

SPACE CONTROL OPERATIONS AND THE U.S. ARMY

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THE U.S. ARMY's ability to achieve battlefield dominance critically depends on global information dominance (ID), the free flow of information to and from our forces while denying the enemy that same free flow. In today's battlespace, space superiority is a key ingredient of ID. Space systems provide critical force multipliers needed to conduct successful full-dimensional operations. To achieve ID, the Army needs communications satellites; navigation satellites; and reconnaissance, intelligence, surveillance, and target acquisition (RISTA) satellites. Achieving space superiority to protect space systems is of paramount importance to Army commanders.

Department of Defense Directive 3100.10, *Space Policy*, states that "the degree of dominance in space of one force over another . . . without prohibitive interference by opposing force" is dominant space control (SC).¹ Another document, Joint Publication (JP) 3-14, *Joint Tactics, Techniques, and Procedures for Space Operations*, defines SC as "ensur[ing] freedom of action in space for friendly forces while denying it to the enemy."² SC operations include space surveillance, prevention, protection, and negation. Effective SC actions help ensure the Army's ability to provide intelligence support to U.S. forces. It enhances a commander's situational awareness of the battlespace, ensures in-depth coverage of the battlefield, facilitates unit coordination and critical resource management, helps rapid force projection, and protects vital battle command functions. Effective SC also denies those same advantages to an enemy and helps create the foundation for swift victory.

As with any military capability, the Army has a vested interest in mastering SC. A land component commander's (LCC's) strengths will be magnified and weaknesses lessened by effectively applying SC measures. Protecting and defending

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Most likely, depending on the threat and theater, the commander will employ a combination of organic assets and nonorganic capabilities from other services and national agencies using reachback. If these assets are unavailable through reachback, the theater commander must have his own organic capability to perform these functions.

According to U.S. Army Field Manual (FM) 100-6, *Information Operations*, "Information is an essential foundation of knowledge-based warfare. When transformed into capabilities, information is the currency of victory."³ Space is today's high ground, and satellite systems provide critical information. The Army uses space systems to enhance force deployment, detect problems, provide early warning, fill information gaps, reduce vulnerability, and facilitate entry into a theater of operations. Space systems also provide assured communications, reliable intelligence and weather information, and

dependable and accurate positional data. The connectivity provided by satellite communications systems enhances the flexibility, agility, and battle command of Army forces. Satellite systems provide Army units with imagery and meteorological data to support mission planning, terrain analysis, and

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mapping. Information—the currency of space operations—enables commanders to act before an enemy does and helps create conditions for victory.

Unfortunately, similar data may be readily available to an adversary on the open world market, much of which can be used for military purposes. The United States' advantages in collecting, processing, and disseminating military data are steadily eroding. Other nations openly share their satellite products, and commercial products can be purchased over the Internet.

Army's Vital Interest for SC

Successful operations require the ability to anticipate situations, respond with greater agility and capability than the enemy, and support a high operating tempo. Timely and accurate information is vital. Space-based systems have unrestricted access to battlefields and allow commanders to receive deep-operations information as quickly as they can receive close-operation information. Space systems enable Army forces to recognize critical events, influence the decisionmaking process, enhance intelligence preparation of the battlefield, and support total force positioning within the battlespace. Space systems help the commander establish conditions conducive to effective operations such as isolating the enemy force, detecting impediments to movement, and countering nontraditional threats. Space-based communications systems provide the global connectivity necessary to support command and control (C2) planning, coordinating, directing, and controlling. Tactical forces possess improved capabilities to target the enemy, coordi-

nate fires, conduct operational maneuver, assess the effects of previous operations, and anticipate enemy actions.

SC operations facilitate friendly freedom of action on the ground as well as in space. SC operations include surveying space systems, which provide both actual and predicted satellite positioning. This knowledge enables a commander to know when a threat system can view his operations. The commander then has options to counter the threat by hiding his forces, repositioning his forces, or allowing the enemy to see the forces arrayed against him.

The commander can also use satellite positional information to better plan his own operations. Space systems are one of the primary means of battle damage assessment (BDA). If quick-turn BDA is necessary, he can take that into account when planning force employment. Communications and global positioning system satellites might need to be in a specific configuration to fully support the operation.

Being able to ascertain a satellite's stability, operational parameters, and operational uses creates value for the warfighter. Even though a U.S. force might be in view of a threat satellite, if that satellite is unstable or offline, it might not really be a threat.

In an offensive counterspace role, SC operations help suppress and negate enemy space capabilities. The commander employs a counterspace capability to protect the force from enemy satellites and assure friendly access to space. If an adversary's ground forces cannot be neutralized due to political, economic, or other constraints, the commander must defeat the space forces or systems to support his own operations and to protect his force. If he decides to employ a weapon against the satellite, he will require an extraordinary fire control capacity. In such cases, the surveillance functions take on a new importance—space control becomes fire control.

Overall, SC capabilities are force multipliers for operational effectiveness. Robust SC capabilities mitigate the limitations of small, mobile forces such as brigade combat teams while increasing their lethality. Space systems provide a reachback capability to deployed forces to allow them to operate in an austere environment or to conduct split-based operations. Space systems enhance the Army's capability to conduct full-dimensional operations, exercise more effective battle control, meet deployment demands, and allow flexible responses in environments ranging from stability and support operations to decisive engagement.

Conducting SC Operations

Military applications of SC have solid foundations in military doctrine, starting with JP 3-14. The Army has developed the same doctrine in FM 100-18, *Space Support to Army Operations*, and clearly articulates its understanding of SC's importance and emphasizes the need to be a key player in carrying out SC operations; however, the Army is limited in its ability to influence the employment of these space systems.⁴

The U.S. Air Force owns and operates most DOD space systems and C2 capability. For example, the worldwide Space Surveillance Network (SSN), centered at Cheyenne Mountain Operations Center, Space Control Center, Colorado, tracks all manmade objects in orbit. The Satellite Control Network, headquartered at Schriever Air Force Base, Colorado, enables the Air Force to command and control many of the DOD payloads in orbit.

The resources a theater commander or an LCC need for RISTA, for instance, are controlled by organizations at the national level. The Army does not control assets and capabilities that are essential to victory for land forces. Assets are limited, and their capabilities and products are a matter of shifting priorities that the Army has little control over. The Army has much to lose if these systems are not supporting the Army. Defensive counterspace, those efforts that guarantee friendly access to space, is a limited toolset confined to surveillance, tracking, and C2. The Army depends heavily on these space systems but has no way to protect them. Also, the Army has no apparent capability to deny an adversary's access to space.

If the Army truly has the most to lose if these functions fail, then the Army has the most to gain by ensuring those functions are accomplished. For example, suppose the commander in chief is considering Operation Left Hook, a turning movement to outflank enemy forces. This plan needs satellite reconnaissance to detect resistance and confirm routes. At the same time, the plan needs satellite reconnaissance of the nation's littoral region to access resistance and map potential landing sites. In addition, the plan must ensure that the enemy does not detect the preparations for Operation Left Hook. Meanwhile, the National Command Authorities (NCA) have decided that controlling the burning oil fires in Kuwait is a national priority and that the entire area needs surveillance. With only one satellite capable of providing the resolution necessary to fulfill these intelligence needs, a tasking conflict arises.



Surveyors from the 30th Engineer Battalion use GPS survey receivers to establish precise positions during a Bright Star exercise.

US Army

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At the same time, the enemy is procuring images of allied forces from the Indian Remote Sensing (IRS) 1D satellite and trying to procure imagery from Space Imaging's IKONOS satellite and Israel's Earth Remote Observation Satellite (EROS) A1. But IRS-1D recently maneuvered its satellite, and the SSN has not found it yet. Based on previous passes, the SSN knows that IRS-1D might soon be over our immediate area, but we do not know exactly when or where. The United States cannot afford to have IRS-1D images of its marshaling areas passed to the enemy.

In this scenario, the LCC may simply be out of luck. If the NCA decide the oil fires are the highest priority, the LCC does not get his critical reconnaissance when he needs it. This will probably delay Operation Left Hook, which will increase the risk of discovery. Also, finding IRS-1D is problematic. Without tracking sensors in theater, there is no capability to locate that satellite. Consequently, IRS-1D is unrestricted and threatens to expose our forces

and plans. At this point, the United States has lost SC; denying the enemy access to space has failed.

To provide the necessary SC capabilities for the 21st-century Army, the Army Space Master Plan

The USASMDC should also create a dedicated military occupational specialty for space operations and a space additional skill identifier for warrant officers. If the Army wants to develop, acquire, and then operate organic SC capabilities, it must have trained soldiers. Functional area specialists, although valuable, will simply be insufficiently trained to meet the needs of day-to-day operations.

(ASMP) and the U.S. Space Command Long-Range Plan offer a compelling vision of the future as it relates to SC. This vision of space supremacy and uncontested control of space defines four key SC objectives as the ability to:

- Surveil a region of space and achieve situational understanding.
- Protect our critical space systems from hostile actions.
- Prevent unauthorized access to and exploitation of U.S. space systems.
- Negate hostile space systems that place U.S. interests at risk.

Recommendations

With organic SC assets, tomorrow's LCC could fare better. Given an operational-level, DOD-owned, space-based radar system with C2 to task, control, and process the data, the LCC could have a theater-level space-based RISTA capability. The LCC should also have surveillance and tracking capabilities under his control. The tracking capability could also be used to track an uncooperative target like IRS-1D. The tracking function can also provide target acquisition that could direct the fires of the in-theater counterspace capability.

Clearly, a tactical SC capability to support the joint forces and LCC is a requirement. The primary objective must be to establish SC at the theater or operational level of war, both offensively and defensively, within the land component. The U.S. Army Space and Missile Defense Command (USASMDC) is the only agency with the charter and potential resources to implement such a capability. Deploying a fully capable SC "system of systems" will take several years; however, there are steps that could be taken to realize such an interim capability.

One step is for the Force Development and Integration Center (FDIC) to begin drafting space operations doctrine and SC FMs. Working closely with the Space and Missile Defense Battle Lab (SMDBL), FDIC will study operations in an experimental environment. Doctrine and FM concepts can be evaluated before being finalized and instituted throughout the Army.

SMDBL would design demonstrations and experiments to develop and test SC technologies, doctrine, and concepts. Using results from experiments, SMDBL would work with FDIC to refine requirements that are already validated and to develop programs to acquire resources for future capabilities.

The Space and Missile Defense Technology Center and the Space and Missile Defense Acquisition Center, Army Space Program Office (ASPO), should immediately look to the services' and nation's research and development labs, the services' battle labs, academia, and industry for additional interim SC capabilities. The U.S. Army Space Command (ARSPACE) could use ASPO's accelerated acquisition authority to expedite integration of acquired short-term SC capabilities.

A large portion of this work will fall on USASMDC. The first order of business should be to refocus the ARSPACE integrated product team and make it responsible for supporting joint commanders, LCCs, and Army forces headquarters with tactical deployable SC capabilities for short and long term.

The USASMDC should also create a dedicated military occupational specialty for space operations and a space additional skill identifier for warrant officers. If the Army wants to develop, acquire, and then operate organic SC capabilities, it must have trained soldiers. Functional area specialists, although valuable, will simply be insufficiently trained to meet the needs of day-to-day operations. Just as specialized enlisted and warrant officer training is required in all other branches, so too will specialized training and expertise be required for SC.

Eventually, ARSPACE will operationalize the Army's SC capabilities and create organizations to employ these assets. The 1st Space Battalion Battalion would pursue C2 and tactical warning/attack assessment missions. The 1st Space Battalion would also command Army space support teams (ARSSTs) and would be the conduit for transferring new technologies from the SMDBL to the field. ARSSTs would deploy to division and corps levels and would be the Army space forces' primary C2 agents for Army space assets. They would also serve on the respective commanders' staffs as ARSPACE liaisons. The 1st Satellite Control Battalion would com-

The amphibious assault ship USS *Bataan* lies across a pier from a fast combat support ship in this image taken from the commercial IKONOS satellite orbiting 423 miles above the earth.



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mand the joint tactical ground station and the defense satellite communications systems.

The 2d Space and Information Operations Brigade (2d SpIO Bde) would become the space combat arm of ARSPACE. Manning would include a large pool of Army space operations officers, warrant officer technicians, and noncommissioned officers. The 2d SpIO Bde will be a fully deployable unit, responsible for supporting the LCC in theater. Its missions are active space and information operations (IO) defense and any counteroffense the LCC may require. Once deployed, the 2d SpIO Bde would come under the operational control of the LCC and would require a highly technical skill mix that would work closely with the intelligence units that operate the tactical exploitation systems. The 2d SpIO Bde's subordinate units would include the 8th IO Battalion (Land Information Warfare Activity), the 9th Space Battalion (SC), and the 10th IO Battalion. The 8th would be responsible for all IO activities. The 9th Space Battalion would have space surveillance and negation capabilities. The 10th IO would be dedicated to electronic warfare, both terrestrial and space. The 2d SpIO Bde would also, when authorized, be able to directly support other components of ARSPACE's warfighting efforts.

The Southwest Asia scenario used earlier in this article changes when the new 2d SpIO Bde is added as the LCC's organic SC forces. As before, the commander in chief is considering Operation Left Hook, a turning movement to outflank enemy forces. He knows the enemy is procuring images of allied forces from the IRS-1D satellite and trying to procure imagery from IKONOS and EROS-A1 satellites. But the IRS-1D has recently maneuvered, and the SSN has not found it yet. Based on previous passes, the SSN knows that IRS-1D might soon be over our immediate area, but we do not know exactly when or where. The United States cannot afford to have IRS-1D images of its marshaling areas passed to the enemy.

Before forming the 2d SpIO Bde, the LCC was simply out of luck. He had no capability to detect, track, or counter the space threat. The 2d SpIO Bde has changed all that. ARSST members at division receive word that IRS-1D has maneuvered. They immediately relay the last confirmed position data to the 9th Space Bn with the task to locate and disrupt the satellite's operations.

The 9th Space Bn activates surveillance radar in search mode to cover the possible paths IRS-1D may take. The surveillance radar detects the satel-

lite and sends its position data to the 10th IO Battalion, whose tracking radar produces fire control-quality tracking data. Simultaneously, the 8th IO Battalion begins to reconnoiter the information domain. IRS-1D data is transmitted electronically, and the 8th IO Battalion prevents that imaging data from reaching the intended user.

Meanwhile, the 10th IO Battalion sweeps the electronic domain to ascertain the IRS-1D downlink frequencies. The 10th could, if tasked, jam the ground-based receiver site. The commander then decides which method to use to counter the threat. He has the resources to defend his own forces and to neutralize the space threat.

The 9th Space Battalion could employ its mobile laser dazzler to temporarily blind the satellite's cameras. If that were unsuccessful, the 10th IO Battalion would attempt to jam the downlink site to prevent images from downloading. Finally, if that failed, the 8th IO Battalion could intercept the successfully downloaded images during landline transmission. Regardless of the method, the commander's organic capability has neutralized the threat, maintained SC, and allowed the plan to continue.

The Army's ability to accomplish its missions around the world depends largely on guaranteed access to space systems. The force-multiplying effects of space systems allow for a small, lethal force that can deploy quickly with assured knowledge of the battlespace and the enemy. Space systems allow

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split-based operations and the C2 necessary to manage dispersed forces. Space systems also provide the means to know more than an adversary and to be able to act before he does. Access to space can only be guaranteed by applying effective SC measures. Surveillance and tracking, satellite control, and counterspace operations are the fundamental capabilities the Army must have to guarantee access to the information necessary for swift victory. An organic organization within the Army dedicated to SC and ID could implement the necessary capabilities for full support. Mastering space is no longer an optional competency left to a single agency. **MR**

NOTES

1. Department of Defense Directive 3100.10, *Space Policy* (Washington, DC: U.S. Government Printing Office [GPO], TBP).
2. Joint Publication (JP) 3-14, *Joint Tactics, Techniques, and Procedures for Space Operations* (Washington, DC: GPO, TBP).
3. U.S. Army Field Manual (FM) 100-6, *Information Operations* (Washington, DC: GPO, 27 August 1996).
4. FM 100-18, *Space Support to Army Operations* (Washington, DC: GPO, 20 July 1995).

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