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How communications can support (and hinder) operations on the mobile battlefield ●●

Communications have played an irreplaceable role on the battlefield for all of time, and as technology has advanced, so too have communications capabilities. Satellite now offers more communications assuredness than ever before in tough situations. Kelly Nicklin, Vice President Sales and Marketing at XTAR expands on how X-band satellite communications can assist the warfighter in the field.

Before the telegraph was widely used, signal officers in the US Civil War carried with them a variety of flags, staffs, torches, matches, pliers, shears, a funnel and one-half gallon of flammable liquid. While everything was rolled together to strap to the soldier's back for portability, when it was time to send a message, it did take considerable setup and assembly.

Once ready to transmit, the signal officer had to position himself away from obstacles such as tents or dust, even tying himself up in a tree, if necessary, to get the signal through.

Technology has come a long way since our officer from the 1800s, trying to send his message while strapped to a tree. Yet to be successful in battle, the military still requires every one of its components to be highly mobile and communications are no exception.

For communications to effectively support the mobile mission, there are three main requirements: 1) communications must be easily portable 2) communications should work smoothly with minimal disruptions and 3) the signal must get through, no matter what.

This article will explore best practices in the field of satellite

communications, supporting these requirements and ensuring that communications stay strong and support the mission, especially on the mobile battlefield.

Communications must be portable

The first and most obvious requirement for the mobile battlefield is portability. Satellite communications today must support bandwidth-heavy applications such as high definition video, but in mobile situations, they must do so many times by using smaller (sub-meter) antennas and highly portable equipment.

To achieve the data rates for more than a short voice chat, GEO satellites have become an invaluable resource for the soldier. In particular, X-band frequency can support throughput needs from low to high. The antennas which support these satellites are constantly becoming more technically advanced, pushing SWaP (size, weight and power) to the limits of physics. No longer is there an expectation of hours to set up a communications system. The expectation now has become in 30 minutes or less. Representatives from the US Army have quoted the mantra of "move, shoot and communicate in 30-minute increments" which drive home the need for portability.

Satellite communications must work with minimal disruptions to the mission

On the mobile battlefield, both speed and ease of communications are required to fully support the mission. Disruptions caused by communication issues are costly to operations in terms of safety, effectiveness and of course, financially.

While our user may initially be using military satellite communications (MILSATCOM) they require a backup in case

MILSATCOM is not available. Often, this takes the form of commercial satellite communications (COMSATCOM). If for some reason MILSATCOM is unavailable, the ability to quickly and seamlessly switch to COMSATCOM is vital. Currently, leasing commercially available military-only frequencies such as X-band is a seamless option to ensure this interoperable continuation of service.

While this is true in other operations, it is especially so in mobile situations. A user that needs to switch frequencies in order to continue the mission, requires additional equipment to purchase and carry, plus that user must know how to use the equipment. Using commercially-available military frequencies allow users to simply re-point and continue the mission with minimal disruption, using the X-band frequency they already know.

Another important consideration for user mobility is potential constraints caused by beam size. While high throughput satellites (HTS) may be gaining a lot of attention, their beams are small, typically a few hundred miles wide, therefore, the user in a mobile situation is likely to have to transfer between beams. This requires specialized equipment to facilitate beam switching as well as the leasing of bandwidth in more than one area. Both workarounds cost the mission in terms of time and money. X-band spot beams on the other hand, are typically about 1,000 miles wide, which means operations are normally encapsulated with one beam.

Satellite communications must work consistently

Finally, and perhaps most importantly, satellite communications must work, with a strong and effective signal throughout the mission. In situations where there is only one chance to get

things right, a communications system should not be a hindrance to your overall mission.

Adjacent satellite interference is an issue experienced by many commercial frequency bands. Military frequency satellites are spaced 4 degrees apart versus approximately 2 degrees of separation between other frequency bands. Due to this increased spacing, satellite solutions often require less space segment and incur less frequent interference than non-military frequencies.

As our US Civil War Signals Officer most likely found, challenging weather can also pose a threat to communications on the mobile battlefield. But even today, dust storms, rain and humidity can easily knock out commercial communications which operate at frequencies higher than 10GHz, making them susceptible to atmospheric attenuation. X-band's position on the spectrum makes it virtually weatherproof so that weather need not be an issue either for current or expected conditions.

Conclusion

In the civilian world, we all want to do more on the move via our cell phones and laptops - it's nice to have constant communications wherever we are. Our soldiers are required to have communications work effectively while on the move, to complete their mission safely and effectively. When it comes to satellite communications on the battlefield, there is no question that portability, ease of use and reliance of signal must all occur to allow the user to maximize their mission. X-band has been and continues to be a valuable resource for military use, both from MILSATCOM and COMSATCOM satellites around the globe. Now, more than ever, SATCOM as a mobile resource to the warfighter must be provided to keep them safe and effective.

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