

A CRITICAL CONNECTION: SUPPORTING THE 21ST CENTURY WARFIGHTER THROUGH COMMERCIAL SATELLITE AUGMENTATION

Rebecca Cowen-Hirsch

Inmarsat U.S. Government Business Unit, Rebecca.Cowen-Hirsch@inmarsat.com

ABSTRACT

More than ever, with rapidly changing world events, the warfighter depends upon reliable satellite communications (SATCOM) everywhere, all the time. The current operational profile is extremely mobile and agile, with smaller and highly portable devices. Once in theater, the military deploys data-intensive applications on the ground, at sea and in the air. This is creating an almost insatiable demand for SATCOM capacity – in fact; the Pentagon is using ten times the amount of bandwidth today than it did in 2001, according to last year’s “Satellite Communications Strategy Report” from the Department of Defense (DoD)¹.

Given the dynamics, military SATCOM (MILSATCOM) and commercial (COMSATCOM) serve as continual topics of conversation both inside and outside the Pentagon. The discussion within the DoD has taken on increased urgency with growing world challenges running headlong into a shrinking Pentagon budget. The government’s non-protected, Wideband Global SATCOM (WGS) and the Mobile User Objective System (MUOS) with legacy UHF fulfill key pieces of the solution, but WGS and MUOS simply cannot “go it alone.” While incredibly capable, these systems are often contended or even inaccessible for the wide range of geographic or mission-specific surges in demand.

This is where commercial satellite communications comes into play. While some people may mistakenly view MILSATCOM and COMSATCOM as competitive, in actuality they are not– they are complementary. Both prove essential for the bandwidth necessary for virtually every function. To get the most out of its investment, the DoD should utilize these as blended resources in an integrated architecture. Fortunately, DoD officials have championed this concept in recent years.

Also relative to the discussion are the procurement procedures and costs for using COMSATCOM. This paper will address these issues, and explain how commercial systems can and must augment military space assets in a manner that is practical and affordable.

WARFIGHTER DESERVES BETTER THAN FRAGMENTED ‘WHO’S ON FIRST?’ SATELLITE ACQUISITIONS

In the modern era of highly globalized, asymmetrical conflict, a wealth of U.S. commanders would find it unthinkable to proceed into combat without the very latest, most advanced satellite capabilities – wherever they are, whenever they need them. Ongoing developments, however, present formidable obstacles. The Department of Defense (DoD) has reached a turning point in SATCOM acquisition and deployment, for example, as the budget forecast for the foreseeable future does not incorporate the replacement or addition of systems other than the planned deployment of existing programs of record with some modest improvements.

To raise greater concerns, the acquisition of MILSATCOM has grown more fragmented. There is a buying channel and process for the ground segment (teleports and gateways), then another for terminals, then yet

another for the space segment (the satellites themselves). Because this is conducted in piecemeal fashion, the technologies face significant challenges in syncing with each other.

For too many years, we have resigned ourselves to a model in which multiple DoD entities are responsible for multiple parts of the package, turning to private industry generally on an ‘as needed’ or ‘fill the gaps’ basis. While the Air Force is the executive agent for space, the Under Secretary of Defense for Acquisition, Technology and Logistics actually oversees procurement approval for space systems. Within the Air Force, the Space and Missile Systems Center is in charge of wideband and protected communication satellites while the Navy acquires narrowband. Commercial SATCOM is leased through DISA, yet is funded on a pay-as-you-go basis from the services and associated Combatant Commands largely using non-appropriated funds identified for contingency operations. The overarching life-cycle management of SATCOM from end-to-end is notably absent in these seemingly ad hoc acquisition methods.

On the operational side, the Joint Staff prioritizes use and defines requirements for SATCOM, a process that is dysfunctional at best. At the same time, U.S. Strategic Command (STRATCOM) performs the advocacy role for space, including SATCOM following their assumption of the United States Space Command (USSPACECOM) mission set. Yet, one could argue, this responsibility is eclipsed by other obligations related to nuclear deterrence as well as cyber.

Meanwhile, terminals are acquired throughout the military services and embedded into other programs of record, with seemingly no direct correlation to space system timelines. In many cases, these programs of record have suffered from delays and/or budget overruns which occasionally qualify as Nunn-McCurdy acquisition cost breaches, resulting in the re-baselining of spending estimates. Exacerbating this complicated scenario of “who’s on first,” the DoD has admitted that it is unable to fully characterize its future requirements.

‘STATUS QUO’ FAILS TO SUPPORT 21ST CENTURY SHIFTS

How did we reach this level of piecemeal procurement – one that has diminished the ability to integrate SATCOM into the communication architecture meaningfully, so it can emerge as an essential enabler of superior warfighting, peacekeeping and mission-serving communications? Certainly not because it’s particularly effective in meeting the rapidly shifting requirements of the modern-day warfighter. Just the opposite, in fact. One could argue that following the unanticipated evolution of SATCOM dependency, we simply do it this way because “that’s the way we’ve always done it.” Yet the ‘status quo’ mindset here shortchanges missions and causes inefficiencies throughout the enterprise.

Up until a few years before the 21st Century, ‘status quo’ worked: There were sufficient military resources to cover operations while demand was somewhat predictable. Still, the Navy had the foresight to go through commercial providers to obtain SATCOM services. Why? Because U.S. ships ventured to all parts of the world’s oceans – often dispatched in unpredictable fashion. Locational remoteness on global seas kept crews from wireless access or land-based fiber installations. They weren’t assured of the access sought from military satellite services either. Private industry filled in the gaps, so crews could communicate and send/receive voice, data and video via satellite as duties dictated. This demonstrates the Navy’s foresight, as leadership recognized that MILSATCOM may not always deliver what’s needed, when it’s needed.

Since the turn of the century, however, a confluence of developments have illustrated the failings of status quo: In 2009, the DoD cancelled the Transformational Satellite Communications System (TSAT) program, which

was intended as a secure, high-capacity global communications network for “net-centric warfare.” Other SATCOM programs ran into major delays and/or experienced program failures. And the very face of global conflict changed in ways that were certainly not envisioned in the early days of MILSATCOM. Few in the 1980s, after all, predicted the proliferation of unmanned aerial vehicles (UAV)/Airborne Intelligence, Surveillance and Reconnaissance (AISR), or the seemingly insatiable demand of today’s data-rich applications.

The conflicts in Iraq and Afghanistan have created the present state of highly mobile, asymmetrical engagement. Ground, air and sea units must be ready to go anywhere, at any time – not strictly to battlefields either, but to suddenly devastated regions for disaster response or humanitarian relief. To do their jobs, troops depend upon mobile, data-intensive apps, such as streaming video for ISR. While we have been at war, the government has added funding to cover contingencies, paving the way for numerous ad hoc networks and solutions with little thought given to affordability or efficiency, much less sustainability. Individual leases have been assured, even if they aren’t necessarily best suited for communications coordination or planning. The ill-thought decisions have generated demand, for certain. But they have also set in motion an architecture fixated on the “urgent,” but unsustainable for the long haul. Absent of forethought, a patchwork of applications, assets and resources have emerged to meet the needs of yesterday yet can – and *should* be – reviewed with a longer-term vision of integration and full life-cycle management.

Such a vision would deliver a sustainable architecture, which is exactly what warfighters seek. To them, it is less important which Armed Service branch ‘owns’ which part of the communications package, or whether the actual technology is supplied by a DoD or commercial provider. They want results, in the form of maximum capability, flexibility and resiliency. Bandwidth must go where they go, with smaller, easier-to-use equipment, and multi-band terminals to ensure it stays up and running no matter how challenging the situational or geographic conditions.

At the height of operations in Southwest Asia, industry represented at least 80 percent of the military satellite presence, according to the report, “World Demand for Commercial Satellite Communications by the U.S. Government and Military Markets,” from Frost & Sullivan². While reports of the percentage breakdown today vary widely, it is universally accepted that commercial SATCOM dependency remains and will continue to do so for the foreseeable future. During the Gulf War, MILSATCOM availability was static, just as an abundance of commercial capacity emerged. With the exponential growth in demand for access, the industry’s dominance was a matter of supply and demand. By the time of Operation Iraqi Freedom, COMSATCOM was embedded into missions while military SATCOM access and the associated terminals were lacking. This lasted up until recent years, when WGS deployments accelerated much desired MILSATCOM capacity, fueling the debate of MILSATCOM versus COMSATCOM.

In addition, existing contract procedures – as well as the overall DoD culture – have made partnerships with industry difficult. DoD conducts COMSATCOM procurements on annual basis, causing uncertainty and often not fitting in with the private sector’s long-term financial plans and ROI projections. There is bias too, as DoD Services and Combatant Commands are partial to MILSATCOM since they view it as “free” and are not directly charged for usage, while they are for COMSATCOM.

But status quo is not working, and decision-makers are beginning to recognize the benefits of greater centralization and integration. In August, the DoD indicated in its Satellite Communications Strategy Report that the military is consuming ten times the amount of bandwidth than it did in 2001, and that a five-year plan should include a stronger commercial presence within a more cohesive, integrated architecture.

“(A) decentralized approach impedes centralized, multi-year acquisition and hinders the DoD’s ability to manage MILSATCOM and commercial SATCOM as a holistic capability to best support the warfighter,” according to the report. It continues to note that the DoD “may have to move toward a ‘shared resource’ model of usage, versus the current ‘my demand/my capacity’ separatist philosophy. This will require a centralized management strategy with resource monitoring and management instantiated on an ‘enterprise-level’ instead of the current method that allows users to implement (and pay for) resource monitoring and usage management at their own discretion.”

AN IDEAL PARTNERSHIP

Enterprise-level centralization would increase availability of private industry products which are the most innovative in the world, ready to easily integrate with military systems. With the click of a button, these integrations would be up and running in any part of the globe for any conceivable purpose. To make this a reality, the government purchaser and commercial enterprises must adapt a more proactive approach to collaboration and adoption.

The most innovative private operators simultaneously develop capabilities throughout the ground, terminal and space segments – full end-to-end capability. This incorporates complete functionality, producing systems that empower users with the most flexible and immediate of technologies. Combining these modern technologies and capabilities within MILSATCOM, users can turn to MILSATCOM for core requirements, then seamlessly integrate commercial technologies to fill in all gaps to achieve absolute protection, resiliency and global portability.

In doing so, they would reap the benefits without any upfront financial commitment, because innovation would augment crucial communication capabilities. Industry is regularly investing R&D funding and internal talent into the pursuit of innovation and more affordable solutions. When DoD purchase decision-makers realize there is a need, it is likely already addressed by the commercial side. Trusted business leaders cultivate close relationships with government leadership and operators and listen closely when they speak about their users. The private sector understands what DoD architectures require, what the budget restrictions are, and how to plug in the remaining holes. And industry can do so much faster than the public sector: Average time from concept to launch for COMSATCOM takes three to four years, as opposed to five to 15 years (or longer) for MILSATCOM projects.

The time for action is now. Current military narrow and wideband programs of record will deliver new satellites and be operational through 2025, with an analysis of alternatives likely underway in 2016 for the next generation of wideband capabilities. These alternative assessments must reflect the vital dependence upon and accessibility of commercial SATCOM components within the architectural solution set³, because military programs are not as agile or flexible as commercial solutions.

After all, if warfighters are using literally ten times the bandwidth than they did at the turn of the century, then why are we still supplying it to them through the scattered acquisition and architecture model? Military and commercial providers should move forward as partners, not rivals. We must work together to break down long-held siloed practices, and build a cohesive SATCOM community.

In doing so, unit commanders will be empowered to leverage the very best of what both have to offer. They may not even know what part of the satellite communications package came from where. They’ll only know that it’s allowing them to do what they have to do, when they have to do it. No matter where on the globe they are.

MEASURES OF EFFECTIVENESS

A productive partnership must address the following critical communications components:

Suitability

What frequency band (wideband, X-band, Ku-band, Ka-band, narrowband, etc.) is most appropriate for which user? Considerations include the mission being performed, as well as the existing geography and weather, i.e., is the warfighter at sea, on the ground or in the air? Overall, warfighters deserve a wide range of tools to meet objectives. They thrive upon ease of access to the range of SATCOM options, to get the right tool at the right time. As the architecture grows more integrated and terminals have multi-band/multi-mode access, military units can focus on capability – and impact – rather than which frequency band or satellite they're using.

Relatively simple adjustments to existing and planned Ka-band terminal acquisitions would enable tune-ability between military and commercial Ka-band, bringing improved flexibility to match the most suitable solution with the desired outcome. Thus, the terminal is not limited to only MILSATCOM assets. It can access WGS while augmenting COMSATCOM in military and/or commercial Ka-band. Terminal adaptations and revised acquisition approaches to embed the terminals into the SATCOM service increase options for greater effect and affordability within future operations.

Availability

Is the SATCOM in the right place – where and when needed? Some would argue that the Pacific theater lacks available SATCOM. Yet, with MILSATCOM and other complementary commercial systems providing mobility coverage globally, the region *does* have capacity in the form of narrowband (UHF and L-band) in addition to a range of wideband assets (X and Ka-band). Once architecture is developed and agreed, commanders can assess areas in which the supply curve is imbalanced in an informed manner guided by demand, risk and resource availability.

Security

In protecting communications, not all companies are the same. Responsible national security COMSATCOM service providers invest in NSA Type I command encryption, and commit to best practices in cybersecurity for the benefit of government and commercial customers. COMSATCOM also supports the protected tactical waveform as an additional layer of defense in depth. Furthermore, with a proactive public-private partnership, elevated security measures can integrate within the techniques, tactics and procedures of operators for mutual aid and increased information assurance.

Resiliency

With ever proliferating risks and a changing threat environment, resiliency remains a key measure of effectiveness. COMSATCOM can work with MILSATCOM to fill in any gaps here. A range of commercial assets complement current communications satellites. There is a diverse range of available orbital and ground sites and redundant communication paths. While industry robustness on the space segment may vary by operator, strong companies add additional features for assurance and flexibility as a part of their core business. These features can be enhanced if required for government missions.

When the military plans its architecture with interoperability – augmenting commercial assets so flexibility and a diversity of communication paths take hold – warfighters will have greater latitude to reroute traffic as

conditions dictate. As the orbital nodes and teleport sites for MILSATCOM are generally known (or at least discoverable) with COMSATCOM, additional options on the orbital belt and complementary ground networks establish multiple paths for mission execution. Since reliance on COMSATCOM began, some mission leaders have preferred to intentionally use COMSATCOM as a priority over MILSATCOM, so they do not stand out as a unique traffic – “hiding in plain sight,” if you will. With a range of assets weaving into the architecture and made available as mission and conditions dictate, resiliency is ensured through the planned and complementary use of COMSATCOM.

AFFORDABILITY VIA ‘SATCOM AS A SERVICE’

Due to the current, austere budget environment, affordability is as important as mission effectiveness. As COMSATCOM is readily available for government use and the industry invests in government-applicable networks, federal leaders can take advantage of complementary SATCOM at market rates to acquire baseline satellite communications while allowing the government to direct capital to where there are not commercial solutions. Outside of the most unique nuclear hardened and protected communication requirements, ‘COMSATCOM as a Service’ offers the most cost-friendly solution. This shift in perspective is not unprecedented, as terrestrial fiber telecommunications for the government is predominantly and affordably delivered through commercial infrastructure. New business models will even further improve the affordability quotient as managed service approaches are applied to SATCOM, making for more predictable budgeting and planning while also allowing for ‘surge and spot’ market purchases.

Not to be overlooked, the terminal side of the equation creates opportunities to increase capabilities affordably. Programs of record could enhance planned terminals with wider tuning range throughout the adjacent military and commercial Ka frequency range with little to no additional expense, yet with significantly enhanced functionality. Additionally, embedding terminals into the ‘SATCOM as a Service’ model reduces the operations and maintenance tail for terminal replenishment while integrating technical refurbishment into the business model. Affordability goes beyond cost control. Yet, it is a real consideration to obtain the best communication solution within available resources.

CONCLUSION

When the DoD more closely aligns with commercial providers for a robust SATCOM capabilities, it empowers warfighters with a wide range of options. They reap the rewards of greater suitability, availability, security and resiliency, while establishing optimal flexibility and global reach. COMSATCOM augmentation supports any scenario – from peacetime to disaster response to training to active military strategy execution – at an affordable rate to protect taxpayers and stakeholders while boosting the likelihood of mission success.

A holistic approach better positions the military community for the present and the future. Recognizing that a wide variety of missions on a global scale are dependent on satellites, it is time to plan and acquire high-performance SATCOM, from end-to-end, in an intentional, integrated manner. This robust combined architecture will achieve maximum efficiency, effectiveness and affordability and resiliency when and where it’s needed, thereby insuring No Mission is Impossible.

References

1. "Satellite Communications Strategy Report," Department of Defense Chief Information Officer, August 15, 2014. http://www.spacenewsinc.com/pdf/Satellite_Communications_Strategy_Report.pdf.
2. "World Demand for Commercial Satellite Communications by the U.S. Government and Military Markets," Frost & Sullivan, May 1, 2009. <http://www.frost.com/sublib/display-report.do?id=N5C0-01-00-00-00&bdata=aHR0cDovL3d3dy5mcm9zdC5jb20vc3VibGliL3N1YnNjcmlwdGlvbi1pbmRleC5kbz9wYWdlU2l6ZT0xMDAmc3Vic2NyaXB0aW9uSWQ9OTcxMy1DNiZwYWdlPTFAfkBTYXRibGxpdGUgQ29tbXVuaWNhdGlvbnMsIEluZHVzdHJ5IFJlc2VhcmNoLCBhbG9iYWxAfkAxNDI0OTY2NDIwODYz&subscriptionId=9713-C6>.
3. "Taking Advantage of Opportunities for Commercial Satellite Communications Services," Defense Business Board, FY2013-02. <http://dbb.defense.gov/Portals/35/Documents/Reports/2013/FY13-02%20Taking%20Advantage%20of%20Opportunities%20for%20Commercial%20Satellite%20Communications%20Services.pdf>