Get SAT opens a new era of real-time video, audio and information flow by providing direct high bandwidth communications between ground or aerial forces and headquarters," said Kfir Benjamin, CEO of Get SAT. "The initial markets for the terminal are on the battlefield via a highly portable 'man-pack' and in the satcom system of small UAVs. Our experience in the military and security fields enables us to work closely with clients to create secure, rugged solutions that meet their distinct needs for seamless on-the-move communications."

Meanwhile, in September 2019, Intelsat General Communications (IGC) launched FlexGround, a new service that provides military troops around the world with fast, resilient and secure communications for mobility applications requiring compact terminals. FlexGround supports a range of lightweight

Nano Sat-H with radome. Photo courtesy of Get SAT

tactical and early entry user terminals, including communications-on-the-pause (COTP), manpack and emergency responder communications. It enables data, voice and video communications including the ability to meet the High Definition Full-Motion Video (HD FMV) needs of intelligence, surveillance and reconnaissance (ISR) applications. The new service delivers the following features:

- A high-performing, resilient and easily accessible network. Leveraging Intelsat's multi-layered, Ku-band network and Intelsat Epic^NG HTS platform, FlexGround delivers unprecedented data rate transmissions enabling converged data, voice and video communications to the smallest, land mobile terminals. The combination of very high data rates, between 3x and 10x the speed of existing satellite networks, and the very small terminals provide ground forces with the optimal solution for mobility without sacrificing speed.
- Unprecedented flexibility, efficiency and affordability. FlexGround also enables government customers to select among several service options, allowing them to choose a plan that is based on their data-rate usage, geographic and budgetary needs, without having to make an upfront commitment. FlexGround offers a flexible pay-as you go option that provides a budget friendly cost structure. The flexible service options provide for a full-time lease for long duration missions, or usage based on-demand service for limited-duration needs such as emergency response.
- Advanced interference mitigation capabilities. Intelsat Epic^NG satellites have smaller spot beams and an advanced digital payload which helps to quickly identify and mitigate attempts to disrupt signals in the field. Anti-jamming capabilities, combined with multiple layers of resiliency provided by Intelsat's global network, ensure always-on connectivity, secure communications, and most importantly, a layer of security for the people who depend on them.

"Our new FlexGround service ensures that tactical users in remote environments around the world can stay connected," said Skot Butler, President of Intelsat General. "The service's high data rates and open architecture enable ground forces to use a wide array of ultra-portable antennas, providing them with the mission agility they need. The flexible service plans, pay-as-you-go option, and global availability enable troops to quickly access the connectivity they need whenever and wherever necessary."

In others news, November 2019 saw Viasat's AN/TSC-241 Multi-Mission Terminal (MMT) begin the UK Ministry of Defence (MoD) Skynet satellite communications architecture assurance and certification process, which will authorize the terminal's operation on the Skynet X-band system as well as other government and commercial networks.

Viasat's tri-band multi-network software-defined MMT delivers high-quality IP-based voice, video and data networking across multiple networks in both highly contested and benign environments around the world. Using a portable terminal design, the MMT is an ideal networking solution for forward operating bases, enabling users to securely access networks and establish command post communications quickly and easily. During the 2018 multinational Saber Strike exercise, which trained US, NATO and coalition forces on security and threat preparedness, field personnel were able to use the MMT's integrated smartphone app to easily establish communications with minimal training. Other field-proven performance advantages of the MMT included: Enhanced connectivity with a small footprint; resilient, high-quality performance on multiple networks; added flexibility; and ease of use.
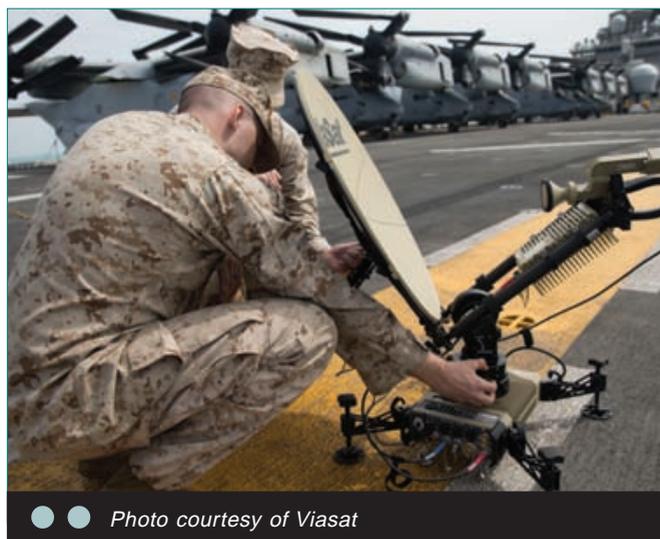
The MMT is designed to switch between both government and private sector assured, resilient, integrated networks (ARIN). In addition, the MMT's CBM-400 software-defined modem allows customers to switch between multiple waveforms as well as multiple networks and upgrade to Viasat's next-generation Ka-band network. The CBM-400 is also the first software-defined, multi-waveform, certified modem available to US and coalition military organizations.

"By certifying Viasat's MMT on the Skynet architecture, the UK MoD will be able to maintain the operational and information advantage needed in today's escalating threat environment," said Ken Peterman, President, Government Systems, Viasat. "The MMT will provide the UK MoD with easy access to secure, resilient, high-speed, multi-orbit, multi-frequency band and multi-network SATCOM architectures, which will deliver the advanced connectivity needed to integrate into the battle-network of the future."

A mobile future

Mobile satellite terminals will play a fundamental role on the battlefield for a long time to come. As such, we can expect to continue to see advances, meeting defence demands for reduced size, weight and power (SWaP) products, with increased operational and cost efficiencies, in the years (and maybe decades) to come. **GMC**

Photo courtesy of Viasat