

Chapter 4

Space Doctrine

*Maj Christopher J. King, USAF; MAJ Dillard W. Young, USA;
Maj Edward P. Byrne, USAF; and Maj Paul P. Konyha III, USAF*

Doctrine provides, in essence, a knowledge base for making strategy decisions. Doctrine is always somewhat abstract and thus provides the foundation from which to begin thinking when facing a concrete and specific decision. Without doctrine, strategists would have to make decisions without points of reference or guidance. They would continually be faced with the prospect of “reinventing the wheel” and repeating past mistakes. Superior doctrine should be the storehouse of analyzed experience and military wisdom and should be the strategist’s fundamental guide in decisionmaking.

—Col Dennis M. Drew, USAF, Retired
and Dr. Donald M. Snow
*Making Strategy: An Introduction to
National Security Process and Problems*

The US National Space Policy Letter establishes the national space strategy and emphasizes the nation’s reliance on space power. It codifies the space roles of the secretary of defense and the director of national intelligence in accomplishing space policy goals. The guidance for conducting space operations is published at both the joint and service levels. Air Force and Army service space doctrine is linked to national-level space strategy through joint space doctrine, Joint Publication (JP) 3-14, *Space Operations*. (Neither the Navy nor the Marine Corps has space doctrine.) This chapter summarizes the three primary doctrinal publications (joint, Air Force, and Army) that address military space operations and the relationships among them. If conflicts arise between JP 3-14 and individual service space doctrine, JP 3-14 takes precedence unless coordinated by the chairman of the Joint Chiefs of Staff (CJCS) and other members of the Joint Chiefs of Staff (JCS). If operating as part of a multinational force, commanders should follow multinational doctrine and procedures that have been ratified by the United States.

Joint Doctrine for Space Operations

Space capabilities continue to improve and evolve as new and better technologies are developed. As a result, space operations have become integrated into almost all aspects of joint military operations. To ensure these capabilities are efficiently and effectively integrated, it is essential that both the joint force commanders (JFC) and space operators have a mutual understanding of how and what space operations contribute to joint operations. JP 3-14 strives to achieve this objective by providing the guidelines for planning, executing, and assessing joint space operations.¹ This publication provides space doctrine fundamentals for all joint war fighters (air, land, sea, space, cyberspace, and special operations forces); describes the military operational principles associated with space operations support from, through, and in space; explains command relationships and responsibilities between the Joint Staff, combatant

commands, US Strategic Command (USSTRATCOM), and USSTRATCOM functional and service components; and establishes a framework for the employment of space forces and space capabilities.² JP 3-14 describes the fundamentals of military space operations, the space mission areas, and command and control of space forces. It also outlines roles, responsibilities, and support to space planning.

Fundamentals of Military Space Operations

The section on fundamentals of military space operations includes discussions on the military space contribution to joint operations and on operational considerations for space.

Military Space Contributions to Joint Operations. Currently, space operations are viewed as a significant force multiplier when successfully integrated with joint military operations. To ensure the most effective allocation of space forces, it is necessary that all parties have a clear and common understanding of the available space capabilities (military, national, civil, commercial, and foreign) and the means to integrate these capabilities throughout the planning, execution, and assessment of joint mission operations.

The rapid advancement of new technologies has increased the application of space capabilities throughout the military, civil, and commercial sectors of the United States. As US reliance on space systems continues to increase, so does its potential vulnerability. Any intentional interference with these systems is viewed by the United States as an infringement on its rights. Commanders must anticipate hostile actions against space systems and take the necessary precautions to ensure their protection. The protection of military space capabilities also provides US forces the freedom to exploit space capabilities at a time and place of their choosing.

Space systems are unique in that they provide a truly global and responsive capability. Commanders must understand, however, that space systems are a limited resource. New requirements for space support can be satisfied by using deployed systems, which may take hours to days, or by developing and deploying new systems, which usually takes years.

Space forces employ the principles of joint operations and enable the application of these principles by other joint forces. Since the inception of joint doctrine, there have existed nine principles of war: objective, offensive, mass, economy of force, maneuver, unity of command, security, surprise, and simplicity. Three new principles—restraint, perseverance, and legitimacy—have been added to comprise the new 12 principles of joint operations. JP 3-0, *Joint Operations*, provides a detailed description on the purpose of these 12 principles. JP 3-14 provides a brief description of each of the 12 principles and also includes discussions on how each principle is employed and the outcome each enables, as it relates to space operations.

Operational Considerations for Space. Integration of space capabilities throughout the range of military operations provides the joint forces with numerous advantages necessary for mission success. The supported commander should integrate and synchronize these capabilities throughout all aspects and phases of the planning process. Both the supported and supporting commanders must coordinate the deployment and employment of required space forces. Coordination is sometimes difficult since space forces simultaneously support numerous global customers. It is the

responsibility of the commander, USSTRATCOM (CDRUSSTRATCOM) to prioritize space capabilities and resources required to meet the supported commander's needs.

Commanders should take into account the following considerations when coordinating military operations. First, commanders should understand how others, including friends and adversaries, use space in support of military and civilian operations. Second, they must provide allies and coalition partners with the necessary access to resources and information. Third, commanders must establish the means to monitor the operational status of space systems. Fourth, they should understand the capabilities and limitations of space forces in relation to the mission at hand. Finally, commanders should understand the potential risks and impacts to space-based and ground-based systems and operations.

Commanders should also have an understanding of the unique characteristics of operating in the space environment as well as the advantages and disadvantages provided by space operations. Satellite orbits are chosen based on the mission they are designed to perform. Once in orbit, a satellite's motion is governed by physics and orbital mechanics. (See chapter 6 for more information regarding orbital mechanics.) Because a nation's sovereign territory does not extend into space, countries benefit from unimpeded satellite overflight of other nations. A major advantage of operating from space is that it provides direct line-of-sight to large areas of the earth's surface. Operating from space also has its disadvantages. Space is a harsh environment. Although systems are designed to survive in space, they are still susceptible to phenomena, such as space weather events or space debris, that have little or no impact to Earth-based systems. Space systems are also vulnerable to attacks. Today, many methods that can be used to disrupt or deny space capabilities are inexpensive, unsophisticated, and easily acquired by adversaries.

Space Mission Areas

JP 3-14 identifies four mission areas in US military space operations: space force enhancement, space support, space control, and space force application.³

Space Force Enhancement. Space force-enhancement operations multiply joint force effectiveness by increasing the combat potential and operational awareness and providing needed joint force support. There are five force-enhancement functions: (1) intelligence, surveillance, and reconnaissance (ISR); (2) missile warning; (3) environmental monitoring; (4) satellite communications; and (5) space-based positioning, navigation, and timing.⁴ For detailed information regarding the five force-enhancement functions, refer to JP 3-14, appendices A-E.

Space Support. According to JP 3-14, "space support includes space lift operations (launching and deploying satellites), satellite operations (maintaining, sustaining, and rendezvous and proximity operations), and reconstitution of space forces (replenishing lost or diminished satellites)."⁵

Space Control. The space control mission area includes "offensive space control (OSC), defensive space control (DSC), and space situational awareness (SSA). OSC is used to deny adversary freedom of action in space and is based on negation and offensive prevention measures. DSC is used to protect space capabilities and is based on protection and defensive prevention measures. SSA involves characterizing the space capabilities operating within the terrestrial environment and space domain."⁶

Space Force Application. “Space force application operations consist of attacks against terrestrial-based targets carried out by military weapons systems operating in or through space.”⁷ Specific responsibilities for the force-application mission can be found in DOD Instruction (DODI) 3100.13, *Space Force Application*.

Command and Control of Space Forces

Command relationships are necessary to generate and maintain unity of command, effort, and purpose in achieving joint force and national security objectives. For space operations, CDRUSSTRATCOM is responsible for promoting, planning, prioritizing, de-conflicting, integrating, synchronizing, and executing military space operations.

Command Relationships. CDRUSSTRATCOM is charged with conducting the military space operations mission. The commander, Joint Functional Component Command for Space (CDR JFCC Space) is the primary point of contact for military space operations. The responsibility for managing day-to-day space operations has been delegated to CDR JFCC Space by CDRUSSTRATCOM. CDRUSSTRATCOM has also delegated coordinating authority for space operations planning and execution, operational control (OPCON) of designated space and missile-warning forces, and management of the theater event system to CDR JFCC Space.

It is the nature of space operations that space assets provide simultaneous support to multiple global customers. Therefore, these forces normally remain attached to CDRUSSTRATCOM. Situations may arise, however, that require the transfer of space forces to a specific combatant commander (CCDR).

Responsibilities. CCDRs are responsible for prioritizing their requirements for space operations support and providing them to CDRUSSTRATCOM. CCDRs should also establish guidance and objectives for joint forces, identify OSC and DSC objectives that must be met, and if necessary, consider designating a space coordinating authority (SCA).

Space Coordinating Authority. The SCA is responsible for planning, coordinating, and integrating space capabilities and operations within the joint force. The SCA can either be retained by the JFC or designated to a component commander. The SCA collects requirements and determines if they can be satisfied by space capabilities. If so, the SCA plans and conducts space operations within established processes. Once coordinated, the SCA provides a prioritized list of requirements to the JFC for approval. The SCA also monitors theater space operations and events and ensures their respective commanders are aware of all coordination activities.

Role of Non-Department of Defense Capabilities. Space systems are a limited resource. Often DOD space systems cannot satisfy all CCDR requirements and must be augmented by civil, commercial, international, allied, or other US government agency systems. USSTRATCOM is the primary organization responsible for coordinating non-DOD space support to fulfill CCDR requirements.

Roles and Responsibilities

According to JP 3-14, “The joint force achieves maximum utility from space forces when they are organized and employed effectively. While some command and support relationships are enduring, others may vary for operations of different scopes and purposes. The joint force allocates space forces in the joint operations planning process.”⁸

Chairman of the Joint Chiefs of Staff. The CJCS establishes a standardized system for assessing each combatant command's and combat support agency's readiness to employ space forces. The CJCS is also responsible for developing joint doctrine for the exploitation of space capabilities, developing joint space training and military education, integrating space forces and their industrial base into the Joint Strategic Capabilities Plan, and establishing policies for the integration of the National Guard and Reserve forces. Finally, the CJCS provides direction to CCDRs for the exploitation of space capabilities throughout the joint operation planning process.

Combatant Commanders. CCDRs are responsible for satisfying mission needs and must consider all available options, including space operations. When space forces are required, the CCDR is responsible for prioritizing requirements and submitting them to CDRUSSTRATCOM. Once approved, CCDRs ensure space capabilities are integrated into joint mission plans. Depending on the complexity and scale of the effort, CCDRs may need to employ staff elements or component commands to assist with the space mission. CCDRs are also responsible for responding to Joint Staff inquiries regarding the coordination, readiness, and protection of space forces.

US Strategic Command. The Unified Command Plan assigns USSTRATCOM the responsibility for the space operations mission. This responsibility includes planning, directing, coordinating, and controlling space assets and forces for daily operations. It also includes crisis action planning in the event of hostilities directed against the United States and its allies. CDRUSSTRATCOM ensures the most efficient and effective use of space assets by integrating and synchronizing DOD space capabilities. JP 3-14 states that "USSTRATCOM operates assigned space forces through Joint Functional Component Command for Space—JFCC Space, in coordination with Service component commands, USSTRATCOM functional component commands, and other agencies and organizations."⁹

Joint Functional Component Command for Space. The goal of JFCC Space, as defined in JP 3-14, "is to provide unity of command and unity of effort in unimpeded delivery of joint space capabilities to supported commanders and, when directed, to deny the benefits of space to adversaries."¹⁰ CDR JFCC Space is the primary point of contact for military space operations and is the primary interface between USSTRATCOM and the supported commanders. As the focal point for military space operations, JFCC Space has been charged with numerous responsibilities:

- Plan and conduct space operations.
- Conduct operational-level command and control (C2) of assigned forces.
- Maintain and make available to all authorized users and mission partners a common space picture, to include satellite constellation maintenance and state-of-health operations.
- Coordinate space operations between USSTRATCOM and the National Reconnaissance Office (NRO).
- If designated SCA, coordinate joint space operations with each combatant command's SCA.
- Support CDRUSSTRATCOM as the DOD manager for human spaceflight support.
- Perform radio frequency deconfliction and laser clearinghouse operations.
- Provide indications, warnings, and assessments of attacks on space systems.
- Provide missile warnings.

- Integrate navigation warfare (NAVWAR) operations.
- Identify and assess current and future space requirements.
- Exploit joint space operations in support of CDRUSSTRATCOM requirements.

The Joint Space Operations Center (JSpOC) directly supports the CDR JFCC Space mission by providing continuous C2 capabilities to conduct space operations. The JSpOC also develops and provides an integrated space picture to enhance the CCDR's space situational awareness and supports both CDRUSSTRATCOM and CDR JFCC Space on all aspects of the space mission.

Other US Strategic Command Functional Components. In addition to JFCC Space, USSTRATCOM has five other functional components.

1. Joint Task Force-Global Network Operations (JTF-GNO): Directs the operation and defense of the Global Information Grid.
2. Joint Functional Component Command for Intelligence, Surveillance, and Reconnaissance (JFCC ISR): Formulates the plan to integrate global ISR capabilities associated with mission requirements into combatant command planning and operations.
3. Joint Functional Component Command for Network Warfare (JFCC NW): Responsible for the cyber warfare mission in support of the joint force.
4. Joint Functional Component Command for Integrated Missile Defense (JFCC IMD): Responsible for integrated missile defense planning and operational support.
5. Joint Functional Component Command for Global Strike (JFCC GS): "Provides planning and force management in order to deter attacks against the United States, its territories, possessions, and bases, and when directed, defeat adversaries through decisive joint global strike."¹¹

Service Component Operations. Service component commands play an important role in supporting USSTRATCOM's space operations mission by training, equipping, and providing the necessary forces. USSTRATCOM works through JFCC Space to coordinate with the service components and their operations centers. The service component commands include the US Army Space and Missile Defense Command/Army Forces Strategic Command (USASMD/ARSTRAT); Naval Network Warfare Command (NETWARCOM); Marine Corps Forces, US Strategic Command (MARFORSTRAT); and Air Force Space Command (AFSPC). Although each service component performs its own unique mission, common responsibilities do exist. Each service component is responsible for

advocating for space requirements within their respective Services, providing a single point of contact for access to Service resources and capabilities, making recommendations to USSTRATCOM on appropriate employment of Service forces, providing assigned space forces to CDRUSSTRATCOM and CCDRs as directed, assisting in planning in support of space operations and assigned tasking, and supporting CDRUSSTRATCOM and other CCDRs with space mission area expertise and advocacy of desired capabilities as requested.¹²

Theater Support. JFCs and their components are responsible for requesting space services and capabilities early in the planning process. Individuals, either assigned or resident on staffs, assist the SCA with theater space operations by creating, gathering, and prioritizing space capability requirements. Space service support can also be provided by other DOD and national agencies.

Combat Support Agencies. Space forces are a limited resource and are constantly in high demand. Often CCDR space requirements cannot be entirely satisfied by DOD

systems alone and must be augmented by national, civil, commercial, and/or foreign systems. USSTRATCOM is the primary organization responsible for coordinating non-DOD space support to fulfill CCDR requirements. Three major agencies provide support in this area:

1. National Geospatial-Intelligence Agency (NGA): Provides geospatial intelligence in the form of imagery analysis to “describe, assess, and visually depict physical features and geographically referenced activities on the Earth.”¹³
2. National Security Agency/Central Security Service (NSA/CSS): A unified organization that helps protect the United States by providing signals intelligence products to national-level decision makers.
3. Defense Intelligence Agency (DIA): Provides intelligence support to include “all-source military analysis, measures and MASINT [measurement and signature intelligence], HUMINT [human intelligence], counterintelligence, IO [information operations], personnel recovery, peacekeeping and coalition support, indications and warning, targeting, BDA [battle damage assessment], collection management, and intelligence support to operations planning.”¹⁴ Other important elements of the DIA are the Defense Intelligence Operations Coordination Center (DIOCC), the Missile and Space Intelligence Center (MSIC), and the Defense Special Missile and Aerospace Center (DEFSMAC).

Other Agencies and Organizations. Other agencies with a role in joint space operations include:

1. National Reconnaissance Office (NRO): A joint organization that researches, develops, acquires, launches, and operates overhead reconnaissance systems to obtain information in support of intelligence community and DOD requirements.
2. National Air and Space Intelligence Center (NASIC): The primary agency for foreign air and space threat assessments.
3. National Oceanic and Atmospheric Administration (NOAA): Operates numerous programs that provide information in support of military, commercial, civil, and interagency operations, including Operational Significant Event Imagery (OSEI), National Geophysical Data Center, Space Weather Prediction Center (SWPC), Earth weather satellites, and search and rescue satellite-aided tracking (SARSAT).

Commercial Space Operations. The benefits of space operations can go far beyond their military application. Space operations are infused in the day-to-day activities of society on a global scale. According to JP 3-14, “due to the demand for space-based products and services, the [US government] has established policy to foster the use of US commercial space capabilities around the globe.”¹⁵ Such capabilities include remote sensing; position, navigation, and timing; and commercial satellite imagery.

Multinational Space Operations. Unlike the United States, most other nations’ space operations are dominated by their civilian and commercial segments, but space operations often provide support to military operations. For example, the United States relies heavily on foreign environmental space capabilities to augment its own systems. It is essential to understand US disclosure policy regarding the release of space-derived products when working with allied or coalition forces. NATO has established offices to coordinate specific programs and integrate space capabilities. For NATO, the

Consultation, Command, and Control Agency is responsible for commercial space imagery and satellite communications (SATCOM) programs.

Planning

Planning is an essential component of space operations, as prescribed in JP 3-14: “Commanders address space operations in all types of plans and orders, at all levels of war. Additionally, plans must address how to effectively integrate capabilities, counter an adversary’s use of space, maximize use of limited space assets, and to consolidate operational requirements for space capabilities.”¹⁶

Operational Art and Design. JP 5-0, *Joint Operation Planning*, defines operational art and design:

Operational art is the application of creative imagination by commanders and staffs—supported by their skill, knowledge, and experience—to design strategies, campaigns, and major operations and organize and employ military forces. Operational art integrates ends, ways, and means across all levels of war. . . .

Operational design is the conception and construction of the framework that underpins a joint operation plan and its subsequent execution. While operational art is the manifestation of informed vision, operational design is the practical extension of the creative process.¹⁷

Successfully synchronized, operational art and design combine to help commanders and staffs visualize the flow of a campaign. There are 17 elements of operational design that must be considered during the planning process: termination, end state and objectives, effects, centers of gravity, decisive points, direct versus indirect, lines of operation, operational reach, simultaneity and depth, timing and tempo, forces and functions, leverage, balance, anticipation, synergy, culmination, and arranging operations.

Key Planning Considerations. Space planners must understand the capabilities and limitations of space systems and how they can support mission requirements. Space operations have their own unique challenges that must be understood and considered during planning. These include the predictability of satellite orbits, the vulnerabilities of space systems, the limited nature of space resources and the long lead times to replenish or supplement on-orbit assets, timing considerations, legal aspects associated with laws and treaties, and the impacts of multinational space operations.

Control and Coordinating Measures. The joint space tasking cycle is used to coordinate and deconflict space assets and missions. The joint space tasking order is used to task units with specific missions but does not incorporate non-DOD space assets.

Air Force Doctrine for Space Operations

Air Force doctrine for space operations is articulated in AFDD 2-2, *Space Operations*. Air Force doctrine establishes guidance for the integration of space power across the range of military operations and recommends command and control constructs. This doctrine provides the foundation upon which Air Force commanders plan, execute, and assess space operations, as well as integrate space capabilities throughout joint operations.¹⁸ Eleven foundational doctrinal statements about space operations drive the development of Air Force space doctrine. AFDD 2-2 follows the general construct of the previous version of JP 3-14 by describing a foundation for military space operations, command and control of space forces, support for space planning, and military space

operations. Although similar to the previous version, the January 2009 version of JP 3-14 has changed slightly and now describes the fundamentals of military space operations, space mission areas, command and control of space forces, roles and responsibilities, and support for space planning.

An important assumption made in Air Force doctrine is that the commander, Air Force forces (COMAFFOR) will be assigned simultaneously as a joint force air (and space) component commander (JFACC). Additionally, Air Force doctrine assumes that through the JFACC it will execute tactical control of both joint air and space forces through the air (and space) operations center (AOC).¹⁹ The relatively new change in terminology to include “and space” in both the JFACC and AOC titles is significant and reflects the Air Force’s view of its role as the executive agent for space.

Foundational Doctrine Statements

Air Force doctrine explicitly states the basic principles and beliefs upon which the doctrine is built. These foundational doctrine statements drive Air Force space doctrine:²⁰

- Space power should be integrated throughout joint operations as both an enabler and a force multiplier.
- Space capabilities contribute to situational awareness; highly accurate, all-weather weapon system employment; rapid operational tempo; information superiority; increased survivability; and more efficient military operations.
- Space power operates differently from other forms of military power due to its global perspective, responsiveness, and persistence.
- Global and theater space capabilities may be best employed when placed under the command of a single Airman through appropriate command relationships, focused expeditionary organization and equipment, “reachback,” and specialized talent.
- Space is a domain—like the air, land, sea, and cyberspace—within which military operations take place.
- Space coordinating authority is an authority within a joint force aiding in the coordination of joint space operations and integration of space capabilities and effects. SCA is an authority, not a person.
- The combined force air and space component commander (CFACC) should be designated as the supported commander for counterspace operations.
- To plan, execute, and assess space operations, the COMAFFOR typically designates a director of space forces, an Air Force senior space advisor who facilitates coordination, integration, and staffing activities.
- Space operations should be integrated into the joint force commander’s contingency and crisis action planning to magnify joint force effectiveness.
- Integration of theater space requirements must consider both a global and a theater perspective.
- An established relationship between the CFACC and the commander, Joint Functional Component Command for Space is essential to ensure flexibility and responsiveness when integrating space operations.

Space Operations Fundamentals

The space operations fundamentals chapter in AFDD 2-2 includes a discussion of the Airman's perspective on space power, the effects-based approach to operations, and key space operations principles.

Air Force doctrine views space power as a key ingredient for achieving battlespace superiority. Space is considered the ultimate high ground, and control of space is critical for space superiority to ensure availability of the force-multiplying capabilities of space power. Space power should be integrated throughout joint operations as both an enabler and a force multiplier. Space power adds another dimension to the joint force's ability to posture quickly and achieve battlespace superiority. Additionally, space power bolsters the US global presence because it is not limited by terrestrial antiaccess concerns.²¹

The ability to create accurate effects is crucial in military operations, and space power contributes significantly to this requirement. Space capabilities contribute to situational awareness; highly accurate, all-weather weapon system employment; rapid operational tempo; information superiority; increased survivability; and more efficient military operations. Precision, based on space capabilities, benefits weapons delivery and has many other applications, such as mapping terrain and environmental conditions, collecting detailed imagery, and detecting and characterizing inbound missiles.

Space capabilities significantly increase the flexibility of military operations. Space-based communications allow much greater freedom of movement for terrestrial forces and enhance their command and control. Intelligence derived from space capabilities fills critical gaps in situational awareness, further augmenting joint force command and control capability.²²

An Airman's Perspective on Space Power. Space power operates differently from other forms of military power due to its global perspective, responsiveness, and persistence. Because space-related effects and targeting can be global in nature, space power can be used to accomplish an effects-based approach based on functional capabilities rather than geographic limitations. The Air Force leverages the strengths of space platforms to produce effects based on this global perspective and responsiveness and the unique degree of persistence provided by assets in the space domain.²³

The Air Force is focused on "operationalizing" space at the operational and tactical levels of war. This requires significant integration with other assets and capabilities. The synergistic effect of combining space capabilities with traditional surface, subsurface, and airborne systems delivers persistence over the joint operations area.²⁴

Space operations and the space domain are unique. Space power defies a single model for organization and operations because it requires both a theater and a global perspective. Global and theater space capabilities may be best employed when placed under the command of a single Airman through appropriate command relationships, focused expeditionary organization and equipment, reachback, and specialized talent.²⁵

Space is viewed as a physical domain where space-centric activities are conducted to achieve objectives. Space is a domain—like the air, land, sea, and cyberspace—within which military operations take place.²⁶

Key Space Operations Principles. To share a common perspective on space operations, Airmen should understand key principles and concepts—the four space mission areas and the categories of space capabilities—and know the relevant space-related terminology.

There are four space mission areas: space control, space support, space force enhancement, and space force application. The discussion of these four areas in Air Force doctrine is consistent with that of joint doctrine with one notable exception. The Air Force uses the term *counterspace* as equivalent to the space control mission, as this term aligns more appropriately with other Air Force functions, provides less ambiguity, and provides a common Air Force language.²⁷

Three terms are used to describe different categories of space capabilities: space systems, space assets, and space forces. The term *space systems* refers to the equipment required for space operations, which is comprised of nodes and links. This includes all the devices and organizations forming the space network, which consists of spacecraft; ground and airborne stations; and data links among spacecraft, mission, and user terminals.²⁸ *Space assets* include military and civil space systems, commercial and foreign entities, ground control elements, operators, and space-lift vehicles.²⁹ *Space forces* are military space assets and personnel used by the joint force, which are normally organized as units. There are both global space forces and theater space forces. Global space forces support multiple theater and/or national objectives and are controlled by the commander, USSTRATCOM. Theater space forces support individual theater requirements and generally fall under control of the geographic combatant commander.³⁰

Executing Space Operations

The employment of space forces at the operational level of war is accomplished through tasking orders that deconflict, synchronize, and integrate space operations with theater operations. Although no authority exists for control over nonmilitary space assets, the joint force must integrate with enabling space operations conducted by nonmilitary space assets.³¹

Space AOC/Joint Space Operations Center

The Air Force provides a Space AOC that forms the core of the Joint Space Operations Center (JSpOC) at Vandenberg AFB, California. It includes the personnel, facilities, and equipment necessary to plan, execute, and assess space operations and to integrate space power. The JSpOC tracks assigned and attached space forces and space assets and also provides reachback support to organic theater space personnel. The JSpOC also creates the space tasking order (STO), based on CDRUSSTRATCOM operation orders (OPORD) and CDR JFCC Space guidance. The STO tasks and directs assigned and attached space forces to fulfill theater and global mission requirements in support of national objectives.³²

Integrating Global with Theater Space Operations. Control of military space forces is normally retained by USSTRATCOM due to the inherently global nature of most space assets. Thus, support is the normal command relationship used to integrate USSTRATCOM space operations with theater operations. The JSpOC normally synchronizes its supporting operations with the theaters because they (as the supported commander) drive tasking requirements. An established relationship between the JFACC and the CDR JFCC Space is essential to ensure flexibility and responsiveness when integrating space operations.³³

Execution of Space Forces in-Theater. There are multiservice space forces that can deploy to support operations in-theater. Some of these forces are designed to integrate into

various levels of command within the joint force, while others possess capabilities that must be integrated into the overall military campaign. The secretary of defense may attach these forces to geographic combatant commanders conducting combat operations.³⁴

When deployed, Air Force space forces are normally attached to an air and space expeditionary task force (AETF) under the operational control of the COMAFFOR. When the COMAFFOR is also assigned as the JFACC, the JFACC is normally given tactical control (TACON) of other service space forces that exceed their organic requirements (similar to how the JFACC would receive TACON of any Navy aviation sorties that exceed the Navy's organic requirements).³⁵

Integrating Civil, Commercial, and Foreign Space Assets. Many civil, commercial, and foreign organizations contribute space capabilities to military operations. These nonmilitary space assets provide invaluable alternatives to meet the military's operational needs. Thus, the integration of nonmilitary space assets may become vital to mission accomplishment. In most cases, the geographic combatant commander's staff will determine the appropriate avenue for using these assets.³⁶

Civil, commercial, and foreign space assets often must be requested on an unplanned basis; therefore, preestablished agreements can significantly enhance effectiveness and responsiveness. Additionally, space planners must understand that civil, commercial, and foreign space assets may be specialized and not have sufficient flexibility for dynamic retasking, may require unique procedures and equipment, and may not meet critical requirements for military operations.³⁷

Army Doctrine for Space Operations

US Army doctrine for space operations is articulated in FM 3-14, *Space Support to Army Operations*. Central to this document is the understanding that the objective of Army use of space is to support Army land dominance. Space capabilities are well integrated into Army operations and are critical to Army and joint war fighting.³⁸

Space Operations Overview

The Army leverages space capabilities to accomplish a wide variety of missions. Space-based and space-enabled communications; position, velocity, and timing; environmental monitoring; ISR; and missile-warning support are all necessary for success on the battlefield.³⁹ Robust space capabilities enhance both information superiority and situational awareness. Space operations are conducted by space forces and other personnel who routinely facilitate the use of space assets to support the war fighter.

Army space operations fall into two categories: controlling space and exploiting space. Controlling space means to affect space to benefit US efforts or detract from adversary efforts and falls within the space-control joint space mission area. Exploiting space is making space-based capabilities available to benefit operations and falls within the space force-enhancement joint space mission area.⁴⁰ The ability of the Army to capitalize on space systems, along with the ability to protect them and attack the adversary's capability to use them, yields military power.⁴¹

Key Terms and Organizations

The US Army Space and Missile Defense Command (USASMDC), a major Army command, is the Army proponent for space. USASMDC is also the Army service component command (ASCC) for USSTRATCOM, and in this capacity it is called Army Strategic Command (ARSTRAT).⁴²

ARSTRAT executes command and control of ARSTRAT space forces worldwide and is the focal point for the employment and integration of ARSTRAT space forces into global, national, and military operations. ARSTRAT commands a space brigade consisting of three battalions that provide theater missile warning, space control, and other space-based capabilities and expertise to the war fighter. The satellite control battalion provides communication satellite network and payload control.⁴³

Controlling and Exploiting Space to Enhance Land War-fighting Power

Army space operations consist of those activities concerned with controlling and exploiting space to enhance land war fighting; Army space power is a terrestrial entity and is land-warfare-centric.⁴⁴ The prerequisite to exploiting space is to control the domain of operations. The armed forces require maximum control of particular space assets at particular times; this requires the ability to exercise control of any space asset at any time (which differs from controlling all space assets all the time). The essence of space control for land force purposes is to exercise the Army's will at decisive points for space operations in support of land campaigns. Having space superiority maximizes the contribution space can make to land war-fighting dominance.⁴⁵

Having established space control, the United States can then exploit space to gain military advantage. Land forces should see first, understand first, act first, and finish decisively as the means to achieve tactical success. Space systems provide critical support to each of these capabilities.

Army space operations are guided by five mission-essential tasks included in the Army space policy:

1. Enable situational understanding and joint battle command.
2. Support precision maneuver, fires, and sustainment.
3. Contribute to continuous information and decision superiority.
4. Support increased deployability by reducing the in-theater footprint.
5. Protect the force during all phases of operations.

To accomplish these tasks, space-based capabilities and services provide assured, responsive, and timely support.⁴⁶

Army Joint Space Operations Relationships

Space operations, by their nature, are joint operations. Each service component contributes to an integrated whole that is synchronized by the joint force headquarters. Army space operations support joint force missions and receive support from service and other joint force, government, civil, and commercial space assets. The joint operations concepts document, provided by the secretary of defense, sets the goal of being full-spectrum dominant, which is a driver for the Army's development of space operations capabilities.⁴⁷

JP 3-14 lays the foundation of joint space doctrine by establishing principles for the integrated employment of space capabilities. JP 3-14 recognizes that the services have unique roles to play in providing space capabilities, including specific Army roles:

The Army is to provide space control operations and space support to the joint force and Army component, coordinate and integrate Army resources in the execution of [USSTRAT-COM] plans and operations, provide theater missile warning through employment of joint tactical ground stations (JTAGS), provide space support through the use of Army space support teams, and perform Defense Satellite Communications System payload and network control. Additionally, [USASMDC/ARSTRAT] functions as the SATCOM system expert for Wideband Gapfiller System super-high frequency (SHF) communications satellites and is the parent command for regional satellite communications support centers servicing all combatant commands, their components, and the Defense agencies and other users. U.S. Army Space and Missile Defense Command is the U.S. Army major command that organizes, trains, equips, and provides forces to [USASMDC/ARSTRAT] and plans for national missile defense.⁴⁸

The G3 Section and Space Operations

The corps and division G3 (Operations) has overall coordinating staff responsibility for space operations at its level. The G3 section normally has an assigned space element that provides space operations planning and coordinates space mission execution. Additionally, the G3 coordinates the space-related activities of other staff sections, primarily the G2 (Intelligence) and G6 (Communications).

The G3 space element serves as the staff focal point for coordination of most space activities. The primary function of the space element is to synchronize space mission-area (space control and space force enhancement) activities throughout the operations process. Additionally, space element members coordinate space operations objectives and tasks with their counterparts at higher and lower echelons.⁴⁹

The Functional Area 40 space operations officer is familiar with corps and division operations and plans and is thoroughly educated in space capabilities available for theater operations. Space operations officers identify opportunities for space capabilities to provide effective solutions for war-fighting problems. The space operations officer advises the G3 to request an Army space support team for contingencies or exercises when space operations activities would otherwise overwhelm the space element. The space element and space operations officer also recommend to the G3 and commander other space capabilities that should be used to support the mission.⁵⁰

Army Space Command and Control

At the direction of the secretary of defense, the CDRUSSTRATCOM transfers designated space capabilities to the supported combatant commander or subordinate joint force commander. These capabilities are forces that, for the Army, are normally provided via USASMDC/ARSTRAT.⁵¹

The Space and Missile Defense Command Operations Center (SMDCOC) provides the USASMDC/ARSTRAT commander the means to communicate and execute command and control of USASMDC space and missile defense assets. The SMDCOC provides command situational awareness and maintains command asset operational status. Additionally, the SMDCOC provides around-the-clock reach for space operations officers and deployed space assets (in a function very similar to that of the JSpOC/Air Force Special Operations Command [AFSOC]).⁵²

To ensure overall synchronization of space efforts, the joint force commander designates a space authority to coordinate theater space operations and integrate space capabilities. Similarly, the USASMDC/ARSTRAT commander may designate an Army space coordination authority in support of the ASCC for the regional combatant commander, Army forces (ARFOR) commander or joint force land component commander (JFLCC), and theater space authority.⁵³

Differences in Service Doctrine

Much, if not most, of the current Army and Air Force space-related doctrine is similar. Apparently, both services agree on the most significant issues. For the most part, the doctrine differs only in the format of its presentation. The Army doctrine is unique in that it incorporates the relevant guidance from the National Space Policy and demonstrates how the Army policy and doctrine align with this guidance.⁵⁴ The Air Force doctrine does not address national or DOD policy, but it does include foundational doctrine statements at the beginning of the document, which are the Air Force's space-related fundamental principles that guided the development of the manual.⁵⁵ As an additional helpful formatting technique, these foundational doctrine statements are presented in bold font wherever they appear later in the text.

In addition to these relatively minor formatting discrepancies, there are at least three noteworthy differences to be found in the two sets of doctrine. The areas that differ include the focus for space capabilities, the emphasis on the four space mission areas, and the role of each service with regard to space coordinating authority.

The first notable difference between the Army and Air Force doctrine is the focus. The Army doctrine is quite clear that the purpose of space forces, assets, and capabilities is for achieving land dominance;⁵⁶ the Army is committed to "using space to its best advantage."⁵⁷ Throughout the Army doctrine it is apparent that the Army vision for space is rather land-centric, whereas the Air Force doctrine regarding space is somewhat more "joint-minded," focusing on complete battlespace dominance, rather than dominance in any single domain.⁵⁸

The second significant difference between service doctrines concerns the space mission areas. The Air Force is responsible for executing tasks in all four of the joint space mission areas and has space forces and assets related to each. The Army, however, is currently concerned with only two functions: controlling space and exploiting space.⁵⁹ Army forces exploit space by making space-based capabilities available to enhance Army operations. Space control means to affect space to benefit US efforts or to detract from adversary efforts. Army forces play an important part in executing the space-control mission area by affecting adversary land-based space forces and assets; terrestrial-based space control is an Army responsibility.⁶⁰ Space support and space force application, however, are two joint space mission areas that the Army is currently not concerned with, as the service does not have the forces, assets, or capabilities to execute operations within these mission areas.

The final significant difference between Army and Air Force space doctrine concerns the delegation of SCA. The SCA coordinates space operations, integrates space capabilities, and has primary responsibility for in-theater joint space operations planning. The Army doctrine mentions that the ARFOR commander/JFLCC may be designated as the space authority at the discretion of the JFC. This is likely to happen if the Army

has the preponderance of space capabilities in-theater and has adequate command and control to fully coordinate space issues.⁶¹ The nature and duration of the overall mission are also factors when assigning space authority.

The Air Force assumes that the JFC should delegate space authority to the COMAFFOR/JFACC.⁶² Air Force doctrine does mention that space authority might be delegated to the functional component commander with the preponderance of space assets and the ability to best command and control them, but this point is not emphasized, and several paragraphs follow which justify a JFC appointing SCA to the COMAFFOR/JFACC. The point here is not to say that this perspective is unjustified, but rather simply to highlight that the “tone” of the two documents differs significantly with regard to this issue.

The Air Force plans and trains “to employ forces through a COMAFFOR who is also dual-hatted as a JFACC.”⁶³ This statement is particularly noteworthy, as the service has adopted new naming conventions to emphasize its role which assume that the COMAFFOR will be delegated space coordinating authority. According to JP 1-02, the acronym JFACC stands for joint forces air component commander; however, the Air Force has notably inserted “and space” (joint forces air *and space* component commander) into the acronym.⁶⁴ Similarly, the Air Force has renamed the joint air operations center (JAOC)⁶⁵ as the joint air *and space* operations center,⁶⁶ while the joint air operations plan (JAOP)⁶⁷ has been renamed the joint air *and space* operations plan.⁶⁸

Together, these three issues—focus for space capabilities, emphasis on the four space mission areas, and the role of each service with regard to space coordinating authority—comprise the most significant differences between Army and Air Force space operations doctrine.

Notes

1. JP 3-14, *Space Operations*, 6 January 2009, i.
2. *Ibid.*, I-1.
3. *Ibid.*, II-1.
4. *Ibid.*, x.
5. *Ibid.*, xi.
6. *Ibid.*
7. *Ibid.*
8. *Ibid.*, IV-1.
9. *Ibid.*, xii.
10. *Ibid.*, IV-3.
11. *Ibid.*, IV-7.
12. *Ibid.*, IV-8.
13. *Ibid.*, IV-12.
14. *Ibid.*, IV-13.
15. *Ibid.*, IV-17.
16. *Ibid.*, V-1.
17. JP 5-0, *Joint Operation Planning*, 26 December 2006, IV-2.
18. AFDD 2-2, *Space Operations*, 27 November 2006, v.
19. *Ibid.*, vi.
20. *Ibid.*, vii.
21. *Ibid.*, 1.
22. *Ibid.*, 2.
23. *Ibid.*
24. *Ibid.*, 3.
25. *Ibid.*

26. Ibid.
27. Ibid., 5.
28. Ibid.
29. Ibid.
30. Ibid., 6.
31. Ibid., 29.
32. Ibid., 29–30.
33. Ibid., 32–33.
34. Ibid., 34.
35. Ibid.
36. Ibid., 35.
37. Ibid.
38. FM 3-14, *Space Support to Army Operations*, 18 May 2005, 1-1.
39. Ibid.
40. Refer to chapter 8 of this *Space Primer* for details on the joint space mission areas.
41. FM 3-14, *Space Support*, 1-2.
42. Refer to chapter 10 of this *Space Primer* for additional discussion of US Army space organizations.
43. FM 3-14, *Space Support*, 1-6.
44. Ibid., 1-9.
45. Ibid., 1-10.
46. Ibid.
47. Ibid., 1-15.
48. JP 3-14, *Space Operations*, II-3.
49. FM 3-14, *Space Support*, 1-16.
50. Ibid.
51. Ibid., 3-8.
52. Ibid., 3-9.
53. Ibid.
54. FM 3-14, *Space Support*, 1-6.
55. AFDD 2-2, *Space Operations*, vii.
56. FM 3-14, *Space Support*, 1-9.
57. Ibid., 1-1.
58. AFDD 2-2, *Space Operations*, 1.
59. FM 3-14, *Space Support*, 1-2.
60. Ibid., 2-12.
61. Ibid., 3-8.
62. AFDD 2-2, *Space Operations*, 13.
63. AFDD 1, *Air Force Basic Doctrine*, 17 November 2003, 65.
64. JP 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (as amended through 17 October 2008), 287.
65. Ibid., A-73.
66. AFDD 2-2, *Space Operations*, vii.
67. JP 1-02, *Dictionary*, 284.
68. AFDD 2-2, *Space Operations*, 20.