



Companies around the world are developing SATCOM capabilities catering to governments that are struggling to provide sufficient bandwidth through military satellite constellations.

Beth Stevenson weighs up some of the options.

WGS-4 was launched in January this year, and WGS-5 and 6 are set to enter orbit in 2013.

(Photo: Boeing)

Bandwidth boost

Within the networked battlefield of modern day operations, broadband communications are essential. Such connectivity must be readily accessible to the warfighter, and SATCOM capabilities are often relied on to provide this service.

The US DoD is arguably at the forefront of SATCOM development. Its 'backbone' high-capacity satellite system, the Wideband Global SATCOM (WGS) constellation, has been operational since the first satellite entered orbit above Asia-Pacific in 2008.

Three Block I satellites are now 'operational and performing well', while WGS-4, the first of Block II, was launched in January. Boeing, prime contractor on the programme, says WGS satellites have military-specific features, such as X-band

phased-array antennas that 'enable operations in a contested environment'. Further capacity beyond WGS is offered by a range of companies offering access to commercial satellite constellations.

MORE CAPACITY

Xtar, for example, provides services for military and other government agencies 'requiring additional capacity that the WGS system cannot rapidly provide', according to Andrew Ruszkowski, VP of global sales and marketing at the company. 'With services available to all government users, two categories tend to benefit regularly – those who do not have high enough priority to receive access to WGS capacity in short supply, and users with mission-critical requirements that cannot

tolerate the risk of having to relinquish their capacity to others.'

He claimed that the company is the 'only US-based provider of commercial satellite services in the X-band frequency', providing coverage to users requiring 'much-needed' new technology that has not yet been certified for use on WGS.

Ruszkowski said Xtar's complementary service saves time and money for the DoD at a critical time of shrinking budgets and growing communications demands. The department has a 'priority system' for users to gain access to the WGS network, including allied government users, and this sometimes leaves 'important, but not critically high-priority users', without a guaranteed SATCOM service. ➤

'This includes users conducting testing and undergoing training before deployment – this role is quite important, but not the highest priority,' he continued. 'For example, National Guard units need to train before deployment and may need satellite capacity during this. In this case, Xtar's high-capacity X-band can provide the bandwidth needed when and where the user requires. Users can train with exactly the same capabilities as when they deploy, and ultimately have a seamless transition when they do get deployed and gain access to WGS.'

The company is also supporting customers where the technology or platform are not yet certified for use with WGS. 'Since this process can take several years to complete, Xtar can complement WGS at the time the users require,' explained Ruskowski. 'Airborne ISR fits into this category, as terminals and technology to support this rapidly growing critical set of applications are not yet available for use on WGS.'

■ COUNTDOWN TO LAUNCH

As noted above, the WGS satellite constellation has now entered Block II configuration, with WGS-4 launched on 19 January this year and handed over to the USAF in April. WGS-5 and 6 are planned to be launched in January and June 2013 respectively – final launch dates will be determined by the USAF 'pending launch vehicle availability', Mark Spiwack, WGS programme director at Boeing, told *Digital Battlespace*.



SATCOM can meet the need for comms on combat vehicles in remote locations.
(Photo: Xtar)



Operators access Inmarsat's network on board a ship.
(Photo: Inmarsat)

The initial Block I contract (satellites 1 through 3) and associated ground control equipment, was awarded in January 2001, and the Block II contract (satellites 4 through 6) was awarded in 2005. The Block II satellites contain an RF bypass capability that enables data transmission at rates three times greater than WGS Block I satellites,' he said. 'As is common with DoD satellite contracts, the government has incrementally increased the size of the constellation through the exercise of contract options for procurement of additional satellites.'

The Block II follow-on contract was awarded in August 2010, with an initial order for satellite 7. Satellites 8 and 9 were awarded in December 2011 and January 2012 respectively, and the USAF has indicated that satellite 10 will be awarded in the summer of 2012, according to Spiwack. He also said that satellites 8 through 10 have an 'enhanced wideband digital channeliser', providing an increase in bandwidth of over 80% from previous WGS satellites.

'Our first Boeing 702MP, Intelsat 22, was launched on 25 March 2012 and carries a hosted payload that the Australian Defence Force [ADF] will lease for UHF communications services,' explained Boeing representative Tiffany Pitts. 'We have four other satellites in production now that will carry hosted payloads – one for Intelsat and three for Inmarsat.'

According to Spiwack, international partnerships are a 'critical part' of the WGS programme, and in November 2007 the US and Australian governments negotiated an MoU to provide the ADF with access to WGS services globally, in exchange for funding to procure WGS-6.

In January 2012, a partnership was established between the US government and five allied nations – Canada, Denmark, Luxembourg, the Netherlands and New Zealand – and these partner countries will gain access to global WGS

services in exchange for providing funding for the procurement of WGS-9.

Some 275 satellites have been launched by Boeing to date, and although the company could not expand on any future plans for its SATCOM offerings, Pitts said the challenges in the market are in balancing diminishing funding for military programmes with meeting customer needs.

■ SHOWING COMMITMENT

According to Andy Beegan, senior VP and chief technology officer of Inmarsat Government, the US government has demonstrated a firm commitment to the commercial satellite industry by placing 80-90% of its satellite requirements in the company's hands for the past ten years. He said: 'Furthermore, Inmarsat Government continues to invest in its network architecture to ensure that it can meet future demand, even as that may shift quickly from region to region on a global basis.'

The company's network service delivery framework is designed to meet requirements that come ad hoc or in the form of a bulk commitment. Beegan said: 'To the extent that the government is able to make a multi-year commitment to commercial services, Inmarsat Government can provide significant cost efficiencies in delivering against those requirements.'

The company's Global Xpress next-generation Ka-band service is due to begin in 2013, with global coverage in 2014. 'It will respond to growing customer demand for higher capacity, lower cost, better adaptability and global deployability,' he explained. 'Global Xpress will deliver 5Mbps [uplink] and 50Mbps [downlink] of throughput, on 60cm antennas, so that government users will get more capability and capacity at a lower cost than the satellite-based broadband services it receives today.'



Inmarsat is developing the next-generation Ka-band Global Xpress service, due to begin in 2013. (Image: Inmarsat)

According to Beegan, employing the Ka-band frequency will give the government the flexibility of using its own WGS Ka-band service, adding Global Xpress Ka-band as needed. Inmarsat's existing L-band capability will 'reinforce the reliability' of this service as a hybrid solution, so when Ka-band is not available, 'L-band will continue communications without the user needing to procure service from another provider'.

Inmarsat Government aims to provide a single source to its customers, delivering end-to-end communication capabilities, including network, hardware, software and services, shortening the distribution path.

'Through its network, [the company] delivers bandwidth efficiency and scalability, allowing capacity to scale up or down on demand, and therefore enhancing network performance,' added Beegan. 'When looking at the ISR world where demand is growing each day, these advantages and benefits become amplified because of the very high data rates that customers require.'

INDUSTRY INCENTIVES

He explained that the problem with creating a solution from separate providers is that there is no incentive on industry to make efficient use of the spectrum. 'When the customer buys it as a service and they need a real-time video feed off an ISR platform, Inmarsat Government takes on the responsibility to make the most efficient use of all resources, optimising the spectrum required, creating cost efficiencies throughout the service delivery – ultimately, those cost savings get transferred to the government customer.'

Britt Lewis, VP of marketing and business strategy at Intelsat General, said that as the US government continues to manage its requirements with smaller budgets, commercial satellite providers are looking for ways to help meet the growing demand of various government users. The company has launched the Epic Next-Generation (EpicNG) platform that will be built into its global satellite system, supporting a range of high-powered mobile applications,

including airborne, manned and unmanned ISR, comms-on-the-move and manpacks.

'The globalisation of intensive US military operations has caused bandwidth requirements to soar, particularly for mobility applications,' explained Lewis. 'The limited availability and reliability of terrestrial networks have made satellites the foundation of critical government communications in many regions of the globe.'

He added that by overlaying wide-beam coverage with high-power spot beams, EpicNG offers the government a range of options that can be customised for each mission, and high throughput, efficiency and availability will enable smaller terminals and support new applications, such as mobile broadband and aero, while also benefiting data-centric services like cellular backhaul.

It will be fully integrated with Intelsat's existing satellite fleet and global IntelsatOne terrestrial network. 'This advanced communications technology will complement WGS with higher power, highly efficient capacity for disadvantaged terminals – a role that WGS was not designed to manage,' explained Lewis. 'In addition, it will help the DoD fulfil growing bandwidth demands for UAVs by enabling these users to keep operating their existing terminals, which primarily use commercial Ku-band capacity.'

CRITICAL COMMS

He said the department's mission to protect national security will continue demanding the most advanced resources to support its critical communications, and reduced budgets will limit that ability. 'Through its ongoing relationship with commercial providers, the DoD will receive guaranteed access to capacity for critical applications that it cannot fulfil quickly with its own satellite capabilities, have technology compatible for a range of multimedia, on-the-move applications and meet current and expected areas of operations and surge,' he continued.

NEW LAUNCH

It is not just the US developing SATCOM capabilities, Israeli company Gilat Satcom used the Eurosatory exhibition in Paris in June to launch the Suricate Iridium link and Iridium Tactical Radio Solution. The former connects Iridium users located in underground, closed or remote facilities, while the latter connects HQs to field tactical radios via the Iridium network.

'The problem with satellite phones is that they need to have a sky view,' Ami Schneider, head of the mobile satellite division at Gilat Satcom, told *DB* during the exhibition. 'With these systems, the distance becomes irrelevant. We talked to the customer and they asked us to devise something to use in a closed area – we've already received orders from a few in the US and Europe.' He noted that the systems have already been delivered.

Suricate provides complete coverage for Iridium satellite devices in closed-off environments, and is available in the wired Suricate variant or wireless SuricatePRO. It also allows communications over three Iridium satellite phones simultaneously in 'secure surroundings', such as military operations rooms and bunkers. Suricate antennas can be located some 6km from a structure, enabling the location to remain concealed.

The Iridium Tactical Radio Solution is based on a dynamic relay system unit, offering a set of features for tactical radio communication. 'We attached this small device and each radio becomes a bridge – a relay,' explained Schneider. 'By doing that, we create a mesh network. All of these customers are already using Iridium, and we are leveraging what they already have.'

'We are pleased to introduce two new solutions at Eurosatory, the end result of R&D to ensure reliable, continuous communications for military and governments anytime, anywhere.'

The company has also teamed with Tri-Logical Technologies to develop the Personal Location Product – Hybrid communications system. 'When there is no cellular coverage, it turns to satellite coverage,' said Roey Michelsohn, marketing and sales director at the company. He claimed the system will never lose signal, and is operational with the Israeli Air Force and special operations and intelligence forces. **DB**