

AMERICAN FOREIGN POLICY COUNCIL

Space Policy Initiative

Space Policy Review

Proposing a Peacetime Doctrine for USSF Domain Development By: Peter Garretson

The Big Picture

- Beyond Warfighting: U.S. Space Force strategy must extend beyond "right of bang" and focus on shaping the operational environment through posture, partnerships, and technology before conflict arises.
- Doctrine as a Guide: Current spacepower doctrine prioritizes force employment but lacks a framework for space domain development. A dedicated Space Doctrine Publication 0-0, "Shaping & Competing," is needed to guide peacetime strategy.
- Strategic Positioning Matters: Just as military theorists have long emphasized setting conditions for success, the U.S. Space Force must deliberately shape the space domain to secure U.S. interests and maintain strategic advantage.
- Whole-of-Nation Approach: Space superiority requires integrated national efforts, including economic, industrial, and technological development, where Guardians must provide best military advice to policymakers.
- Lessons From History: U.S. dominance in land, sea, air, and cyber was built on proactive domain development—space must follow the same path through strategic planning, infrastructure, and industrial base cultivation.
- Time as a Weapon: The U.S. Space Force must use peacetime to create the future force it needs, rather than relying on the technology and posture available at the moment of crisis.



Guardians needn't accept a poor position or tools; rather, they can use time as a lever to "change the game" by developing and planning for their domain. I propose a fundamental necessity for a strategic doctrine—a Space Doctrine Publication 0-0, "Shaping & Competing"—that provides an informed starting point for strategy and force development in the peacetime interwar years. This doctrine will provide guidance to Guardians to ensure that sound, authoritative advice is available to a force expected to "secure our nation's interests in…space"—interests that will only grow over time.

Peter Garretson is a senior fellow in defense studies at the American Foreign Policy Council in Washington, D.C. He co-directs the organization's Space Policy Initiative and is a co-author on the book The Next Space Race: A Blueprint for American Primacy (Praeger, March 2023) and Scramble for the Skies: The Great Power Competition to Control the Resources of Outer Space (Lexington Books, October 2020).

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Background

In September 2023, the U.S. Space Force (USSF) unveiled its new mission statement: "Secure our nation's interests in, from, and to space" and later introduced a "theory of success."¹ Certain modifications to the USSF's theory of success are necessary if the USSF is to maximize America's strategic and military advantage during the interwar years and execute a peacetime strategic initiative in the context of strategic competition.²

Starting with the 2017 National Security Strategy,³ the United States "openly advanced the idea that America and fellow Great Powers, Russia and China, had transitioned formally from a more than 20-year period of collaboration and cooperation into one of competition."4 Subsequently the Joint Staff released the 2018 "Joint Concept for Integrated Campaigning,"⁵ and then the 2023 "Joint Concept for Competing,"⁶ which began to move the department toward a realization that the Joint Force is not just in the "warfighting business"; it is in the "national security business" and the Joint Force is never "off the clock." The National Security Strategy defined strategic competition as a persistent and long-term struggle that occurs between two or more adversaries seeking to pursue incompatible interests without necessarily engaging in armed conflict with each other, and asserted that strategic competition is thus an enduring condition to be managed, not a problem to be solved. Thus, succeeding means retaining freedom of action to pursue national interests at an acceptable risk and sustainable cost, and avoiding armed conflict with adversaries. In this new strategic context, if the United States does not compete effectively against adversaries, it could "lose without fighting," ceding strategic influence, advantage, and leverage while preparing for a war that may never occur. Thus, while the United States must remain fully prepared and poised for war, this alone will be insufficient to secure its strategic objectives and protect its freedoms, and the Joint Force (and the Space Force specifically) must ask itself whether it is appropriately and adequately prepared and postured to help defend the United States from threats that do not require the Joint Force to engage in warfighting.

Traditional military strategies focus on military victory in which interagency or commercial-industrial partners are in a supporting role and the military is the main actor. In contrast, competitive strategies reverse the supported and supporting roles, expecting the military to take on a role that *architects*, supports, encourages, and provides direction to *surrogates* such as a commercial vanguard or other government agencies executing a *peacetime strategic offensive*.

With the introduction of the two Joint Concepts, the Joint Force was directed to focus on pursuing and promoting U.S. national interests and strategic objectives and denying adversaries' incompatible interests below the threshold of armed conflict. The Joint Concepts direct the Joint Force to *shape the competitive space by seeking opportunities to integrate its operations* and activities in time, space, and purpose with the activities of interorganizational partners, *proxies, and surrogates, acting by-with-and-through* others.

Shortly after publication of the Joint Concepts, Chief of Space Operations (CSO) Gen. B. Chance Saltzman stated, "Establishing the Space Force to focus on a contested space domain was a critical step...Now we must focus our efforts on a purpose-built Space Force for great power competition."⁷

In January 2024, Saltzman introduced a white paper, titled "Competitive Endurance: A Proposed Theory of Success for The U.S. Space Force," in an attempt to outline how the USSF could "secure our nation's interests" through protracted, day-to-day competition.⁸ Very recently, the U.S. Space Force unveiled two documents, "Space Force Doctrine Document 1"⁹ and "Space Warfighting: A Framework for Planners"¹⁰ which provide significant insight into how the U.S. Space Force sees its warfighting role in the context of its current theory of success. Both documents seek to avoid operational surprise, deny first-mover advantage, and conduct responsible counter space operations, and at least mention the competition continuum.

Is the USSF's theory of success adequate to ensure success in the broader context of strategic competition as articulated in the "Joint Concept for Competing"? Is the current Guardians' conception of strategy focused on *warfighting* broad enough to inform integrated campaigning?

In short, no. A strategy that sees success purely in terms of prevailing in war or preventing war through deterrence is inadequate. A complete theory of success necessarily must include a key shaping element in which we *advance our relative position*, through *industrial and positional means*. Strategies of deterrence can fail spectacularly, and they depend entirely on the adver-

realm of strategy.

sary to comply; moreover, the adversary may still choose to advance below the threshold of armed conflict, using a cumulative strategy to erode our security. The traditional notion of military strategy is something that starts only "right of bang" (after hostilities commence). But the efficient movement and employment of our systems is only the last part of a strategy process that begins-or should begin--decades before.

The success of our past and future battles depends on more than what we do with our platforms-it depends on the platforms we have developed, where we base those platforms in advance of any conflict, our production capability and our ability to scale the production of those assets to meet timely strategic needs, and

our partner-building capacity to multiply our strength and points of access. This is true not just in the space domain but in every domain in which we maneuver to create effects. The famous war theorist Baron Antoine-Henri de Jomini said, "Strategy is the art of making war upon the map."11 But to make war on a map, we have to think about setting up the starting positions before the conflict. So where in USSF or Joint Doctrine can we learn how to set up the positions on the map in the first place?

When Guardians want to understand the "fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives," they turn to doctrine.

Joint Publication 1-02, "Department of Defense Dictionary of Military and Associated Terms," tells us that doctrine is authoritative but requires commanders to exercise judgment in application.¹² Space Doctrine Publication 1-0, "Personnel," reminds us that "doctrine guides the development and employment of Guardians in support of the Service's cornerstone responsibilities. A body of carefully developed and sanctioned ideas, doctrine establishes a common framework for understanding and applying USSF capabilities."13 Space Doctrine

Publication 5-0, "Planning," states, "Doctrine guides the proper use of military spacepower in support of the Service's cornerstone responsibilities. It establishes a common frame of reference on the best way to plan and employ USSF forces as part of a broader Joint Force. This doctrine provides official advice and describes how to execute and leverage spacepower utilizing its core competencies. It is not directive-rather, it provides Guardians an informed starting point for decision-making and strategy development."14

Today's spacepower doctrine is inadequate because it speaks largely to spacepower employment, not spacepower development or space domain advancement. With

regard to domain development and spacepower development, don't we have-and shouldn't we record—best practices for setting conditions? Shouldn't our Guardians start their strategic considerations with thoughts about posture, partnership, and tech-"Guardians need not accept the nology-as called for board as given. The layout of the in the "Joint Concept for Integrated Camboard itself—and even the number paigning" and the "Joint and type of pieces—are within the Concept for Compet-Shouldn't they ing"? have an implementing doctrine and concept of (CONOPS) operations for shaping and competing in the space domain in the interwar years? Shouldn't they have the equivalent of the Marine Corps's Doctrinal Publication 1-4, "Competing"?¹⁵

> You go to war with the Army you have, not the Army you might want or wish to have at a later time.

-Secretary of Defense Donald Rumsfeld

To secure ourselves against defeat lies in our own hands, but the opportunity of defeating the enemy is provided by the enemy himself.

-Sun Tzu¹⁶

Instead of merely fighting our nation's wars with whatever technology and processes we happen to have at

the time, Guardians should have a doctrine that informs how they go about building the future force and shaping the operational environment in the *present* to ensure victory and the security of our national interests in the *future*.

Below, I offer what represents a school of thinking characteristic of avant-garde military strategists who sought to *set conditions* so that their operational forces were pre-postured to be successful in battle. They, in turn, drew from successful and unsuccessful historical examples of how nations exploited new domains and built national strength and military capacity—outlining best practices that should be recorded in doctrine (Table 1).

Doctrine for Strategic Development of a Domain

Airpower is anything a nation can do in the Air. —Brig. Gen. Billy Mitchell

Spacepower is anything a nation can do in space. —Dr. Brent Ziarnick

The major war theorists that form a central part of the Joint Professional Military Education curriculum have historically taken—and are expected to take—an attitude of deliberately developing the domain and operational environment to enhance U.S. freedom of action and economic/industrial might.

Table 1. Relevant Space Doctrine Publications Summarized

Space Doctrine	Main Points
Publication 0-0, (Shaping & Competing)	A suggested new doctrine publication that would focus on peacetime strategy and force development. It would provide guidance on how Guardians should approach building the future force and shaping the operational environment to ensure future victory and security of national interests in space.
Space Capstone Publication (Spacepower: Doctrine for Space Forces)	This publication answers why spacepower is vital for our nation, how military spacepower is employed, who military space forces are, and what military space forces value.
Publication 1 (The Space Force)	Codifies why the U.S. Space Force exists as a Service, the identity of Guardians, and how the U.S. Space Force employs spacepower to drive the success of the joint force, including through organization and integration. It asserts that Space is re vital to our national security or to our prosperity; that the Space Force must defend its capabilities, or the joint force will be unable to project power; and that Space is a warfighting domain, not a collection of supporting activities.
Space Warfighting: A Framework for Planners	Establishes basic principles for the use of military power in pursuit of this objectives of achieving space superiority—to ensure freedom of movement in space for U.S. forces while denying the same to U.S. adversaries. It defines a common strategic framework to execute the activities that constitute Competitive Endurance. The document operationalizes two core Space Force truths: we must defend U.S. space capabilities, and we must protect our forces from space-enabled attack. Asserting that military space operations have become the backbone of the Joint Force enabling long-range kill chains and global power projection, but that, in the face of growing threats in, from, and to space, access to the domain can no longer be taken for granted, it provides foundational insights into Service responsibilities, missions, and core competencies as an integral component of the Joint and Combined Force.
Publication 1-0 (Personnel)	Established a common framework for understanding and applying U.S. Space Force capabilities. It guides the development and employment of Guardians in support of the Service's cornerstone responsibilities.
Publication 5-0 (Planning)	Focuses on planning for space operations. It provides guidance on how to properly use military space power in support of the Service's responsibilities and offers a common frame of reference for planning and employing USSF forces as part of a broader Joint Force.

[Our] responsibility is to seek it under the most advantageous agencies or higher authorities, Guardians must take circumstance in order to produce the most profitable result. the initiative and provide best military advice on how Hence his true aim [as a strategist] is not so much to seek bat- to coordinate the elements of national power through tle as to seek a strategic situation so advantageous that if it the development of strategic doctrine. The architecture does not of itself produce the decision, its continuation by a that secures the nation's interests in space is never "someone battle is sure to achieve this.

-B.H. Liddell Hart¹⁷

To use a chess analogy, Guardians need not, and should not, confine their strategy to the effective movement of pieces. They should not accept the board as given. Both the layout of the board itself and the arrangement of pieces--and even the number and type of pieces-are within the realm of strategy. Just as a chess player can adapt the layout of the board to their advantage, strategically thinking Guardians can shape effective operations in the space domain through effective procurement, arrangement, and movement of operational platforms.

In peace, [strategy]...may gain its most decisive victories by occupying...excellent positions which would perhaps hardly be got by war.

—Alfred Thayer Mahan¹⁸

The skillful fighter puts himself into a position which makes defeat impossible, and does not miss the moment for defeating the enemy.

-Sun Tzu¹⁹

Guardians should use peacetime or "Phase 0" operations to actively shape their operational environment. Such shaping is, necessarily, a whole-of-nation affair requiring a long-term vision and coordination with many agencies, surrogates, and friendly commercial partners. The burden to provide advice and strategy, and to architect the system, falls to those who are the stewards of their domain, who have a global view and can see it holistically. Guardians are the stewards of the United States's long-term security, whose mission is to "secure our nation's interests in, from, and to space"-though they execute this responsibility in conjunction with the other domain practitioners. Usually, it is the military that possesses larger, more capable staff with longer-term vision than our interagency partners. Therefore, Guardians must realize that although strategic planning efforts may be initiated and led by other

else's job"—it is the Guardian's job to conceive and make real, though the Guardian may execute their vision "bywith-and-through" non-USSF partners and surrogates.

Considering Domains

What is a domain? Since the term has yet to be defined in doctrine, I'll offer a definition. A domain is a space in which forces can maneuver to create effects. Domains are typically delineated by the unique considerations that condition movement, communications, and persistent operations.

These "unique considerations" condition the type of equipment that will be viable in each domain. The high density of salt water makes it possible to have enormous vessels but also slows their operational speed and exposes them to harsh weather and corrosion. The low density of air and its ability to be burned enables rapid movement but requires aircraft to be lightweight and unarmored. Vehicles transiting the air, land, or sea all encounter friction and will require constant energy expenditure to remain operational, whereas the extremely low density of space places no practical limit on speed and requires energy only to change direction. While electromagnetic waves propagate in all domains, only space is without obstacles. The terrain on land, the curvature of Earth, and the density and composition of water and air limit which frequencies will propagate and drive specific communications equipment. Movement of vehicles in the space domain is strongly conditioned and limited by the gravity of our planet, the Sun, the Moon, other planets and moons, and minor natural bodies. The periodic orbits of these astronomical bodies and their alignments also create physical obstacles to line-of-sight communication, visibility, or access to the Sun's rays for electric power.

Knowledge of operating and acquiring effective systems in a given domain often requires extensive expertise that must be maintained over time. Consider three important truths that affect cross- or multi-domain operations (Figure 1): First, you can make use of the advantages of a domain only from within the domain.²⁰ For example, you must be resident in air or space to utilize

the advantage of altitude. Second, exploitation of one domain allows you to express effects in adjacent domains. For example, if you are in space, you can surveil or attack the ground or sea. Third, you can deny a domain from an adjacent domain. An opponent doesn't need to reside in a domain to deny it. For example, while a belligerent may have no ability to exploit the space domain with satellites, they could own surface-based missile systems that could deny those domains to their opponent.

Figure 1. Three Important Truths of Cross-Domain Operations



...the intensely sharp competitive preparation for war by the nation is the real war, permanent, unceasing, and...the battles are only a sort of public verification of mastery gained during the peace intervals (emphasis added)

—William James²¹

The United States has significant historical experience with the linked industrial-military development of new domains (Figure 2). First, the U.S. expanded westward and developed an entire continent in the land domain, including roads, canals, the transcontinental railroad, and the Eisenhower Interstate Highway System—surveyed and assisted by the Army Corps of Engineers and protected by the U.S. Cavalry. Second, it expanded in the maritime domain, including shipyards, coaling stations, and the Panama Canal. Naval expansion happened in tandem with maritime shipping and the expansion of

overseas interests. Third, the U.S. expanded in the air domain, developing the first successful manned aircraft and architecting global norms for aviation, as well as the national and international runway system and standards. The U.S. developed a worldwide system of bases, runways, navigational aids, and radio stations, which formed the backbone of both commercial and military aviation. Fourth, the U.S. developed the internet (largely through the Defense Advanced Research Projects Agency, or DARPA), giving rise to the cyber domain. Lastly, the U.S. initially developed the space domain from the Mercury through the Apollo programs and then expanded this domain with the fielding of Cold War space systems. Nevertheless, the development of the space domain is in its infancy. We are far from achieving the domain development that has been accomplished in the maritime domain and are decades to centuries from developing its full potential—all the more reason for a doctrine to inform such development.

Figure 2. Timeline of U.S. Domain Capabilities



Twenty Maxims for Space Domain Development

There are no battles in this strategy; each side is merely trying to outdo in performance the equipment of the other. ... Its tactics are industrial, technical, and financial. ... A silent and apparently peaceful war is therefore in progress, but it could well be a war which of itself could be decisive. —General d'Armee Andre Beaufre²²

The U.S. military has nearly three centuries of experience developing capabilities in the land and sea domains

(leveraging centuries of prior experience by older powers), over a century in the air domain, and decades of experience in the space domain. From these experiences, we can divine certain truths expressed in twenty maxims (Table 2).

"Guardians must be proactive #1 Be an Activist about shaping the conditions of Steward of Your Domain. Domain develtheir domain. They must seek vicopment works best as tory first through preparation." an activist strategy, not as passive laissez-faire watching of industry. The United States developed flight first, only to see itself eclipsed by a more activist France.23 Likewise, the U.S. initially had the largest share of the space launch market, only to lose that dominance, before efforts by DARPA and

NASA public-private partnerships recaptured a dominant position in launch via SpaceX. Economic sectors that convey military advantage require nurturance and advocacy by military champions.

#2 Offer Best Military Advice to Create Whole-of-Nation Plans. Guardians must not be absent from the national conversation on domain development—they should lead it. Guardians are uniquely positioned to understand the totality of their domain and its linkage to national power. Guardians should be aware of where civil and commercial sectors wish to expand and incorporate these sectors' most exciting ideas and visions into a larger strategic narrative to enable policymakers to understand what future operations could look like.²⁴

What is needed is a vision rooted in human nature so noble, so attractive that it not only attracts the uncommitted and magnifies the spirit and strength of its adherents, but also undermines the dedication and determination of any competitors and adversaries. —Col. John Boyd²⁵

#3 Craft a Compelling Vision for Your Domain. It

was the vision of military-industrial thinkers that fueled westward expansion, naval expansion, and the development of airpower. Vision is essential in attracting talent and capital to develop a domain. A failure to provide an exciting vision is a failure of leadership.

> If you want to build a ship, don't drum up the men to gather wood, divide the work and give orders. Instead, teach them to yearn for the vast and endless sea. (emphasis added)

—Antoine de Saint-Exupéry (attributed)

#4 Enlist the Media in Creating National Will to Be Domain-Faring. Once a technical-industrial-geographic vision exists, Guardians should enlist the capabilities of the arts (storytellers, artists, movie producers) to publicize such a vision and make it tangible in the minds of their compatriots. An excellent example is Walt Disney's World War II film Victory Through Airpower.

There is no limit to the amount of good you can do if you don't care who gets the credit. —President Ronald Reagan (attributed)

#5 Leverage the Resources of Others ("By-With-and-Through"). It is foolhardy to waste resources to do what others may be willing and able to do. The goal is not a list of achievements but accomplished objectives in further-

ance of a mission. Guardians should seek to multiply their efforts through partnerships with other actors: sister services, other agencies, other nations, and other intergovernmental and nongovernmental organizations—and in particular the commercial space industry, which has a great capacity to expand U.S. interests. It is not necessary to get the credit or leave one's fingerprints. *To create something is good. To cause something to be created is better.* Consider the example of how the War Department and Department of the Navy enabled Pan American Airways to build a globe-spanning infrastructure that would form the backbone of the United States' World War II logistics.²⁶

#6 Seek the Domain's Ultimate Independent Expression. Don't allow your domain to be sidelined as merely a support function to another domain, but instead explore its expression as an independent space for maneuver, power projection, and national economic advantage.

#7 Explore the Domain's Capability to Influence Other Domains. All domains are interconnected. While you can exploit the advantages of a domain only from within that domain, you can deny or have effects in a domain from an adjacent domain (see Figure 1). Guardians should seek synergy and integration of planning and effects between the domains of their stewardship and the domains they have the ability to affect.

#8 Develop Domain Expertise. Developing expertise specific to and in the domain is essential. Each domain has a different geography/astrography and physics that dominates movement, maneuvering, communications, and trade. Typically, this requires significant study, meaning domain expertise does not translate well across domains. In developing their domain, Guardians should seek to ensure they have the best-trained individuals with as much experience as possible. Creating in-domain expertise is not limited to the military. Past visionaries like Billy Mitchell sought to create general skill sets in society. Air power visionaries encouraged groups like the Air Force Auxiliary (also called the Civil Air Patrol) to develop the skills to operate in the air domain and the capabilities to build and maintain platforms suited to airpower. Likewise, the Navy encouraged the development of a merchant marine that could be called upon in times of war.

#9 Attack the Limits to Access and Exploitation. Our nation has previously achieved national economic and military advantage by seeking mastery of new domains. In seeking to master a domain, a service first encounters limits to its ability to access and then exploit the domain. Especially in the sea and air, it took a long time to develop increasingly seaworthy and airworthy craft-craft that could travel farther, faster, or persist longer; craft that could dive deeper and fly higher; and cargo capacity and payloads that could exploit their position in the domain. Explicitly attacking the limits to access and exploitation in the maritime and air domains has resulted in U.S. global dominance in air and sea. However, limits to access and exploitation exist in all domains. Today's Guardians rightly seek to achieve freedom of action, dynamic space operations, and sustained maneuver. Such ambition must extend to movement and maneuver in deep space.²⁷

Limits to access and exploitation are often technological limits, and seeking to master them often constitutes their own strategic struggle. Within the context of developing a posture to support hegemony, deterrence, dissuasion, and continuing advantage, a Cold War textbook, The Strategy of Technology, offers the following perspective:

The Technological War is the decisive struggle in the Protracted Conflict. Victory in the Technological War gives supremacy in all other phases of the conflict. ... The Technological War creates the resources to be employed in all other parts of the Protracted Conflict. It governs the range of strategies that can be adapted in actual or hot war.... Military superiority or even supremacy is not permanent, and never ends the conflict unless it is used. The United States considers the Technological War as an infinite game: one which is not played out to a decisive victory. We are committed to a grand strategy of defense, and will never employ a decisive advantage to end the conflict by destroying our enemies. Consequently, we must maintain not only military superiority but [also] technological supremacy. The race is an alternative to destructive war, not the cause of military conflict.... The United States is dedicated to a strategy of stability. We are a stabilizing rather than a disturbing power, and our goal is preserving the status quo and the balance of power rather than seeking conquest and the final solution to the problems of international conflict through occupation or extermination of all opponents. In a word, the U.S. sees the Technological War as an infinite game, one played for the sake of continuing to play, rather than for the sake of "victory" in the narrow sense. (emphases added)

—The Strategy of Technology

#10 Develop In-Domain Transportation. All domains require in-domain transportation to be able to make use of them. This is the fundamental capability for mere access to the sea, air, and space domains. Critical for space, Guardians require enabling technologies, including engine/propulsion and life support. Since transportation is limited or enabled by energy, a strategy to develop advantage in movement and maneuver is necessarily also a strategy to seek space energy dominance.

#11 Develop the Means to Navigate Within Your Domain. For both trade and military maneuvers, it is critical to understand where you are and be able to orient. Guardians must take leadership in designing navigational systems.

#12 Develop In-Domain Communication. To fully exploit a domain, one must have the ability to coordinate and communicate within the domain and from the domain to adjacent domains. The physics of signal transmission are different in each domain and require specific equipment. Guardians must take leadership in developing communications technology that enables broader commerce and the ability to command and control forces.

#13 Develop In-Domain Sensing. Each domain has unique sensing considerations-as it is more useful when we understand what is in it and what is happening in it. A domain may also afford an excellent vantage over adjacent domains. Guardians should advocate for developing better awareness in space to facilitate commerce and safety of navigation and to provide advanced intelligence (indications and warnings) to inform grand strategy, best military advice, and allow targeting. Historically, from Lewis and Clark to Army Corps of Engineer surveyors to Naval exploration and mapping, to Air Force atmospheric and polar mapping, America's military services have extended their warfighting-relevant sensing through peacetime scientific exploration. Space professionals can also look to the example of Clementine I,²⁹ a Strategic Defense Initiative Organization planetary mission that mapped the resources of the Moon, found water at the Lunar poles, and simultaneously qualified the sensors, avionics, and software for ballistic missile defense space-based interceptors.

#14 Develop In-Domain Control. Domains often require coordination and traffic control for commerce and military movement. Guardians must take leadership in designing traffic control and command-and-control systems that create the safety-of-navigation needed to secure commerce and enable national advantage in conflict.

He will be like a round stone rolled down a mountain thousands of feet in height. So much on the subject of energy. —Sun Tzu³⁰

You will not find it difficult to prove that battles, campaigns, and even wars have been won or lost primarily because of logistics.

-Gen. Dwight D. Eisenhower

#15 Multiply and Cultivate One's Sources of Power and Freedom. Infrastructure in every domain is necessary to enable freedom of action. These might be ports, airports, roads, rail, shipyards, aircraft factories, fuel depots, or outposts of economic value. First, identifying the equivalents, and second, occupying or constructing such equivalents in the space domain is a primary task for guardians.

Guardians should endeavor to understand the locations that convey strategic advantage and superior vantage, locations of control, locations of value, and choke points, and secure such locations in peacetime. Guardians should constantly search for these "launch pads" to broaden their freedom of action. Guardians must also keep in mind that early occupation is shaping and typically seen as less aggressive than attempts to dislodge others.

Possession/Occupation is nine-tenths of the law. —Traditional English proverb

Under conditions in which both parties seek to avoid armed conflict, early presence at choice locations conveys positional advantage and forces others to expend greater energy to find less advantageous locations. Such positions can likely be attained only in peacetime. Early occupation of valuable positions are logistics multipliers, enabling still further expansion and cost-effective logistical reach, allowing the United States to position itself to await the enemy from a position of strength.

Energy may be likened to the bending of a crossbow; decision, to the releasing of the trigger. —Sun Tzu³¹

The nation that leads in energy innovation will lead in warfighting effectiveness. —Peter W. Singer

Military power has historically also been dependent on caches of energy that could be scavenged, or compact portable sources of energy that could be taken along, to power one's journey. In gaining military freedom of action, it has been new energy sources and their transformers (compact, high-power engines; high-density storage) coupled with vehicles and logistics and basing that have had an outsized impact. Therefore, a strategy to develop power and freedom in the domain is necessarily also a strategy to seek space energy dominance. Guardians should therefore pursue a deliberate program to secure the caches of energy and their distribution nodes; they should march up the ladder of increasingly powerful space systems, with ever more compact and mass-efficient energy sources enabling ever greater options for maneuver, persistence, and effect.

Logs and rocks are still when in a secure place, but roll on an incline...when people are skillfully led into battle, the momentum is like that of round rocks rolling down a high mountain—this is force.

—Sun Tzu³²

#16 Nurture Your Industrial Base. You must actively cultivate your industrial base. Military power is built on industrial power and economic power. Domains are places of human activity and commerce. Guardians should advocate for the United States to take leadership in owning the carrying trade and producing the highest value goods. The space domain is unique in that its long-term economic potential vastly exceeds any domain on Earth, with upward of a billion times the energy and mineral wealth of Earth.³³ Nurturing and protecting a U.S.-led space economy provides the possibility to improve American prosperity, quality of life, and economic dominance. A larger space economy also means a larger tax base, defense budget, and war chest.

Observers have noted that whenever a state rises to hegemonic status, it does so in a precise sequence. First,



Figure 3. The Effects of Early vs. Late Investing

it dominates the production of the most valuable commodities. Second, the hegemonic state dominates trade by becoming the carrier or shipper of choice. Third, the profits made from the transfer of bulk trade in the system (through dominating shipping and movement of goods) allow the hegemonic state to become the financial or banking leader of the world—lending capital and operating as both the lender of last resort and the international counter-cyclical lender.³⁴

Guardians should therefore advocate to allow other polities to ride upon the United States' commercial lines and purchase from its industrial base (including foreign military sales). This allows the United States to benefit from economies of scale and amortize its capital investments while denying such advantages to its competitors. Failure to nurture one's industrial base can be fatal—it can take decades to create the necessary expertise and manufacturing when the decisions required in battle may grant only hours.

If you adopt a pattern of life that focuses on golden eggs and neglects the goose, you will soon be without the asset that produces golden eggs.

-Stephen Covey

In World War II, the United States had approximately a 10-times shipbuilding advantage over Japan. Today, a failure of military strategists to deliberately manage the United States' shipbuilding industrial base has resulted in China having a 230-times shipbuilding advantage over the U.S.³⁵ USSF officers and strategists have it within their power to build such a comparative inspace construction advantage within their domain, and a failure to do so proactively constitutes a dereliction of duty. The road to victory starts with making yourself invincible by creating mobilizable industrial depth.

Quantity has a quality all its own. —Joseph Stalin

Both military and economic advantage depend on scale, and per-unit production costs do not scale linearly but, rather, follow what is called an industrial learning curve. In planning for peacetime expansion and mobilization, Guardians must constantly keep Wright's Law in mind (Figure 3): for every cumulative doubling of units produced, costs fall by a constant percentage (typically 10–30 percent for space systems). Military systems are embedded in economic systems. Since the essence of economic development is efficiency of production, states that excel in producing civilian goods and services also tend to excel in producing military force and produce lopsided victories.³⁶ Therefore, military strategists must concern themselves also with civilian production.





There are huge upsides to deliberately creating an off-Earth industrial base and supply chain.³⁷ The mineral and energy resources of the solar system are a billion times that of Earth and can be moved in space with much less energy than sourcing fuel or construction materials from Earth. Philosophically, the nation that first constructs an off-Earth supply chain will have a significant advantage over its rivals. Those advantages include occupying the commanding heights and having a logistical advantage, a war-mobilization advantage (an "arsenal of democracy" in space), a "time to breakout" advantage,³⁸ an economic (size of war chest) advantage, and so on. These in turn support hard-core space control.

#17 Nurture One's Scientific and Technical Base. The ability to attack the limits of access and exploitation, and to develop in-domain capabilities, depends greatly on scientific, technological, engineering, and math (STEM) skills. These don't just appear by market forces. As with the post-Sputnik and Apollo-era grants, such skills can be created through government incentives, but they also require activism on the part of defense leadership. Cutting-edge skills can be created nationwide by exploring prototypes, X-[space]planes, and innovation prizes.

#18 Never Stop Developing In-Domain Capabilities. Once you achieve a certain level of transportation, communication, sensing, and the like, you must look at your domain anew and assess your current limits. Be explicit and then deliberately attack those limits. The process is never-ending. Ask, "What limits my freedom of action today?"

#19 Structure the International Governance Domain to One's Benefit. Develop one's domain to restrain competitors while providing freedom of action for yourself and your allies. This includes being proactive about "lawfare" (the construction of treaties and international regimes), governance issues, and arms control agreements. The U.S. Air Force had a central role in constructing international civil aviation norms and initial space law.³⁹

Compound interest is the eighth wonder of the world. He who understands it, earns it. He who doesn't, pays it. —Albert Einstein (attributed) The best time to plant a tree was 20 years ago. The second-best time is now.

-Chinese proverb

#20 Use Time as a Weapon. Remember that small efforts can snowball over time. Strategy is required only when you want to go somewhere other than where the system's momentum is taking you. Begin by imagining the conflicts you may have to fight in the future and then imagine the posture and tools you wish to have at your disposal. Small investments today can have outsized effects compounded over time (Figure 3).⁴⁰ Use the lever of time to bring about those conditions. Plant the seeds today that will grow exponentially over time.

Conclusion

Victorious warriors win first and then go to war, while defeated warriors go to war first and then seek to win. —Sun Tzu⁴¹

Guardians must be proactive about shaping the conditions of their domain. They must seek victory first through preparation—by creating partnerships, occupying the positions that enable control and freedom of action in the key terrain, attacking the limits of access and maneuver through research and development, cultivating their industrial base,⁴² and supplying national vision. If Guardians succeed in these endeavors, many battles may be avoided by portraying a position of strength, and those conflicts that cannot be avoided will merely confirm conditions were adequately set in the first place.

While today's spacepower doctrine largely starts with how space forces are employed, we have the power to change that. We can record historical best practices for setting conditions and removing barriers. Establishing how Guardians shape their operating environments sets expectations and enlarges the number of Guardians actively shaping the United States' operational environment through technology, posture, and partnerships. The time is ripe for the U.S. Space Force to develop and deploy a strategic doctrine for developing its domain during interwar periods.

Note: An earlier (pre-USSF) version of this essay was published in Over the Horizon Journal in 2017 in response to a general officer who observed, "We need a peacetime doctrine," and the article was informed by Air University thinking that the Department of the Air Force needs to be ready for changes in the space domain and advocate for an independent Space Service.⁴³

Endnotes

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