SPACE WARFIGHTING

A Framework for Planners

UNITED STATES
SPACE FORCE

Table of Contents

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Foreword

Since the first satellite launched into orbit in 1957, space has increasingly become the foundation of modern life. Accordingly, military space operations have become the backbone of the Joint Force enabling long-range kill chains and global power projection. However, in the face of growing threats in, from, and to space, access to the domain can no longer be taken for granted. For this reason, it is the formative purpose of the Space Force to achieve space superiority—to ensure freedom of movement in space for our forces while denying the same to our adversaries.

This document, *Space Warfighting*, establishes basic principles for the use of military power in pursuit of this objective. It defines a common strategic framework to execute the activities that constitute *Competitive Endurance*. It provides foundational insights into Service responsibilities, missions, and core competencies as an integral component of the Joint and Combined Force. In short, *Space Warfighting* operationalizes two core Space Force truths: we must defend U.S. space capabilities, and we must protect our forces from space-enabled attack.

Space superiority is not only a necessary precondition for Joint Force success but also something for which we must be prepared to fight. Gained and maintained, it unlocks superiority in other domains, fuels Coalition lethality, and fortifies troop survivability. It is therefore the basis from which the Joint Force projects power, deters aggression, and secures the homeland.

To that end, our nation depends on us to organize, train, and equip space forces ready and able to conduct space warfighting operations. We must be prepared to employ capabilities for offensive and defensive purposes to deter and, if necessary, defeat aggressors that threaten our vital national interests. We must deliver space superiority for the nation, and *Space Warfighting* provides the Service-level framework required to do so.

Informed by history, this framework focuses on the future to build readiness for the challenges to come. Properly planned and executed, responsible counterspace operations are critical to achieving Combatant Commander objectives through competition, crisis, and conflict. Guardians at every level must be educated and trained to carry out these operations in accordance with commander's intent, the principles of mission command, and the tenets of *Competitive Endurance*.

Semper Supra!

B. Chance Saltzman
General, USSF
Chief of Space Operations

Executive Summary

- Provides a structured approach to analyze and organize space superiority
- Describes space superiority as a necessary precondition for Joint Force success
- Contextualizes space superiority with space control and counterspace operations
- Explains types of operations nested under offensive and defensive actions
- Describes how the United States Space Force gains and maintains space superiority

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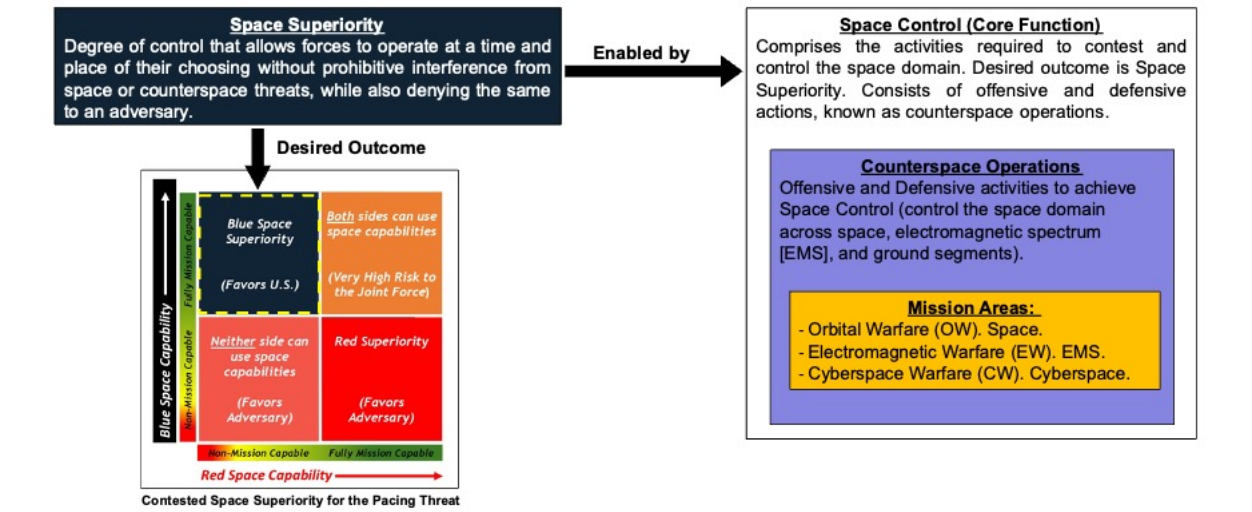

Counterspace Operations

Offensive Actions	Defensive Actions
• Orbital Strike	• Active Space Defense
• Pursuit	• Escort
• Standoff	• Counterattack
• Space Link Interdiction	• Suppression of Adversary Counterspace Targeting
• Electromagnetic Attack	• Passive Space Defense
• Cybernetwork Attack	• Threat Warning
• Terrestrial Strike	• Military Deception
• Ground-based fires	• Hardening
• Maritme-based fires	• Dispersal
• Air-based fires	• Dissagregation
• Space-based fires	• Mobility
	• Redundancy

- **Command and control**
- **Information**
- **Intelligence**
- **Joint fires**
- **Movement and maneuver**
- **Protection**
- **Sustainment**

Joint Functions (JP 3-0)

Space Warfighting

> It is a rule in strategy, one derived empirically from the evidence of two and a half millennia, that anything of great strategic importance to one belligerent, for that reason has to be worth attacking by others. And the greater the importance, the greater has to be the incentive to damage, disable, capture, or destroy it. In the bluntest of statements: space warfare is a certainty in the future because the use of space in war has become vital.
>
> —Colin S. Gray

Access to and the ability to operate freely in space are vital to U.S. national interests. This framework presents the United States Space Force (USSF) current body of knowledge pertaining to space warfighting. It provides the Guardian's perspective on the best way to approach warfare in the space domain throughout the competition continuum.

This framework is informed by Chief of Space Operations Notes, USSF doctrine, joint doctrine, and USSF Commercial Space Strategy (2024).

Space superiority is a joint force priority. This is especially important whenever the enemy is capable of threatening friendly forces in the space domain or inhibiting a Joint Force Commander's (JFC's) ability to conduct operations. Whether directly in the space domain, or through advances in space superiority capabilities, peer and near-peer competitors are capable of challenging or denying control of the space domain. These capabilities, supported by cyberspace and space advancements, present growing challenges to the Joint Force's ability to exercise space superiority. Not only are space operations global, they are also multi-domain. A successful attack against the terrestrial, link, or orbital segment can neutralize a space capability; therefore, space domain access, maneuver, and utilization require deliberate and synchronized offensive and defensive operations across all segments.

Space Force Truths

1. USSF capabilities are critical to the Joint Force and the American way of life.
2. The USSF must defend its capabilities, or the Joint Force will be unable to project power.
3. The USSF must protect the Joint/ Combined Force from space-enabled targeting, or the Joint / Combined Force will be unable to meet military objectives.
4. Space is a warfighting domain, not a collection of supporting activities.
5. The USSF is responsible for organizing, training, and equipping critical space capabilities, but is also responsible for performance of warfighting operations as an integral part of the Joint Force.
6. Guardians are uniquely and specifically trained, educated, and experienced in warfighting activities in, from, and to the space domain.

Space superiority may shift from defense to offense and be conducted within the vicinity of enemy, friendly, and commercial spacecraft, or along shared lines of communication in both space and cyberspace. Space superiority may involve seeking out and destroying an enemy's spacecraft, systems, and networks through measures designed to minimize the

effectiveness of those systems, or countering enemy efforts in the other warfighting domains (land, maritime, air, and cyberspace).

Because warfare serves political aims, warfare is fundamentally a human activity. The same holds true for space warfare. Credible-combat space forces support U.S. deterrence efforts, which seek to affect the decision calculus of would-be aggressors. The USSF organizes, trains, equips forces, and is ready to conduct the operations that provide offensive and defensive actions that deny, degrade, or disrupt an adversary's decision-making cycle and ability to observe, orient, decide, and act.

While space warfare—like all warfare—is a human activity, the character of warfare in the space domain features highly automated systems that filter or reduce human decision making. These systems are necessary for space vehicles to operate in the domain featuring high speeds, long distances, and congested orbital regimes. Detailed analysis must help us characterize how and when humans interact with these systems.

Space Superiority

Space Superiority

A degree of control that allows forces to operate at a time and place of their choosing without prohibitive interference from space or counterspace threats, while also denying the same to an adversary.

Space superiority allows military forces in all domains to operate at a time and place of their choosing without prohibitive interference from space or counterspace threats, while also denying the same to an adversary. Space superiority extends beyond protecting friendly space capabilities from attack, it also encompasses protection of friendly forces in all domains from space-enabled attack. Adversary exploitation of the space domain enables adversaries to communicate and to find, engage, and conduct post-attack assessments against joint forces and partners; space superiority enables the denial of these key adversary advantages. The ability to establish space superiority at the time and place of our choosing enables joint lethality in all domains.

Figure 1 highlights space superiority options for the United States against a potential adversary. The condition where both have full capability is undesirable and results in prohibitive interference to the Joint Force during conflict. The condition where neither have full capability is undesirable because the Joint Force relies heavily on space to achieve joint effects. The desired condition is to maximize U.S. advantage while minimizing that of a potential adversary. Importantly, actions taken to achieve space superiority should not completely jeopardize the long-term safety, security, stability, or sustainability of the space domain.

In some situations, an actor may not be able to control the domain by operating how it wishes but may have the power to deny use of the domain to others. This is known as a denial. A situation of mutual denial may exist as shown in the bottom left corner of Figure 1. The most striking example of this would be a region of debris that denies

any use of an orbital regime, but denial could also be achieved with reversible, temporary effects. Denial, like other aspects of space superiority, may be bounded in temporal and spatial dimensions.

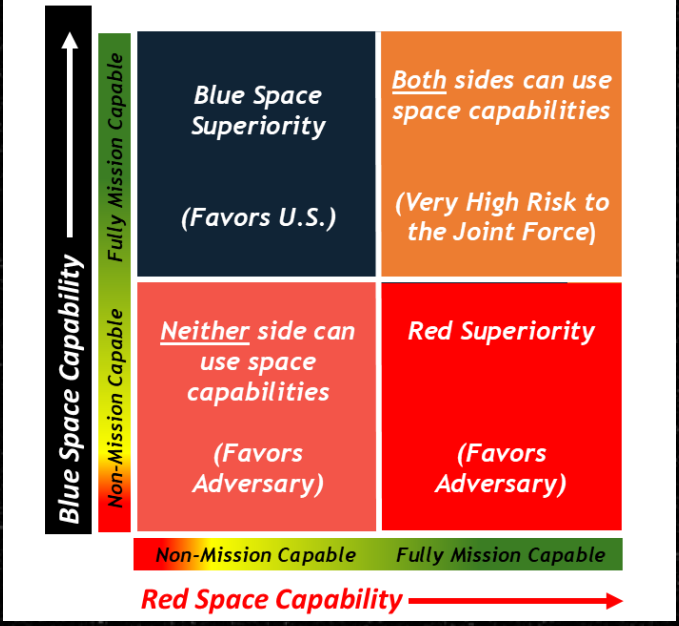

Figure 1. Contested Space Superiority for a Pacing Threat

Seizing space superiority at the time and place of our choosing can offer advantages to military forces. By concentrating effects to control celestial lines of communication, United States space forces can achieve space superiority and enable joint lethality. In many ways, the modern use of various orbital regimes in the space domain provides similar advantages to military forces that control key terrain and positions in other domains.

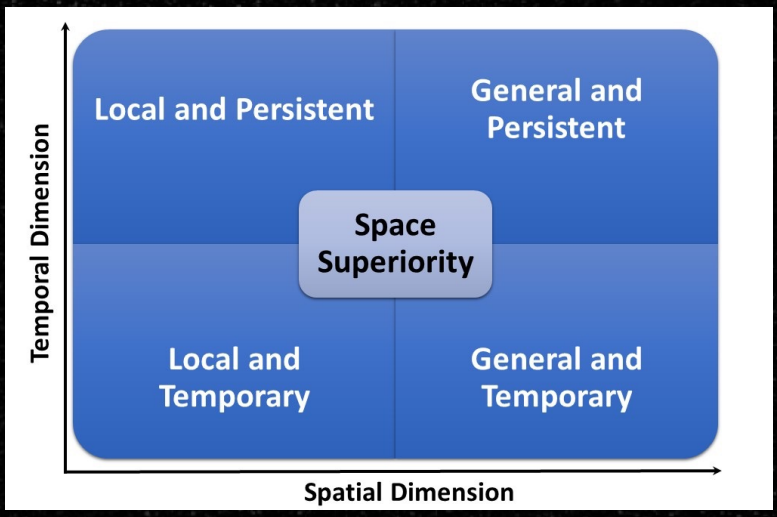

Figure 2. Dimensions of Space Superiority

Space superiority has both spatial and temporal dimensions (see Figure 2). Because of the expansiveness of the space domain, which includes the orbital, link, and terrestrial segments, various Earth orbits, and cislunar space, *the attainment of space superiority at all places and all times will likely prove elusive*. This means space superiority can be either general or local and either persistent or temporary.

General superiority of space is achieved when the enemy is no longer able to act in a meaningful or dangerous way against friendly celestial lines of communication, and it also means that the enemy is unable to adequately defend or control its own assets or deliver space effects in support of its own operations. Local superiority is where control is gained or exercised and is less than the total region where one's interests in space lie. Persistent superiority means that despite the adversary's attempts, the element of time is no longer a significant strategic factor in the execution of warfare in, from, and to space. Temporary superiority means that either general or local control is gained for a specific period to achieve either military or non-military objectives.

When superiority is both general and persistent, it does not mean the enemy cannot act, but that the adversary is severely weakened to such a point where its efforts are unlikely to affect the war's outcome in a significant and lasting way, and this condition aligns most with *space supremacy*. When superiority is both local and persistent, it signifies that significant space capabilities and celestial lines of communication are protected within a specified region for the foreseeable future, yet the military outcome is still not assured. Achieving space superiority involves both offensive and defensive operations. During the pursuit for space superiority, it is critical to heed the timeless advice of maritime strategist Julian Corbett:

> To seek invulnerability is to fall into the strategical vice of trying to be superior everywhere, to forfeit the attainment of the essential for fear of risking the unessential, to base our plans on an assumption that war may be waged without loss, that it is, in short, something that it never has been and never can be.

Space Control

Space control is a core function of the USSF to achieve space superiority. Space control comprises the activities required to contest and control the space domain. The desired outcome of space control operations is space superiority, a degree of control that allows forces to operate at a time and place of their choosing without prohibitive interference from space or counterspace threats, while also denying the same to an adversary.

Space Control

Space control comprises the activities required to contest and control the space domain. The desired outcome of space control operations is space superiority. Space control consists of offensive and defensive actions, referred to as counterspace operations.

Counterspace Operations

Space control consists of offensive and defensive actions, referred to collectively as counterspace operations. Counterspace operations are conducted across the orbital, link, and terrestrial segments of the space architecture.

Counterspace operations are illustrated in Figure 3, which shows offensive and defensive actions taken to create effects in support of space superiority. It lists and categorizes numerous distinct tasks or missions conducted within the larger framework. Note that in many cases the distinctions between the categories may blur and not fit in tidy categories For example, an attack on an enemy antisatellite capability (whether ground or space-based) may be considered at times as either an offensive action (i.e., orbital strike) or defensive action (i.e., counterattack).

Counterspace Operations

The USSF conducts Counterspace Operations across three Mission Areas:

- **Orbital Warfare (OW)**. Combat operations conducted through fires, movement, and maneuver to control the space domain.
- **Electromagnetic Warfare (EW)**. Combat operations through the electromagnetic spectrum to negate space or counterspace threats.
- **Cyberspace Warfare (CW)**. Combat operations conducted in the cyber domain through fires, movement, and maneuver to control the space domain.

Figure 3. Counterspace Operations

Offensive Actions

Offensive action is an important space component mission when the enemy has the capability to threaten friendly forces, or provide significant support to adversary terrestrial forces, using space capabilities. Given finite resources, the allocation of forces and capabilities to meet the supported Commanders' objectives should be judiciously planned and allocated. Successful offensive actions result in greater

freedom from attack, by disrupting, degrading, denying, or destroying enemy counterspace capabilities before they are used against friendly forces, enabling increased freedom of action. This, in turn, may free up assets for other operations against the enemy. Successful offensive actions also result in the ability to mitigate the adversary's use of space capabilities to support their fielded forces in all domains. In other words, the initial investment in offensive operations contributing to the achievement of the desired level of control of space may pay significant dividends toward overall military objectives.

Determining which enemy capabilities to target and the level of degradation required is fundamental to successful offensive operations. For instance, it may not be necessary to destroy or degrade a given capability, but only temporarily disrupt or deny it in order to achieve desired effects. This type of intelligence analysis varies from one operation to another, but results in an effective set of target priorities and more efficient use of assets to achieve desired effects.

Offensive actions seek to achieve space superiority and prevent the launch of threats, resulting in greater freedom from attack and increased freedom of action. It includes three activities used to achieve specific space superiority effects: orbital strike, space link interdiction, and terrestrial strike. Tasked units normally have decentralized execution authority and are given significant latitude to plan and coordinate tasks. Offensive actions should be properly planned for, directed, and integrated with other offensive operations. Offensive actions directly enable achieving space superiority, which is a priority objective for the Joint Force.

- **Orbital Strike.** Actions taken to destroy, disrupt, or degrade adversary space platforms in the space domain. Orbital strike operations may be accomplished through kinetic or non-kinetic, reversible or nonreversible actions. These operations can be conducted by any part of the Joint Force. The goal of orbital strike is to constrain an enemy's ability to access, control, or exploit space capabilities, and orbital strike operations may target adversary space or counterspace platforms. Orbital strike operations may be conducted by pursuit operations (i.e., forces that must rendezvous with an adversary spacecraft before weapons employment) or standoff operations (i.e., space- or terrestrial-based long-range fires that can attack without first conducting an orbital rendezvous).
- **Space Link Interdiction.** Actions taken to disrupt, deny, or degrade an enemy's critical space links. These missions are accomplished through non-kinetic attack vectors. The goal of space link interdiction activities is to constrain an enemy's ability to access, control, or exploit space or counterspace capabilities by interfering with the flow of information and data across a space architecture. Space link interdiction includes electromagnetic attack or cybernetwork attack.
- **Terrestrial Strike.** Actions taken by any part of the Joint Force intended to destroy, disrupt, or degrade adversary launch vehicles, space systems, and architectures in the terrestrial domains (land, maritime, and air). Terrestrial strike operations may be accomplished through kinetic or non-kinetic, reversible or nonreversible actions. These offensive actions may be directed against enemy spacecraft before or just after launch, terrestrial counterspace forces, launch infrastructure, command and control facilities,

antennas, terrestrial space domain awareness sensors, and mission networks. The goal of terrestrial strike operations is to constrain an enemy's ability to access, control, or exploit space or counterspace capabilities. Terrestrial strike operations can be conducted by air-based fires, ground-based fires, maritime-based fires, and space-based fires.

Defensive Actions

Defensive actions protect friendly space capabilities from attack, interference, and unintentional hazards to preserve the U.S. and friendly ability to exploit space for military advantage. Conducting effective offensive actions prior to the threat coming to bear may reduce the defensive action requirement, freeing assets for more offensive operations, but some degree of defensive action is normally necessary in every phase of military operations. Defensive actions defend friendly lines of communication, restrict the ability of the enemy to carry out offensive attacks in all domains against friendly space forces and assets, and provide access to space capabilities for all elements of the Joint Force.

Just as in offensive operations, defensive action planners identify enemy targets and capabilities to defend against, while matching available forces against the threat. They use many of the same offensive planning considerations. Planners determine which mission-critical assets and capabilities to protect, which will vary from operation to operation. Defensive actions are conducted in conjunction with or independent of offensive actions and generally fall into one of two categories: active or passive defense.

Active Space Defense. Active space defense consists of direct actions taken to disrupt, degrade, deny, or destroy ongoing or imminent attacks against friendly space forces, assets, and capabilities. Active space defense operations are conducted using a mix of weapon and sensor systems, supported by secure and highly responsive C2 systems, to find, fix, track, target, and destroy or reduce the effectiveness of space threats. Upon a determination of a hostile act or demonstrated hostile intent, defensive actions authorized by an appropriate authority may act in self-defense, including the use of force, consistent with mission objectives and orders. Active space defense is predicated on near-real-time threat identification and attack characterization. Active space defense includes three operations used to achieve specific space superiority effects: escort, counterattack, and suppression of adversary counterspace targeting.

- **Escort.** Dedicated protection for friendly spacecraft using space-to-space capabilities. Escort operations can be further divided into area defense or point defense.
- **Counterattack.** Reactive measures taken to disrupt, deny, degrade, or destroy space forces that have demonstrated hostile action or hostile intent. Counterattack operations are divided into terrestrial counterattack, orbital counterattack, and space link counterattack.
- **Suppression of Adversary Counterspace Targeting.** Reactive measures taken to deny the adversary's ability to collect or disseminate weapons-quality targeting data during an orbital engagement.

Passive Space Defense. Passive space defense consists of measures inherent in the design of space assets and the implementation of space operations that minimize the effectiveness of threats to friendly space forces and capabilities. Unlike active space defense measures, passive space defense does not involve direct action in response to adversary, unintentional, or environmental threats. Passive defenses enhance the survivability of space systems by providing a layered defense to ensure space systems continue to operate both during and after attack. Known survivability measures may dissuade an adversary from attempting to attack friendly space systems. These passive measures can be employed not only in the space domain but also in cyberspace and terrestrial domains. Passive space defense includes seven operations used to achieve specific space superiority effects:

- **Threat warning.** Timelines for indications and warning of enemy space or space-enabled attacks are generally compressed. Threat warning is the urgent communication and acknowledgement of time-critical information essential for the preservation of life and/or vital resources.
- **Military Deception.** Military deception in space may be employed to deny accuracy in locating friendly spacecraft, systems, and capabilities.
- **Hardening.** Valuable spacecraft and space architectures are hardened to protect against hostile attacks: physical, electromagnetic pulse, and transient radiation. Hardening actions are usually accomplished during peacetime but may continue throughout operations.
- **Dispersal.** Dispersal complicates the enemy's ability to locate and target friendly assets. Combined with mobility and deception, dispersal increases uncertainty as to whether an orbital location or region is occupied or will remain occupied. It forces the enemy to search more locations, requiring more resources and time.
- **Disaggregation.** The separation of dissimilar capabilities into separate platforms or payloads mitigates the threat posed by enemy attack. An example of this would be separating tactical and strategic protected satellite communications.
- **Mobility.** Mobility is the capability to move from one location and incorporates the principle of movement and maneuver. Frequent movement of spacecraft, signals, ground nodes, and other systems occurring within the enemy's decision cycle can be of critical importance to joint operations. Mobility reduces vulnerability and increases survivability of friendly assets by complicating enemy surveillance, reconnaissance, and targeting.
- **Redundancy.** Duplication of critical capabilities keeps vital systems functioning even when critical nodes are destroyed or damaged. Redundancy includes dual, contingency, or back-up capabilities that can assume primary mission functions, in whole or in part, when the primary system is degraded or fails. Redundancy includes the distribution, diversification, and proliferation of spacecraft and space architectures. An example might be using a proliferated constellation of small spacecraft rather than one large, unique asset.

Integrated Counterspace Operations and Joint Operations

Counterspace operations, which include offensive and defensive actions, counter space and space-enabled threats to enable space superiority. As such, counterspace operations are a subset of the joint functions, as described in joint doctrine. This linkage is portrayed in the Executive Summary. The coordination of space superiority and joint operations ensures the integration of combat capabilities and overlapping military operations to defend the homeland and national interests, protect the Joint Force, and enable freedom of action by disrupting, degrading, denying, or destroying an adversary's ability to create adverse effects in, from, and to space. Importantly, the USSF is the lead for fires, intelligence, movement and maneuver, protection, and sustainment in, from, and to space, and it is purposely trained to deliver space superiority for the Joint Force.

Integrated Cyberspace Operations

The USSF's ability to project spacepower relies on its ability to maneuver to, from, and through cyberspace. The USSF must not only work to ensure the cyber survivability of its space systems during development but must actively defend its critical cyber terrain across all three space segments—terrestrial, link, and orbital. Ensuring the delivery of spacepower is critical to Joint and Combined Forces, while enabling confidentiality, integrity, and availability of space capabilities for the United States, its allies, and mission partners is a mission imperative.

Space and cyberspace domains overlap and are inextricable due to their interconnectedness and interdependence (see Figure 4). Space and cyberspace domains share strategic elements like lines of communication, informational environment, network dimension, and link segment.

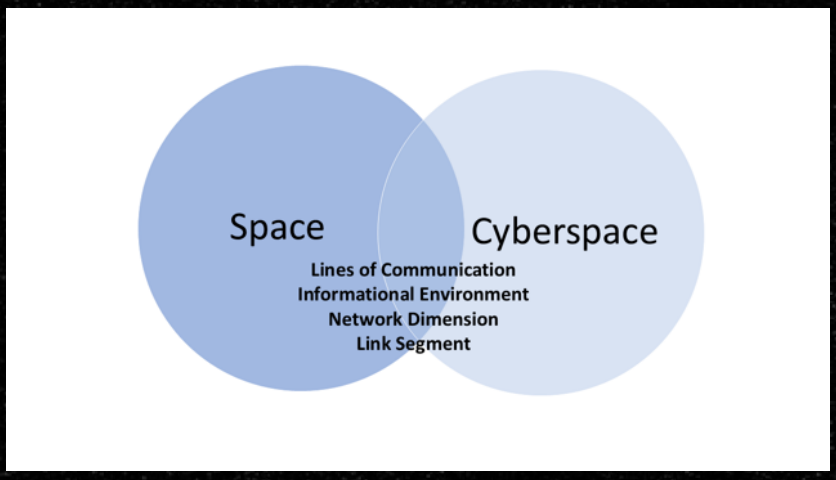

Figure 4. Intersection of Space and Cyberspace Domains

Space is almost entirely reliant on the network dimension of space operations—launch, command and control, communications, and ground-based sensors and space-mission data at some point must traverse cyberspace. As space doctrine, Spacepower points out, cyberspace operations within the network dimension of space operations represent the primary linkage to all other warfighting domains. This dependence means that achieving cyberspace superiority is critical to ensuring space superiority at the time and place necessary for space forces to prevail in conflict.

In 2022, Russia conducted a cyberattack against Viasat, a California- based provider of high-speed satellite broadband services and secure networking systems covering military and commercial markets worldwide. The cyberattack against Viasat was meant to cripple Ukrainian command and control, ahead of the ground invasion of Russian forces. The attack impacted telecommunications systems in the region, along with affecting a major German energy company and satellite internet subscribers in France.

Guardians must be ready to deny adversary operational advantage against our space capabilities and provide options to hold hostile forces at risk to dissuade our adversaries from aggressive and irresponsible actions in space and cyberspace.

Space Segments

Space operations conducted across the competition continuum enable freedom of action for the Joint Force. Space forces consist of orbital and terrestrial systems, equipment, personnel, and support necessary to directly or indirectly impact joint operations. Space systems consist of three interdependent segments: orbital, link, and terrestrial.

Guardians employ space systems to conduct activities and create effects in, from, and to the space domain. Space systems include components in three segments operating across all operational environments. The orbital segment includes space systems operating in the environment of the space domain. Terrestrial segment systems operate in the land, air, and maritime domains. Link segment components of space systems operate in the information operations environment (cyberspace is part of the information operations environment) and the electromagnetic operations environment. These characteristics of these segments and their operational environments play important roles in determining capabilities, limitations, and vulnerabilities for space operations.

Lines of Communication

Celestial lines of communication are those physical and electromagnetic routes in, from, and to space used for the movement of trade, materiel, supplies, personnel, spacecraft, information, and military effects. Access to lines of communication within the orbital segment enables the timely repositioning, on-orbit maintenance, and reconstitution of assets. In the orbital segment, lines of communication include but are not limited to launch trajectories, orbits, and communications links to and from terrestrial nodes (in the terrestrial segment) and between spacecraft in the

orbital segment. Intelligence plays a critical role in understanding and assessing lines of communication to drive mission planning for space operations. Understanding lines of communication in conjunction with key orbital trajectories is essential for Guardians planning, executing, and assessing space operations.

Movement and Maneuver

The expansiveness of lines of communication and distributed space architectures results in a celestial maneuver space. Movement and maneuver is an enduring principle of war and is one of the joint functions as detailed in joint doctrine. The concept of movement and maneuver encompasses the disposition of joint forces to conduct operations by securing positional advantages before or during combat operations and by exploiting tactical success to achieve operational and strategic objectives. Maneuver is the employment of forces in the operational area through movement in combination with fires to achieve a position of advantage in respect to the enemy.

The movement and maneuver of spacecraft includes the deployment, repositioning, or re-orientation of joint space forces. These movements may support service optimization, protection from environmental hazards, passive defense from threats, or the positioning of assets to enable active defensive or offensive measures. For example, a rendezvous and proximity operation may include purposeful positioning of a spacecraft near or in contact with another spacecraft. This can be conducted for the purposes of defense, offense, intelligence, surveillance, reconnaissance, collection, sustainment, training, research and development, or to fulfill other missions.

Geosynchronous Space Situational Awareness Program (GSSAP) satellites are a space-based capability operating near the geosynchronous belt and have the capability to perform Rendezvous and Proximity Operations (RPO). RPO allows for the space vehicle to maneuver near a resident space object of interest, enabling characterization for anomaly resolution and enhanced surveillance, while maintaining flight safety.

The concept of movement and maneuver in the space domain includes rapid and sustained maneuver; moving satellites into different Earth orbits; changing a spacecraft's location between lunar and geostationary orbits; changing trajectory within cislunar space; layering various non-kinetic effects, whether cyberspace attacks, jamming, or lasing; changing radio frequencies used for satellite communications; shifting commercial or military customers from one satellite to another; frequency hopping; dispersing space capabilities and services across space architectures and other domains, while being able to focus military effects when and where needed.

Space Domain Awareness, Intelligence, and Attribution

To counter the exploitation of the space domain by potential adversaries, robust

space domain awareness (SDA), intelligence, and attribution capabilities are needed. SDA encompasses activities that detect, characterize, attribute, predict, and target activities in the space domain to inform decision making. Intelligence is the product resulting from the collection, processing, integration, evaluation, analysis, and interpretation of available information concerning foreign nations, hostile or potentially hostile forces or elements, or areas of actual or potential operations. Ultimately, a credible, known, and trusted attribution process underpins a successful deterrence strategy.

SDA is a mission and an enabling function—it is not inherently an enterprise, architecture, or system. SDA is built from information gleaned from capabilities across the range of Space Force, joint, coalition, and other systems, which can either be dedicated sensors and activities or sensors and activities that contribute to SDA.

Command and Control

Mission command is the backbone of our C2. In a contested, degraded, and operationally limited environment, the most effective form of C2 is mission command. It builds a shared understanding among echelons and allows combat formations to act independently to meet Commander's intent. C2 is the exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Effective C2 is essential to the application of spacepower. Consistent with joint and USSF doctrine, C2 includes three basic functions: gaining and maintaining situational awareness; enabling operational decision making; and directing forces.

Command includes both the authority and responsibility to use resources to accomplish assigned missions. Command at all levels requires motivating and directing people and organizations to accomplish missions. Timely and relevant intelligence enables commanders to make decisions and execute those decisions more rapidly and effectively than the enemy.

Control is inherent in command. It allows commanders to manage and direct forces and functions consistent with their authority. Control of forces and functions helps commanders and staff compute requirements, allocate means, and integrate efforts. Control is necessary to determine the status of organizational effectiveness, identify variance from set standards, and correct deviations from these standards. This permits commanders to acquire and apply means to support the mission and develop specific instructions from general guidance.

C2 and battle management are different. C2 are the activities used by the chain of command to provide forces the direction needed to accomplish an overall objective. Battle management does not require command authority but supports the control of forces in a dynamic operating environment to optimally achieve mission objectives established by the chain of command.

Guardians are purposely developed to lead Joint Force space superiority missions for the Department of Defense and are steeped in the integrated by design strategy.

Senior Guardians are best suited to command joint and coalition space forces. Effective operations require the establishment and promulgation of easily understood Rules of Engagement (ROE). ROE are established to convey national leadership and senior military commander intent and guidance regarding the use of force. ROE are directives issued by competent military authority that delineate the circumstances and limitations under which U.S. forces will initiate and/or continue combat engagement with other forces encountered. Effective ROE should align with commander's intent and balance restrictions with risk and the imperative for success. When establishing the ROE, commanders and planners should obtain the legal advice of the supporting judge advocate. Furthermore, where supplemental measures restrict Secretary of Defense (SecDef) approved ROE, notification must be given to SecDef through the Chairman of the Joint Chiefs (CJCS).

Overly restrictive ROE can be contrary to decentralized execution and may lead Guardians to rely on ever-increasing levels of oversight and approval, potentially leading to situations where Guardians hesitate to act. Such a scenario may increase risk, both to the mission and to the Joint Force. As such, commanders should be careful not to create ROE so restrictive that they place friendly forces at unnecessary risk or at an operational disadvantage. This could be a pitfall in a peer or near-peer, contested environment.

Planning Considerations

In early planning stages, operational staff determine objectives, desired effects, and relative priorities. Planners in the strategy, combat plans, and intelligence focused divisions identify enemy systems, capabilities, and assets capable of contesting control of the space domain. Combat plans and combat operations personnel use this information to match desired effects to targets and create tactical tasks by matching targets to available assets and capabilities that can achieve those effects. To facilitate operations, a list of validated targets is developed before hostilities begin and continually updated based on current intelligence and progress of the operation. The following are general planning considerations for offensive and defensive actions in the space domain or involving space architectures.

- **Intelligence Preparation of the Operational Environment.** Highly detailed and accurate intelligence regarding enemy threats is necessary to properly plan, position, and sequence (timing) offensive actions.
- **ROE.** These directives are authoritative and may critically affect how missions are performed. All levels, from the Combined Joint Force Space Component Commander (CJFSCC) down to individual Guardians, should understand the ROE that apply to the accomplishment of their missions and include ROE in mission planning.
- **Weaponeering.** Effective target and weapon pairing is critical to achieve desired effects.
- **Deconfliction.** Orbital mechanics, trajectory, effects, timing, and numerous other aspects of offensive and defensive actions require deconfliction. The theater and other operational guidance provide the primary means for doing so. However, deconfliction equally applies to individual missions and force

packages. Thorough planning is key. However, procedures and C2 structures and mechanisms should be established to enable real-time deconfliction of all planned missions, including terrestrial, cyberspace, and information warfare.

- **Threat Warning.** Timely detection and warning of space threats provide reaction time for friendly forces to take appropriate action. Reliable and redundant connectivity for communications and sensor systems is vital for accurate and timely warning. To be effective, warning methods and procedures should be established, disseminated, and rehearsed down to the unit level.
- **Reduction of Enemy Targeting Effectiveness.** Certain measures can be taken to reduce the effectiveness of enemy targeting and attacks, to include mobility, deception, EW, and operations security.
- **Reducing Vulnerability.** Four measures that may enable friendly assets to survive enemy attacks by reducing their vulnerability are hardening, redundancy, dispersal, and defense.
- **Recovery and Reconstitution.** Following an attack, prior planning should aid the restoration of space operations capability to a desired level of combat effectiveness commensurate with mission requirements and available resources.

Targeting

Targeting is a joint process. Space warfighters must be knowledgeable of this process and prepared to engage in order to ensure that counterspace targets receive the necessary priority and effects to achieve the JFC's intent. Due to the nature of the space domain, targeting is often enabled by target development, modeling and simulation which can have long lead times and must occur prior to conflict to reduce risk during conflict. Targeting is often a federated process, and targeting resources are usually high demand/low density. Order of battle maintenance is a key enabler for targeting, especially dynamic targeting. Unless delegated, the Defense Intelligence Agency maintains authoritative order of battle data. For a detailed discussion of targeting, refer to Joint Publication 3-60, *Joint Targeting,* and accompany CJCS instructions.

Indicators, Measures of Performance, and Measures of Effectiveness

Assessing the degree of friendly space superiority is challenging. Similarly, the inherent characteristics of spacepower—reach, persistence, endurance, and responsiveness —apply to enemy counterspace threats as well, making assessment of adversary actions and intent more difficult. However, assessment should be guided by space superiority objectives—ensuring freedom to maneuver, freedom to attack, and freedom from attack. Achieving space superiority should be logically tied to these three items. For effective assessment, indicators should be developed at the same time as the objectives, effects, and tasks they measure—not after the fact. Indicators should be either directly observable or be reliably inferred from

other data. Quantitative and qualitative indicators should be identified during planning according to the nature of tasks and desired effects. Planners should choose criteria that describe or establish when actions have been accomplished, desired effects have been created, and objectives have been achieved. Indicators are generally classified as either measures of performance (MOPs) or measures of effectiveness (MOEs).

- **Measures of performance.** MOPs are indicators used to measure a friendly action that is tied to measuring task accomplishment. Operational level tasks and MOPs are typically broader and system-based (e.g., the number of enemy counterspace threats neutralized versus number of enemy threats still operational).
- **Measures of effectiveness.** MOEs are indicators used to measure a current system state, with change indicated by comparing multiple observations over time. MOEs help answer the question, "Are we generating the effects necessary to meet objectives?"

Execution Considerations

During the ongoing battle rhythm, weapon systems are matched to specific targets or missions based on their ability to achieve desired effects. There are numerous systems and capabilities available to achieve space superiority. Each may be more or less capable than the next for a given mission or task. Similarly, employment methods may differ between offensive and defensive actions. Matching capable assets with intended tasks is critical to overall mission success.

The following are some of the planning and execution considerations for conducting offensive and defensive actions:

- **Key Topology.** Planners identify key topology in the physical domain, necessary to seize, exploit, and protect these physical regions. This methodology simplifies the regions of concern, allowing creation of control measures such as area of operations.Key topology includes both celestial lines of communications for the movement and sustainment of space forces and the key orbital trajectories upon which they rely.
- **Barriers to Access,** Movement, and Recovery. Orbital mechanics, atmospheric drag, solar radiation, space weather, availability of in-theater ground equipment, and access to logistics are examples of the shifting nature of the environment. Planners should also account for adversaries, which also influence the various domains and may have the ability to restrict access to, movement, or recovery of assets in orbit, on the ground, or in the electromagnetic spectrum (EMS).
- **Hazards of Orbital Flight.** Planners should consider physical hazards to orbital flight prior to developing courses of action. Identifying physical hazards that threaten friendly assets may levy significant operational limitations on planners. For example, the congested environment may preclude the use of certain capabilities but also expose potential adversary vulnerabilities for exploitation.

- **Electromagnetic Spectrum.** The EMS is crucial to all space operations, incredibly complex in the operational environment, and utilized across the commercial enterprise and governmental organizations of each nation. With each nation potentially imposing different domestic laws, rules, and authorities, and interpreting international law and norms differently, it is imperative to understand and operate effectively within this ecosystem. Additionally, planners should prepare for an adversary's attempts to deny friendly access to the EMS and develop primary, alternate, contingency, and emergency plans for all critical operations.
- **Terrestrial Sites.** Space capabilities often rely on terrestrial equipment (terrestrial segment), which is not all based in US territory. Planners should recognize this limitation and plan for potential limited or loss of access to capabilities in these locations and identify suitable workarounds or solutions. In some cases, terrestrial access required for line-of-sight transmission may become limited due to adversary intervention, weather, maintenance, or other factors. Planners should account for these possibilities and take actions to maximize continuity of space capabilities. Conversely, planners should recognize that adversaries are subject to the same constraints and seek opportunities to create advantages as a result.

Sustainment

Sustainment is the provision of logistics and personnel services to maintain operations until mission accomplishment and redeployment of the force. It is identified as one of seven joint functions—related capabilities and activities grouped together to help JFCs integrate, synchronize, and direct joint operations—and includes the provision of logistics, financial management, physical infrastructure, personnel services, and health service support necessary to maintain operations. Sustainment activities occur in a complex environment spanning the globe and multiple domains. Sustainment capabilities can come from a variety of military forces, other governmental organizations, nongovernmental organizations, or multinational forces.

The essential challenge is to support increasing demand with constrained resources in a potentially contested environment. Understanding the global environment is essential to plan, execute, synchronize, assess, and coordinate sustainment operations. Sustainment facilitates uninterrupted operations through means of adequate logistics support. Services accomplish this through supply systems, maintenance, and other services, which ensure continuing support through the lifecycle of the weapon system.

There are nine principles of sustainment: integration, anticipation, responsiveness, simplicity, economy, survivability, continuity, improvisation, and interoperability. The USSF drives to meet these principles through four pillars of mission sustainment: the natural environment, the built environment, human capital, and mission systems. By identifying and defining these pillars, we begin to articulate both the ways and the means of achieving the strategic goals outlined earlier, acknowledging that each

echelon may have specific methods for achieving short-, mid-, or long-term objectives.

Conclusion

Space Warfighting illuminates why and how the USSF will shift its institutional mindset toward achieving space superiority: the Service's cornerstone responsibility. It establishes a common counterspace framework and associated lexicon to best plan for and employ Space Force forces as part of a broader Joint Force. Counterspace operations are essential to joint operations as achieving space superiority can provide a decisive advantage to those who secure it.

Space Warfighting offers the counterspace framework necessary to execute the tenets of *Competitive Endurance*, the USSF's theory of success to achieve U.S. space superiority while safeguarding the safety, security, stability, and long-term sustainability of the space domain. The ideas in *Space Warfighting* should shape Guardians' planning and activities to avoid operational surprise, deny first-mover advantage, and undertake responsible counterspace campaigning.

Moreover, this framework operationalizes two core Space Force truths: that the USSF must defend U.S. space capabilities and that the USSF must protect Joint and Coalition forces from space-enabled attack. *Space Warfighting*, *Competitive Endurance*, and the Space Force truths all serve as complementary guides in preparing space forces to engage in measured and principled action throughout the competition continuum.

All Guardians—the Service's warfighters—should be well-versed with the terminology and concepts detailed in this framework. USSF Field Commands and Direct Reporting Units will act on this framework when formulating plans, operational concepts, lines of effort, military objectives, and specified tasks. The foundational concepts detailed here also will inform resourcing and programming efforts across the Service.

As with many strategic and operational concepts, definitions and categories rarely fit into neat, tidy boxes—this is the nature of warfighting. In the end there are no set answers, no textbook solutions, and no guarantees of success. The Guardian must understand the principles and, when necessary, break the rules to uncover the military genius in spacepower.