COMMENTARY Rick Lober

How DoD can harness commercial SATCOM's rapidly changing technology

If time is the enemy of technology progress, coordinated effort of the brightest minds is its ally.

As we begin the New Year, commercial satellite providers have never had greater opportunities to support the U.S. Department of Defense's ever-growing need for innovation in communications technology and service delivery.

Yet the reality is that simple lack of understanding or misunderstanding by the DoD about satellite's rapidly changing technology remains a significant stumbling block that must be overcome for collaborative opportunities to be seized. What better time to shed some light on how both sides can collaborate better than the kickoff to the Wideband Analysis of Alternatives (AoA)?

Let's begin with the most significant advancement in satellite communications in the past few years — the proliferation of high-throughput satellites (HTS) and the shift in how services over these satellites are delivered and acquired. We will also examine the postive, potential impact on two of DoD's primary growth areas — airborne intelligence, surveillance and reconnaissance, and land-based portable solutions.

HTS AND MANAGED NETWORK SOLUTIONS

Today's perception of available satellite capabilities is often based on legacy technology —single CONUS broadcast satellites with typically low-digit gigabit capacities — which have been in service for several decades and form the primary core of the world's video-delivery systems, whether for news or entertainment. In fact, these have proven to be inadequate to meet the data-heavy demands of the internet generation and have been eclipsed by a new generation of multi-spot beam HTS satellites offering from many tens to a hundred or more gigabits of capacity that can be allocated by customer site in a dynamically interactive way.

Indeed, HTS satellites are rapidly covering the globe, providing advanced, high-quality broadband connectivity solutions — including enhanced security. Not only do they offer greater bandwidth and delivery flexibility with power focused to very specific locations, these solutions can be acquired as a comprehensive and budget-friendly managed service, rather than having to buy expensive equipment and ad-hoc bandwidth as in the past. This new acquisition model bundles the required satellite bandwidth — not more than needed, and readily scalable — with the associated operating cost of ground system equipment and network management, reducing the miltiary's capital and personnel costs.

The industry refers to this as buying megabits instead of megahertz. The trusted service provider bears the cost of equipment and manpower required to deliver a contractually bound level of service performance and overall quality, mitigating large capital outlays by the customer. The user can access continuous connectivity when and where it is needed, while the provider covers the cost of headcount and infrastructure needed to manage the network. Both sides win.

This managed services model is becoming pervasive in commercial SATCOM, and is also the norm for DoD in acquiring terrestrial and cellular connectivity. If the DoD likely wouldn't approach a cellular provider to buy, say, 30 megahertz (MHz) worth of spectrum (and then try to figure out how to operate it if the cellular provider would even allow it), why should it do so for SATCOM? While a managed services model may not work in every DoD application, adoption is possible in most applications and

with a long list of benefits to be gained.

SOFTWARE-DEFINABLE NETWORKS

In parallel with commercial industry's move to HTS satellites is the evolution of software-definable networks, which many DoD leaders are now realizing obviates the need to buy vast amounts of fixed, transponded bandwidth, an inefficient and unnecessarily costly proposition. The multiple-spot-beam nature of these flexible, new systems with dedicated uplink and downlink beams eliminate the typical DoD reliance on uplinking and downlinking in single- or cross-strapped, broad-coverage beams. Additionally, the availability of unused "MHz" in newer HTS systems may not be possible as it was in the past, unless pre-planned well in advance (possibly before launch).

There needs to be long-term commitment that prioritizes flexibility, agility and cost-efficiency, because having the government reactively buy fixed-transponder capacity for multiple months is not sustainable in today's global operations. Today's information-centric military — especially as it operates in numerous contested environments — needs to work with commercial providers to fulfill its demand for more flexible systems by making use of software definable networks.

With the Wideband AoA being introduced and in-depth planning starting shortly, Hughes and our industry partners would like to see more commercial capabilities and requirements built into the plan from Day One — not when the need for more bandwidth arises months or years into the program.

AIRBORNE COMMUNICATIONS

One of the government's fastest growing mission areas is airborne communications.

The need for advanced airborne intelligence, surveillance and reconnaissance (ISR) capabilities continues to grow in demand for both manned and unmanned platforms, alike. ISR data from fixed- and rotary-wing aircraft, as well as UAVs, are essential in support of U.S. national security strategy — whether operating in commercial airspace or over active war zones. The central role of these aircraft could not have developed without the support of satellite technology for Command and Control, as well as transmission of real-time video collected by the aircraft.

Commercial satellite networks have supported a variety of different missions and are now critical to nearly all Beyond-Line-of-Sight (BLoS) ISR mission planning. Commercial satellite providers have continued to enable this capability since its early deployment more than 20 years ago. At that time, the DoD itself did not have sufficient satellite resources to meet its growing demands, and it has continued to rely on commercial providers. To make these airborne communications as effective as possible requires adaptable technology in space as well as on the ground, with highly reliable, open-architecture systems supporting continuous connectivity, incorporating advanced security and cyber safeguards.

At Hughes, we are addressing airborne requirements with a focus on ISR/BloS platforms — both fixed and rotary-wing — delivering high-quality, reliable communications. We've been able to achieve this capability through the development of specialized waveform technology that enables transmission of real-time, HD video with sufficient operating margin to overcome interruption by rotary blades, interference and certain levels of jamming. Our new ISR/BLoS systems are designed >

< > to operate over various bands (X, Ku, and Ka) of traditional wide-beam satellites, as well as the new generations of high-throughput satellites, making them deployable virtually anywhere on the planet.

System products with reduced size, weight and power requirements mean these manned and unmanned aircraft will be able to utilize cutting-edge satellite technology to support their constantly changing missions and environments. In addition, an open-systems approach to modem and antenna interfaces allows for lower-cost upgrades of these platforms as technology progresses.

LAND-BASED SOLUTIONS IN MINUTES

Military leaders have told also the industry we must continue to innovate with the goal of deploying new SATCOM technology to deliver full and secure land-based connectivity in only minutes. As just one example at Hughes, we've taken this call to action seriously and worked with an industry partner to develop an ultra-compact X-band terminal, called the HM300, to complement their X-band service.

As with airborne, these solutions are driven by one crucial requirement: ensuring military agility and responsiveness. For mobile users and platforms to truly be agile while on the move, the equipment must be small and adaptable to any application.

The terminal is lightweight and designed for maximum portability and minimum deployment time.

New and valuable technology — such as the software-defined modem in our HM300 — is in development across the satellite industry, holding the promise of ever-improving solutions with lower size, weight and power requirements and higher throughputs. These terminals and the supporting modem technology work together with today's advanced HTS satellites to deliver the most flexible and cost-efficient network capabilities to DoD users.

THE IMPORTANCE OF FLEXIBILITY

Commercial SATCOM's current role can help maintain the status quo, but accepting the current order is clearly not the best option for the future of national security. Commercial SATCOM system providers, like Hughes, are designing their technology to seamlessly integrate with existing military-satellite communications capabilities at the networking layer — as is common in most forms of communications technology. The DoD should stop binding itself to implementing single, closed systems.

Rather, the DoD should be able to procure the best components for a system that best fits their mission needs. Hughes, unlike some other providers, continues to focus on providing open-standards terminals and the supporting modems to augment this flexibility to enable faster sharing of vital data. Our mission is to ensure that U.S. commanders have the option of using military assets or relevant commercial systems — or a combination of the two — giving them the most operational flexibility. As many members of the DoD recently discussed at the Satellite Industry Association DoD SATCOM Workshop, this level of flexibility is no longer a want, it's now a need.

The 21st century offers the DoD ever greater opportunities for technology leadership with the age-old challenge to be either the disruptor or be disrupted — something all commercial technology players understand well.

But if time is the enemy of technology progress, coordinated effort of the brightest minds is its ally. Decision-makers from DoD and the commercial-satellite industry need to seize this imperative and formally pioneer a collaborative path for future capabilities and innovation to ensure mission success in tomorrow's contested space environments. Indeed, the time is now. **SN**

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