

Space

The final warfighting frontier

by Col Arun Shankar

Space, the area over 100km above the Earth's surface, has recently emerged as a critical warfighting domain. Specifically, the satellites within this area of operations provide vital connectivity for military and civilian use and must be protected. As a result, the DOD stood up both a Space Force military branch and a Space Command combatant command (CCMD) to manage this domain. This article aims to clarify the roles of these two organizations and highlight some of the challenges they face.

Background

The United States and the Soviet Union declared competitive interests in Space over 60 years ago. At that time, goals included human exploration of space as well as the development of satellite technology. As time progressed, the DOD realized the value of satellites in space to provide over-the-horizon communications, missile detection, global positioning data, and imagery. During Operation DESERT STORM, satellite communications played a tremendous role in synchronizing distributed operations across the multi-domain battlespace. More recently, in Operation IRAQI FREEDOM and Operation ENDURING FREEDOM, satellite communications underpinned convoy communications, intelligence feeds, overhead imagery, common operating pictures, and high bandwidth data communications. Today, as we prepare for near-peer conflict, the space domain remains a vital information transport capability that underpins the command and control of land, air, and sea forces.

Toward the end of 2019, the DOD stood up both the United States Space Force (USSF) and United States Space Command (USSC). The USSF is the newest branch of the military, primarily

focused on managing and defending satellites. The USSC is the Nation's newest "astrographic" CCMD, responsible for all DOD activities greater than 100km above the Earth's surface. These formations emerged while realizing that space is now a strategic warfighting domain. Whereas space functions were previously delegated, buried, and stove-piped within the other branches of Service and combatant commands, the centralization of this domain with direct reporting to the Secretary of Defense (SECDEF) ensures the required strategic support and funding.

Present State

Priorities

The USSC mission is hinged on four pillars. The first is to be prepared and postured for both competition and conflict. The second is to enhance relationships with allies, partners, and the commercial industry. The third is to counter threats within the space domain, and the fourth is to enable a warfighting advantage through leadership and capability development. Together, these strategic tenets guide the command in its daily activities.

Components

As a CCMD, the USSC is presented with forces and capabilities from every Service within the DOD. Moreover, each Service provides a subordinate component command to the USSC. Not surprisingly, the overwhelming Service component contribution comes from Space Forces Space (S4S),

the USSF Service component to USSC. The Army provides the Space and Missile Defense Command, primarily focused on missile defense and warning activities. Air Forces Space is aimed at human space flight support. Navy Space Command and Marine Forces Space Command provide maritime space capabilities.

Tasks

Tasks from the SECDEF to USSC include space operations, sensor management, satellite communications management, and transregional missile defense. Space operations include aspects of offensive and defensive space control measures. Sensor management includes intelligence imagery and launch sensors. Satellite communications mainly use satellites as voice or data relays between two or more ground terminals. Missile defense protects the homeland and vital American interests from missile attacks. Additionally, the USSC plays a significant role in providing weather imagery and Global Positioning System (GPS) capabilities across the globe.

SATCOM

Space Command is the global SATCOM operational manager for the DOD. In other words, the USSC establishes requirements and policies that drive SATCOM capability management for all branches of the military. The five military Service branches develop and present SATCOM capabilities to CCMDs with independent

>Col Shankar is the J36 at USSPACECOM after recently serving as the CO, Communication Training Battalion, and AC/S G-6, 1st MarDiv. He has also served a combined 28 months in Operations IRAQI FREEDOM and ENDURING FREEDOM as a counter-IED Analyst, COIN Assessments Analyst, and Communications Officer, and holds a PhD in Operations Analysis from George Mason University, Fairfax, VA.

budgets arbitrated and approved by the SECDEF. In most cases, satellites are provided by the USSF, and receiver terminals (radios) are provided by the remaining military branches. In practice, military SATCOM (MILSATCOM) capability growth originates with the launch of new satellites, followed by the fielding of compatible ground terminals. Space Command plays a pivotal role in levying advocacy and requirements on the military to configure the balance between satellites and ground terminals optimally. Satellite communication bandwidth sharing among allies and partners enhances the resiliency of this mesh network for coalition operations. Military satellite communication is augmented by commercially procured services, providing a hybrid solution to warfighters.

Spectrum and GPS

Space Command also manages the SATCOM spectrum and GPS capabilities. Satellite communication spectrum sharing with commercial and international partners is essential to long-term success. Dynamic sharing algorithms must be developed to efficiently parse bandwidth among unused portions of the spectrum at any given time. The portioning of specific frequencies for military usage is not sustainable. The GPS satellite signal must be accurate, dependable, and resilient for both military and private sector usage. The world's overwhelming dependence on GPS capabilities does not allow for its failure.

Civilians

Except for cyberspace, no other warfighting domain is so highly dependent upon a civilian workforce for its mission. The specialized technical nature of space-related tasks requires experts who have years of uninterrupted trade experience and background knowledge. In particular, the future innovation required in SATCOM and spectrum fields cannot be realized without appropriately compensated civilian experts. Advanced federal compensation structures that are linked to performance, rather than just presence, greatly assist this effort.

USSC and USSF Overlap

An array of challenges remains in the space domain, and most of them are rooted in command and control relationships. First and foremost is the confusion of roles between USSC and USSF. The Space Force dominates the space domain's operational and tactical level actions, so the role of the USSC can appear redundant. Typically, a higher command has a role in aggregating input from multiple lower commands or distilling guidance to multiple subordinates creatively and effectively. However, due to the USSF's dominance of space responsibilities, S4S is often the only Service component meaningfully connected to the USSC. Moreover, other CCMDs also have USSF component commands, further confusing whether their space support should come from their subordinate USSF component or their supporting, adjacent USSC. Needless to say, this existing configuration is neither joint nor efficient.

Strategic Guidance

Space Command is charged with developing a unique and novel contribution to the warfighting effort at the regional strategic level of command. However, without any overlap, creating guidance nested between policy and operations is no easy task. A quick review of the strategic guidance of any combatant command will likely reveal nebulous, unmeasurable goals duplicated from *National Defense Strategy* (NDS) and *National Military Strategy* (NMS) policy guidance. In most cases, anything more specific is assumed to hinder the freedom of operational-level commands. Space Command especially faces this challenge because of the dominance of the USSF. How does one create Space guidance for the USSF that it cannot already create for itself? This was also observed during Operations IRAQI FREEDOM and ENDURING FREEDOM, where strategic commands like Multi-National Force–Iraq and International Security Assistance Force struggled to develop insightful goals for subordinate commands. As a result of this absent guidance, tactical leaders fought the wars with their own intuition while bulky

operational-level commands served as data collectors for strategic-level policymakers. Optimally, strategic guidance from CCMDs should be more noteworthy than a parsed regurgitation of the NDS and NMS or micromanaging operational and tactical decision making. Strategic guidance should include consideration of regional effects beyond the operational area and a clear, measurable end state that defines success. Perpetual end states, though popular among policymakers, are not practical for warfighters.

USSF Culture

Furthermore, the culture of the USSF can be difficult for other service members and ordinary taxpayers to comprehend. The USSF is a largely stateside group who do not serve in traditional combat roles. They are mainly focused on enabling warfighting as a stand-off force, unlike the Marine Corps which delivers warfighting as a stand-in force. By reputation, the USSF has the highest quality of life and the lowest risk tolerance of any military branch. Their liberal military customs and courtesies, fitness requirements, and grooming standards are nontraditional. Unit names are often themed after science fiction media. The net effect is a Service that defines warfighting in a way that does not readily nest within the larger joint environment. Nevertheless, the USSF function is vital to our national defense.

Presented vs Retained Capabilities

Moreover, the USSF has presented capabilities to the USSC as well as Service-retained capabilities, much like every other Service branch. However, many of these Service-retained capabilities are essential to the USSC mission and are indirectly utilized by S4S. It is not completely clear why so many essential capabilities are retained by the USSF when the USSC is the dominant customer of these capabilities. Aside from internal USSF training requirements, most USSF capabilities should be presented to USSC. An impractical struggle for USSF independence should not be the driving factor behind capability alignment.

Commercial SATCOM

The growing reliance on commercial satellite resources has charged the USSF and USSC with gaining a fiscal and operational awareness of commercial SATCOM usage across the DOD. Though the USSF owns DOD satellite operations, it does not own DOD commercial satellite operations. Currently, local commands purchase their satellite contracts with operations and maintenance funds, carbon-copying the USSF's Commercial SATCOM Coordination Office—but only for general awareness. As expected, the command that procures the commercial satellite capability owns it and does not have to share it, significantly reducing DOD economies of scale. Additionally, commercial entities generally do not profit as much from adhering to interoperability and compatibility standards. Instead, they gain most from stove-piped inventions that require sole-source contracting for configuration, maintenance, and upgrades. As commercial SATCOM capabilities further prevail in DOD operations, centralizing these resources will become more complex.

Way Ahead

Component Contributions

Most of the previously itemized challenges can be resolved by employing all Services more equitably. Even though the ground, air, and sea Services do not own satellites, they own the ground terminals connecting to satellites. Compatibility between the ground and space segments is essential to functionality. At present, ground terminal procurement is managed within individual Service acquisition commands. However, in the same way that the S4S is charged with reporting on satellite constellations, the other Services can be charged with similar tasks associated with ground terminals and commercial SATCOM usage. This reporting can raise awareness of gaps between space and ground segment compatibility and highlight space priorities for Service acquisition efforts. Service components can also significantly contribute to space exercise development and influence the addition of space activities in their own Service-level exercises. Once all Services

begin influencing the space domain as a joint warfighting domain rather than a supporting effort, USSF culture will recalibrate, and the USSC strategy will become more distinct, joint, and encompassing.

Hybrid SATCOM

The optimal mix of military and commercial satellite usage is a hybrid solution. However, gaps in commercial SATCOM capabilities need to be understood by all stakeholders. An appetite for simple, high-bandwidth ground terminals has increased exponentially over the last ten years of *competition*, opening the marketplace for commercial SATCOM. However, it remains to be seen if commercial entities are willing to support high-intensity *conflict*, especially if their organizations can be deemed as warfighting combatants by adversaries. Department of Defense regulations should mandate commercial SATCOM interoperability and transparent specifications to enhance centralized management and awareness. Moreover, in preparation for the event that commercial provisions are unavailable, MILSATCOM capabilities should remain a significant portion of DOD SATCOM capabilities.

Automation

Additionally, no warfighting domain can benefit more from artificial intelligence (AI) and automation than space. The centralization of space and space capabilities under USSC and USSF requires a realtime common operational picture of all space assets and the dynamic, automated shifting of resources as priorities change. This includes the usage of commercial and allied partner satellite assets. Modern AI tools can be trained with secure data to assist with these assembly-line actions. Consequently, the manpower savings realized from implementing these capabilities can be reinvested into decentralized, small-unit leaders, allowing senior leaders to focus on operations and strategies. This necessary culture shift can greatly benefit space operators during high-intensity conflict.

Cyber Force

Concurrently, momentum is gaining in discussions regarding the formation of a new U.S. Cyber Force. Like the stand-up of both USSC and USSF, a Cyber Force that supports United States Cyber Command will likely have similar challenges concerning Service culture, Joint Force contributions, and command relationships. If we believe that cyber is a joint warfighting domain, then no single Service branch should dominate its mission.

Concluding Remarks

Space is the most unexplored warfighting domain with the most significant future potential. Satellite capabilities underpin every level of command and control within the DOD. Modern warfighting—competition, conflict, or post-conflict—depends upon these beyond-line-of-sight information relay capabilities. Without satellites, contemporary distributed operations would regress into the massive formations of previous conflicts, significantly reducing maneuver and effectiveness.

Space Command can benefit from a more holistic joint contribution from its Service components rather than the currently dominated contribution from the USSF. Space Command should focus on unique, strategic contributions to the space domain that do not overlap the role of USSF or duplicate *NDS* and *NMS* policy. The remaining USSC Service components should report on ground terminal health and acquisition since the ground segment is their most significant contribution to the overall space system. Artificial intelligence and automation can enhance global management of the space domain and more efficiently share these highly constrained and limited bandwidth resources.

The status quo is no longer acceptable for the space domain. These critical enhancements must be enacted swiftly and decisively. Our next conflict will not tolerate bureaucratic obstacles as an excuse for a lack of readiness. The time for change is now.

