Chapter 2

Space Power Theory

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The Soviet Union's launch of *Sputnik* in 1957 became the basis for space power theory, and international debate immediately emerged on potential applications of an enemy satellite orbiting the earth. Theories ranged from dropping nuclear weapons from space to peacefully overflying countries for treaty verification.[1] Half a century later, the United States is still asking, what does space power mean? Operations Desert Storm, Allied Force, Enduring Freedom, and Iraqi Freedom gave military theorists a glimpse into the application of space power; however, the validity of their theories has yet to be extensively tested. Theorists continue to search for strategies to interpret and employ space power.

Because law is one of the foundations for space power theory, this chapter begins by exploring air and sea precedents in developing space law. (Space law is discussed more fully in chapter 3.) Second, this chapter highlights the fallacy of assuming space power theory is an extension of air and sea theory. Finally, this chapter presents four leading space power theories and explains the evolution of space power thought.

Air and Sea Precedents in Developing Space Law

Law has provided the basis for air and sea power and is considered foundational in developing a space power theory. Given the short history of US space activities, Irvin White offers "a compelling case for the evolution of space law from a basis in international sea and air traditions."[2] Dr. Everett Dolman states in his book *Astropolitik: Classical Geopolitics in the Space Age* that "the bulk of air law, codified in the twentieth century in conjunction with rapid technological developments of the air, then jet plane, has developed primarily through bilateral treaties and multilateral conventions. Law of the sea, on the other hand, developed primarily by codifying existing customary and normative behaviors of seafaring states."[3] The major contentious issues in regards to air, space, and naval theory are delimitations, sovereignty, registration and liability, and innocent passage.[4]

Delimitation

Delimitation attempts to answer the question of where airspace ends and where space begins. According to Dolman, "The two most prevalent approaches for defining outer space have been spatial and functional. The spatial approach explains that space begins just below the lowest point at which an object can be maintained in orbit . . . about 52 miles."[5] The second approach to defining outer space is "the functional approach [that] is based on the propulsion systems of the air/spacecraft and is legally based in 1919 and 1944 International Air Conventions, which defined aircraft as 'any machine that can derive support from reactions of the air.' Under this definition, space

begins just beyond the maximum height at which aerodynamic flight is possible."[6] An internationally recognized definition of where space begins has to be the first governing principle in establishing space law. Without this definition of space, the second question of sovereignty cannot be answered.

Sovereignty

In addition to delineation, sovereignty aids in developing a framework for space law. The "definition of air space is acceptable for aircraft, since, due to gravity and the relatively small altitudes concerned, the air space above the earth can be monitored and controlled. It can be possessed. There is a legally important distinction here: the air is not susceptible to sovereignty, but the air space is."[7] Having sovereignty in space does not mean having control of space due to the rotation of the earth. Therefore, basing space sovereignty on airspace law is problematic.[8]

While not without its limitations, sea law can aid in developing a working definition of space sovereignty:

> Prior to 1958, the limit of territorial seas had been generally recognized as between 3 and 12 miles. The International Conventions on the Law of the Sea of 1958 and 1960 were unable to formalize a universal legal limit for territorial or contiguous seas, or for high seas. . . . Like the sea, outer space can be divided into subregions, usually defined by their distance from the earth. These distinctions, described in astropolitical terms, include near-Earth and geostationary space, cislunar and translunar space, deep space, etc., and are usually put forward by military or nationalist supporters who wish to derive maximum control of the commons for the benefit of their constituency.[9]

Dolman argues that "the only definition of sovereign space that may truly matter is one that incorporates the notion of a region that can be effectively defended."[10] The US Navy does not attempt to control the entire sea—only the portions that are in support of national interests. Establishing space superiority without first defining space sovereignty results in ineffective use of space resources.

Registration and Liability

The third issue regarding sea and airpower that has relevance for space power is registration and liability. The United Nations (UN) Convention on the Law of the Sea requires each nation to keep a registry of ships. Individual nations, however, may have their own rules and regulations for registration, safety, and related issues.[11] Dolman notes that "in contrast to sea law, aircraft have the additional requirement of *holding* the nationality of the state in which they are registered. . . . The requirements for registration of objects in space are stricter than those for sea or air, with the justification that such registration is necessary because of the greater potential for global physical and/or environmental damage. . . . The most compelling reason for registration of spacecraft, according to policy makers, is to enhance national security."[12] In reference to the 1967 Outer Space Treaty ratification, UN Ambassador Arthur Goldberg stated, "This is a matter of national security. We believe that when there is registration of launchings this gives us an opportunity to, and the world community to, check up on whether the launchings are, indeed, peaceful or whether they are for some other purposes."[13]

Innocent Passage

The final issue of air and sea law that provides a framework for space power theory is the issue of innocent passage. According to the definition of innocent passage for sea areas, "passage is innocent so long as it is not prejudicial to the peace, good order, or security of the coastal state. Innocent passage on the seas is far less strict than the air regime, and the space regime is the least constrained of all."[14] For example, the definition of innocent passage on the oceans permits photographic and other reconnaissance activities in which Soviet Union–equipped fishing trawlers with sophisticated surveillance equipment monitor US shores.[15] Innocent passage of the sea seems to be the most likely model for establishing a space framework for legal activities in space.

Limitations of Air and Sea Power Models

While sea and air models are instructional, the distinction between the mediums provides additional insight into why space power is unique. Lt Cdr John J. Klein's article "Corbett in Orbit: A Maritime Model for Strategic Space Theory" proposes that, given the lack of a comprehensive space theory, previous models should be used for development of a comprehensive theory to develop a space strategy. However, Klein correctly analyses the limitations of equating air and space power as aerospace power.[16] The assumption that air and space power are inextricably linked—that the same theories which apply to airpower also apply to space power—is faulty:

> Early thinkers on space forces considered them simply "high-flying air forces." For example, U.S. Air Force space doctrine was first established merely by replacing the word "air" with the coinage "aerospace" in the literature. According to aerospace integrationists, space power is no different from airpower, because it delivers similar products to users. Consequently, in that view, no separate space power theory or definition is warranted, since aerospace power embraces space operations.[17]

The air and space power linkages begin to fray when one considers the activities US space operations support. Space operations can be categorized into civil, commercial, military, and intelligence. Airpower, on the other hand, focuses almost exclusively on the military aspect. According to Klein, "because of the diverse and pervasive nature of the space activities of the United States, its space operations have implications spanning all elements of national power—diplomatic, military, economic, technological, and information."[18]

Klein notes that "some strategists, pointing to the similarities between sea and space operations, suggest that the best possible space theory would be achieved by simply substituting 'space' for 'sea' in naval strategy."[19] Brentnall, Kohlhepp, Davenport, Cole, and others offered several sea-power analogies to explain space power. The following is a partial list of some of those analogies:

- US dependence on sea power (and now space power) for national growth, prosperity, and security.
- The need for a space battleship to control the "narrows" of the celestial seas.
- The concepts of sea (space) control and sea (space) supremacy.
- Global coverage (the ability to project power around the world).
- Free passage.

- Commercial possibilities.
- A force in being.
- Vehicular rather than positional sovereignty.[20]

However, naval power theory, Klein says, "deals with ships, shipbuilding, war at sea, and military forces associated with navies. Moreover, naval theory is primarily concerned with the means and methods of employing force at sea to achieve national goals while increasing national power and prestige. . . . Consequently, the applicability of the naval model to space is limited, since it does not adequately encompass the interaction and interdependence of other environments or military forces."[21]

Given the similarities and differences between the three domains, are air and sea models applicable for developing a space power theory? The answer is yes; however, the theorist must begin by approaching space as a unique environment rather than reversing the operation and making space fit into the sea and air theories. Adm Alfred Thayer Mahan admonishes "that while it is wise to observe the things that are alike, it is also wise to look for things that differ, for when the imagination is carried away by the detection of points of resemblance—one of the most pleasing of mental pursuits—it is apt to be impatient of any divergence in its new-found parallels, and so may overlook or refuse to recognize such."[22]

Characteristics and Definition of Space Power

Since space is a unique domain and air and sea models are lacking, a new strategy is required. With space law codified, the next step in developing a theory is to identify the characteristics and provide a definition of space power. Lt Col David E. Lupton, in his book *On Space Warfare: A Space Power Doctrine*, provides the framework, outlines the characteristics, and offers a definition of space power:

> Space power, it follows, is the ability to use the space environment in pursuit of some national objective or purpose. Second, space power may be purely military, such as the collection of surveillance data, or nonmilitary, such as earth resource data collection or civilian communications. Third, all four elements of national power embody not just military forces but civilian capabilities as well. For instance, Gen H. H. "Hap" Arnold described air power as the total aeronautical capabilities of a nation. Admiral Mahan even included the nature of a country's political institutions as a determinant of a nation's sea power. By extension, the space shuttle, a civilian vehicle, along with the political structure that allowed its development, contributes to US space power. A definition that includes these three characteristics is that space power is the ability of a nation to exploit the space environment in pursuit of national goals and purposes and includes the entire astronautical capabilities of the nation. A nation with such capabilities is termed a space power.[23]

Lupton's Four Schools of Thought

Having defined space power, Lupton further discusses four schools of thought regarding space power theory. Particularly, he explores those differences in fundamental beliefs that impact the analysis of the four schools of doctrinal thought concerning the best way to employ space forces.[24] His discussion of the sanctuary, survivability, high-ground, and control schools provides the basis for the three remaining space theorists discussed.

Sanctuary School. The fear that space would be weaponized after the *Sputnik* launch resulted in a declaration that space must be reserved for peaceful purposes. The first school, the sanctuary school, was born out of this philosophy:

> A fundamental tenet of this school is that the primary value of space forces is their capability to "see" within the boundaries of sovereign states. This value stems from the space vehicle's legal overflight characteristic. Proponents of sanctuary doctrine argue that past arms limitations treaties could not have been consummated without space systems that serve as the "national technical means of treaty verification." . . .
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> The prospects for any future treaties would be extremely dim without the ability of space systems to fulfill President Eisenhower's dream of verification through open skies. Thus, space systems have had a tremendous stabilizing influence on relations between the two superpowers. Finally, these advocates caution that overflight is a granted right that nations have not attempted to deny and that any proposed military use of space must be weighed against the possible loss of peaceful overflight. This train of thought leads to the conclusion that the only way to maintain the legal overflight characteristic is to designate space as a war-free sanctuary.[25]

Survivability School. The basic tenet of Lupton's survivability school is that "space systems are inherently less survivable than terrestrial forces." Several factors lead him to this conclusion:

> First is the long-range weapon effects in the space environment, coupled with a belief that nuclear weapons are more likely to be used in the remoteness of space. Second, the quasi-positional nature of space forces and their vehicular sovereignty imply that space forces cannot rely on maneuverability or terrestrial barriers to increase survivability. . . . Advocates of the survivability school . . . have serious reservations as to the military value of space forces. They agree that military forces can do certain military functions . . . more economically and efficiently in peacetime than other forces. They believe, however, that space forces must not be depended on for these functions in wartime because they will not survive.[26]

High-Ground School. The third school of thought, known as the high-ground school, believes the force that dominates space will have an asymmetric advantage over its opponent and thus be less vulnerable to attack:

> [This] school harkens back to the old military axiom that domination of the high ground ensures domination of the lower lying areas. Disciples of this "high-ground" school advocate a space-based ballistic missile defense (BMD). They argue that the global-presence characteristic of space forces combined with either directed-energy or high-velocity-impact space weapons provide opportunities for radical new national strategies. In their view, space-based defensive forces can reverse the current stalemate caused by the preeminence of the offense and create either an offensive-defensive balance or a preferred defensive stalemate. This rebalancing would allow replacement of the flawed strategy of assured destruction with one of assured survival. . . . The high-ground school believes space forces will have a dominant influence.[27]

Control School. The final of Lupton's schools is the control school:

> The control school declines to place an exact value on space forces and only suggests their value by using air power and sea power analogies. For example, according to Gen Thomas A. White, ". . . Whoever has the capacity to control space will likewise possess the capacity to exert control over the surface of the earth." Others argue that there are space lanes of communications like sea lanes of communications that must be controlled if a war is to be won in the terrestrial theaters. Control school advocates argue that the capability to deter war is enhanced by the ability to control space and that, in future wars, space control will be coequal with air and sea control.[28]

Given the four schools of thought, Lupton believes that the control school should be the basis for a space power strategy.[29]

The recent Chinese and US antisatellite launches have nullified the sanctuary school as a viable basis for a space power theory. US reliance upon space services such as the global positioning system (GPS), satellite communications (SATCOM), missile warning, and space-based weather makes space a fundamental part of military as well as com-

mercial operations. Given the reliance upon these services, the survivability school is no longer realistic. Given the proliferation of space weapons, the evolution of space power lies with the high-ground and control schools.

Oberg Space Power Theory

James Oberg picks up the space power theory discussion where Lupton leaves off and outlines four reasons for developing a space power theory. Oberg dismisses the sanctuary, survivability, and high-ground schools of thought and proposes further development of space power theory using the control school of thought.[30]

> [First, space power theory] provides a foundation of appreciation of the unique nature of space. Space is not earth and terrestrial metaphors are not helpful and in fact are harmful. With a good space power theory, you can formulate innovative strategies and also make sure that you have all of them, because as we will see later on, many times you find that you didn't initially think of a solution that turns out to have been the best one; it wasn't thought of in time to choose it. The second point, which is an elaboration on the first, is that a good theory of space power protects workers and decision-makers from false analogies, the ultimate "high ground" self-delusion. Another elaboration on the first point is that because space is so unpredictable and unearthly, in the literal meaning of the word, things can be invented or done there, developed and deployed there, that catch people by surprise. The Sputnik shock of forty-five years ago is such a thing that many of us remember. It was one of the great surprises of the twentieth century. Other surprises like that could be out there if we lack an adequate space power theory. And lastly a good theory provides a criterion, a measure of "goodness," for selection among competing options.[31]

Oberg proposes the following foundations for a space power theory when developing a space policy:

- The primary attribute of current space systems lies in their extensive view of the earth.
- A corollary of this attribute is that a space vehicle is in sight of vast areas of Earth's surface.
- Space exists as a distinct medium.
- Space power alone is insufficient to control the outcome of terrestrial conflict or insure the attainment of terrestrial political objectives.
- Space power has developed, for the most part, without human presence in space, making it unique among all forms of national power.
- Situational awareness in space is a key to successful application of space power.
- At some time in the future, the physical presence of humans in space will be necessary to provide greater situational awareness.
- Technological competence is required to become a space power, and conversely, technological benefits are derived from being a space power.
- Control of space is the linchpin upon which a nation's space power depends.
- As with earthbound media, the weaponization of space is inevitable, though the manner and timing are not at all predictable.
- Scientific research and exploration pay off.
- Space operations have been and continue to be extremely capital intensive.
- There will be wild cards.[32]

The lack of accurate space power analogies has created a great deal of confusion. Oberg dismisses previous air and naval analogies and encourages theorists to view space as a separate environment with unique challenges and opportunities. The uniqueness of the environment should be the basis for space power theory rather than viewing space as an extension of the naval or air domain.

Astropolitik

Dr. Dolman, in his book *Astropolitik: Classical Geopolitics in the Space Age*, blends the high-ground and control schools and argues that a realist's view on developing space power theory is necessary. Dolman writes, "Strategy, grand strategy in particular, . . . is ultimately political in nature, that is to say the ends of national strategy are inextricably political, yet the means or dimensions of strategy are not limited."[33] Dolman proposes that the United States "seize control of outer space and become the shepherd (or perhaps watchdog) for all who would venture there, for if any one state must do so, it is the most likely to establish a benign hegemony."[34]

Dolman proposes three steps to implementing his plan. "First, the United States should declare that it is withdrawing from the current space regime and announce that it is establishing a principle of free-market sovereignty in space. . . . Second, by using its current and near-term capacities, the United States should endeavor at once to seize control of low-earth orbit."[35] According to Dolman, in 1961 Dandridge Cole polled 423 leaders in the astronautic community about his Panama hypothesis ("that there are strategic areas in space which may someday be as important to space transportation as the Panama Canal is to ocean transportation").[36] Cole reported that about 80 percent agreed with this hypothesis. Dolman argues that US military control of "low-Earth orbit would be for all practical purposes a police blockade of all current spaceports, monitoring and controlling all traffic both in and out."[37] The third step in implementing Dolman's plan is establishing a national space coordination agency, which would "define, separate, and coordinate the efforts of commercial, civilian, and military space projects. . . . A complementary commercial space technology agency could be subordinated or separated from the coordination agency, to assist in the development of space exploitation programs at national universities and colleges, fund and guide commercial technology research, and generate wealth maximization and other economic strategies for space resources and manufacturing."[38]

Dolman's realist view of space power dismisses the notion that a nation should hold to a strategy hoping one's enemy won't challenge the status quo. Like Oberg, Dolman dismisses the sanctuary and survivability schools. He argues for a high-ground/control space power theory. Given the reliance upon space and the threats already posed in space, the United States should encourage free passage in space while having the capacity to prevent those who will disrupt this freedom.

Klein's Maritime Model

Most of the discussion of Klein's maritime model is reproduced directly from his article "Corbett in Orbit: A Maritime Model for Strategic Space Theory," *Naval War College Review* 57, no. 1 (Winter 2004): 59–74.

While air and naval theories offer insight into a space theory, neither air nor naval theories are capable of sufficiently addressing space:

> Both air and naval models are relevant to space operations and activities, but neither possesses the breadth needed for a strategic space theory. The air model, in its aerospace variant, takes into account the interrelationships of other forces and environments, but it has a primarily military focus. The naval model includes national interests, such as prestige and power, but is focused on naval engagements alone and tends to exclude other operations or forces. Yet there is a theoretical model that incorporates other mediums and forces, as aerospace power does, while including broad national interests, as the naval model does.[39]

Maritime Model. Klein suggests the use of a maritime model for theorizing space power—maritime theory is much broader than naval theory and is more relevant to space operations than air theory: "The term 'maritime,' in contrast to 'naval,' connotes the whole range of activities and interests regarding the seas and oceans of the world, and their interrelationships: science, technology, cartography, industry, economics, trade, politics, international affairs, imperial expansion, communications, migration, international law, social affairs, and leadership."[40]

Among the most recognized maritime strategists is Sir Julian Stafford Corbett, whose work *Some Principles of Maritime Strategy*, can serve as the foundation for developing a space theory:

> Sir Julian Stafford Corbett (1854–1922), acclaimed as Great Britain's greatest maritime strategist, is particularly renowned for his 1911 work *Some Principles of Maritime Strategy,* a "fusion of history and strategy." . . . Therefore, it is Corbett's ideas and principles, from *Some Principles of Maritime Strategy,* that we will use as a framework for deriving a strategic space theory.
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> Corbett wrote of the implications for national power of maritime operations in both peace and war. Like Carl von Clausewitz—whom he cites extensively—Corbett recognized that both land and sea operations are influenced by national politics and interests. The object of naval warfare being in his view to control maritime communications, including commercial and economic aspects, Corbett held that naval action can influence the balance of wealth and power among nations.
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> Nonetheless, Corbett acknowledged that sea and land operations are interdependent, that naval strategy and operations constitute only a subset of a nation's wartime operations. He repeatedly stated the necessity for the closest cooperation of ground and sea forces. In fact, in a departure from the conventional thought of his day, Corbett considered it of paramount importance that naval strategy work within the overall national strategy, since it is almost impossible for war to be decided by naval action alone (*Some Principles*, page 15). Therefore, the purpose of maritime strategy is to determine the "mutual relations of your army and navy in a plan of war" (page 16).
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> Another theme of Corbett's work is "command of the sea," which he considers different from the occupation of territory by an army, for the high seas cannot be subjected to political dominion or ownership. The inherent value of the sea, in his view, is as a means of communication. Consequently, Corbett defines command of the sea as the "control of maritime communications, whether for commercial or military purposes" (94). He explicitly states, however, that to command the sea is a relative advantage, not an absolute; it does not mean that the enemy cannot act, only that it cannot seriously interfere with one's actions. The normal state of affairs, Corbett observes, is not a commanded sea but an uncommanded one—that is, command of the sea is normally in dispute (91).
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> Maritime communications pertain to those routes by which the flow of "national life is maintained ashore"; therefore, they have a broader meaning than land lines of communication and are not analogous to those traditionally used by armies (93, 100). While maritime communications include supply and trade, they also include lines of communication that are of a strategic nature and are thus critical for a nation's survival. The objective of controlling maritime communications is protection of one's own commerce and interference with the enemy's economic interests, ultimately the defeat of the adversary's "power of resistance" (102). Corbett argues that the primary object of the fleet, therefore, is to se-

cure sea lines of communication, putting the enemy's fleet out of action if it is in a position to render them unsafe (102).

For Corbett, offensive operations are called for when political objectives necessitate acquiring something from the enemy; as a more "effective" (his term) form of war than the defensive, offensive operations should be the preference of the stronger power (31). Notwithstanding the advantage of the offensive, however, even a superior naval force seeking a decisive victory will likely find the enemy in a position where he cannot easily be affected; throughout naval history fleets have been able to thwart attempts to force decisive battle by retiring to the safety of coasts and ports (158). Still, and despite this limitation, Corbett expressed concern that some naval professionals made a fetish of the offensive. Corbett argued that defensive operations should not be shunned or avoided; they are, he held, specifically called for when political objectives necessitate preventing the enemy from gaining something (32). Moreover, defensive operations are the "stronger" form of war and, as a rule, should be resorted to by the weaker navy until it is strong enough to assume the offensive (310–11).

Like Clausewitz, Corbett classified wars according to whether the object is limited or unlimited. Because of the nonescalatory nature of truly limited warfare, a nation initiating a limited war needs the "power of isolation" to defend itself against an unlimited counterstroke. Such "isolation" could be achieved by commanding the sea to such a degree as to make it effectively an "insuperable physical obstacle." In such a case, "He that commands the sea is at great liberty and may take as much or as little of the war as he will."

Corbett envisioned several actions that may be taken by lesser naval powers to dispute command of the sea. A lesser naval force would be unlikely to win a decisive major fleet engagement, yet it could achieve significant results. Through minor naval actions—such as attacks on sea lanes and coastal raids (261–62)—it could contest a superior power's command of the sea and thereby accomplish at least limited political objectives. In such ways a lesser power could disturb enemy plans, regardless of its fleet's size, while strengthening its own national power and prestige (61).

A small navy could also effectively dispute command of the sea through the "fleet in being" concept (166). A decisive defeat at the hands of a more capable navy would make one's fleet unavailable should the situation later develop in one's favor (211). Consequently, keeping its fleet actively "in being"—not merely in existence but in active and vigorous life—constitutes a defensive strategy for a relatively small maritime power (214).

Corbett theorized that victory at sea is dependent upon the relative strength of one's force and the exploitation of one's "positions"—naval bases, commercial, and nearby focal areas where trade routes converge (106). If correctly exploited, strategic positions allow a naval force to restrict the size of any enemy force, thus creating favorable conditions for battle (72). Corbett specifically considered it more effective to control ports and maritime choke points, thereby threatening the enemy's commerce and potentially luring his fleet into battle on one's own terms, than to seek out the enemy's fleet for a decisive action (185).

Relatedly, Corbett envisioned blockades, of two types, "close" and "open." The former closes the enemy's commercial ports. "By closing [the enemy's] commercial ports we exercise the highest power of injuring him which the command of the sea can give us"—the enemy must either submit to the close blockade or fight to release himself (185). In contrast, in an open blockade a fleet occupies distant and common lines of communication—a means for a stronger navy to force the enemy out of its harbors. "It is better to sit upon his homeward bound trade routes, thus costing him his trade, or making his fleet come for a decisive battle," than repeatedly attempt to seek out an enemy who habitually retires to the safety of his ports (156–57).

The obverse of blocking maritime communications—in fact, the object of naval warfare, in Corbett's view—is protecting them. This was to be achieved by the "cruiser," a vessel of endurance and power sufficient for long, independent deployments to deter and thwart enemy commerce raiding and protect sea lines of communication. Corbett considered the importance even of the battleship secondary to that of the cruiser (114). Because of the wide expanses of sea and the numerous maritime routes and coastlines involved, cruisers had to be built in significant numbers.

> Finally, if cruisers were to be dispersed to distant operating areas, naval forces had also to be able to concentrate rapidly and decisively when needed (132). Such a strategic combination of concentration and dispersal in warfare, Corbett argues, allows a fleet to engage the enemy's central mass when needed but in the meantime to preserve the flexibility necessary to control maritime communications and to meet minor attacks in several areas at once (133).[41]

Deriving a Strategic Space Theory. From Corbett's discussion of maritime theory, Klein proposes to "extrapolate and define" a theory of space operations, acknowledging the differences between maritime and space operations but contending that at the strategic and theoretical levels, they share many commonalities:

> Maritime operations are not the same as space operations; environmental, technological, and physical factors are definitively different. Nevertheless, many of their strategic aspects are similar, and therefore they may be presumed to share certain theoretical principles. We may attempt, therefore, to derive objectively a space theory in strict keeping with Corbett's original context and strategic intent, verifying the applicability of its principles against contemporary literature.[42]
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> *National Power Implications*. Space operations and activities utilizing space-based assets have broad implications for national power in peace and war, implications that include diplomatic, military, economic, technological, and information elements. Furthermore, military operations in space are extensively interrelated with national and political interests, and any action in space, even minor ones, can impact the balance of wealth and power among nations.
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> *Interdependence with Other Operations*. Operations in space are interdependent with those on land, at sea, and in the air. Space warfare is just a subset of wartime strategy and operations; accordingly, space forces must operate in concert with other military forces. Moreover, space strategy should work within the overall national strategy, since it is next to impossible for space operations alone to decide a war's outcome.
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> *Command of Space*. Command of space is the control of space communications for civil, commercial, intelligence, and military purposes. The inherent value of space is as a means of communications; therefore, space warfare must work directly or indirectly toward either securing command of space or preventing the enemy from securing it. Command of space does not mean that one's adversary cannot act, only that he cannot seriously interfere in one's actions. Additionally, the command of space will normally be in dispute.
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> *Space Communications*. Space communications are those lines of communications by which the flow of national life is sustained in and through space. These include strategic lines of communication, critical to a nation's survival, that serve the movement of trade, materiel, supplies, and information. By attack upon space communications, a nation can adversely affect another's civil, commercial, intelligence, and military activities, thereby reducing that nation's will to resist. The primary purpose of space warfare is to secure space communications; enemy forces that are in a position to render them unsafe must be put out of action.
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> *Strategy of the Offense*. Offensive operations in space are called for when political objectives necessitate acquiring something from the adversary. Generally speaking, offensive operations in space are reserved to the stronger space power. However, an offensive force looking for a decisive victory will likely not find it, since the enemy will usually fall back to a position of safety. Offensive operations must be decided upon with caution; space assets can be thrown away on ill-considered attacks.
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> *Strategy of the Defense*. Despite the advantage of offensive space operations, the utility of defensive operations is substantial; offensive and defensive operations are mutually complementary, and any campaign must have characteristics of both. Defensive space operations are called for when political objectives necessitate preventing the enemy from achieving or gaining something. Defensive operations are inherently the stronger form of action and should be used extensively by lesser space forces until the offensive can be assumed.
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> *The Power of Isolation*. A nation wishing to initiate limited war in or through space requires a defensive capability adequate to protect itself against an unlimited counterattack. The "power of isolation" is made possible by commanding space and making it an insuperable physical obstacle, enabling one nation to attack another for limited political purposes

without fear of a devastating counteroffensive. To paraphrase Corbett, "He that commands space is at great liberty and may take as much or as little of the war as he will."

Actions by Lesser Space Forces. Although a less capable space force is unlikely to win a decisive space engagement, it can still contest the command of space, thereby achieving limited political objectives. To this end the weaker force may seize local or temporary command in areas where the stronger force is not present. Additionally, lesser space forces can disrupt commercial or economic interests or interfere in minor ways with space-based systems. Both types of action are meant to disturb an enemy's plans while increasing the lesser nation's power.

Another effective method by which a lesser space force might dispute command is the "fleet in being" concept. It is important for relatively weak space forces to avoid decisive engagements with stronger ones, but they can be kept safe and active until the situation changes in their favor. Furthermore, while avoiding large-scale engagements with a superior space force, a lesser one can conduct minor attacks against space communications or space-related activities, thus preventing the stronger power from gaining general command of space.

Strategic Positions. Strategic positions include launch facilities, up-and-down link systems, space bases or stations, and focal areas where operations and activities tend to converge. If correctly exploited, strategic positions allow a space force to restrict the movement of the enemy forces or information, thus improving the conditions for military operations. Since it will prove difficult to force an adversary into a decisive engagement, it is better to control strategic positions and threaten commerce and operations, thereby forcing the enemy to action on favorable terms. By exploiting strategic positions through occupation of the enemy's space lanes of communication and closing points of distribution, we destroy elements of the enemy's "national life" in space.

Blockades. Closely related to strategic positions are the methods of blockades, whether close or open. The close blockade for space operations equates to preventing the deployment of systems from launch facilities and to interfering with communications in the vicinity of uplinks or downlinks, as well as impeding the movement of vehicles near space-based hubs. Close blockade may be achieved by physical systems or vehicles or interference measures. In Corbett's model, suppressing operations at these distribution points obliges the adversary either to submit or fight. In contrast, a more capable space power can impose an open blockade, occupying or interfering with the distant and common space lines of communication, to force an adversary into action. Like the close blockade, methods include both physical systems and interference.

Cruisers. The object of space warfare is to control space communications, and therefore a means of establishing this control is required. Consequently "cruisers" are needed in large numbers to defend the vast volumes occupied by space lines of communication. One possible implementation of the "cruiser" concept would be inexpensive micro-satellites designed to defend high-value space assets from attack or space-based interference. Space systems that perform purely offensive operations with negligible influence on space lines of communication are of secondary importance.

Dispersal of Forces. Space forces and systems should in general be dispersed to cover the widest possible area yet retain the ability to concentrate decisive force rapidly. Dispersal of forces will allow the protection of a nation's space assets and interests, thereby facilitating defensive operations or minor attacks wherever a nation's space interests are threatened. To defend against or neutralize a significant threat, however, space forces should quickly concentrate firepower or other destructive effects. This combination of dispersal and concentration preserves the flexibility needed to control space communications but allows an adversary's "central mass" to be engaged when necessary.[43]

Conclusion

Despite operating in space for 51 years, the United States still lacks a comprehensive space strategy. The lack of a space strategy stems from a mantra that space should

not be weaponized and should only be used for peaceful purposes. While this is a noble position, the reality is that the United States faces a decision to either continue to ignore air and sea history or adopt a proactive policy, including a space strategy that is designed to control space. Theodore Roosevelt understood the implications of sea power and as assistant secretary of the navy and president, he advocated for a robust US Navy. Despite the protests that a more powerful Navy would heighten the risk of war, Roosevelt funded and built the Great White Fleet that sailed around the world. Roosevelt wrote, "Preparation for war is the surest guaranty for peace. Arbitration is an excellent thing, but ultimately those who wish to see this country at peace with foreign nations will be wise if they place reliance upon a first-class fleet of first-class battleships rather than on any arbitration treaty which the wit of man devise."[44] Roosevelt seized an opportunity to establish a credible military navy which secured the peace during his tenure as president.

The United States is once again at a critical juncture. Should we be naïve and believe that as long as we don't weaponize space our adversary won't? Or should the United States take advantage of the technology and opportunities, develop a comprehensive space power strategy, and preserve freedom of access in space?

Notes

1. Everett C. Dolman, *Astropolitik: Classical Geopolitics in the Space Age* (New York: Frank Cass Publishers, 2002), 94.
2. Dolman, 113. See Irvin White, *Decision-Making for Space: Law and Politics in Air, Sea and Outer Space* (West Lafayette, IN: Purdue University Press, 1971).
3. Dolman, *Astropolitik*, 113.
4. Ibid., 114.
5. Ibid., 115.
6. Ibid., 115–16. The definition of aircraft is found in Lincoln P. Bloomfield, "The Prospects for Law and Order," in *Outer Space: New Challenge to Law and Policy*, ed. J. E. S. Fawcett (Oxford: Clarendon Press, 1984), 156.
7. Dolman, *Astropolitik*, 117.
8. Ibid.
9. Ibid.
10. Ibid., 117–18.
11. White, *Decision-Making for Space*, 82.
12. Dolman, *Astropolitik*, 118–19.
13. Quoted in Dolman, *Astropolitik*, 119. See US Senate, *Ambassador Goldberg: Hearings before the Committee on Foreign Relations*, 90th Cong., 1st sess., 7 March 1967, 16.
14. Dolman, *Astropolitik*, 119.
15. Ibid., 120.
16. Lt Cdr John J. Klein, "Corbett in Orbit: A Maritime Model for Strategic Space Theory," *Naval War College Review* 57, no. 1 (Winter 2004): 61.
17. Klein, *Corbett in Orbit*, 61. See Gen Thomas White, USAF, "Air and Space Are Indivisible," *Air Force Magazine*, March 1958, 40–41; and M. V. Smith, "Ten Propositions Regarding Space Power" (thesis, Air University, Maxwell AFB, AL, June 2001), 109.
18. Klein, *Corbett in Orbit*, 60. See Joint Forces Command, "Joint Forces Command Glossary," www.jfcom.mil/about/glossary.htm.
19. Klein, *Corbett in Orbit*, 62. Klein references Lt Col David E. Lupton, *On Space Warfare: A Space Power Doctrine* (Maxwell AFB, AL: Air University Press, 1988), 65.
20. Judson J. Jussel, *Space Power Theory: A Rising Star* (Maxwell AFB, AL: Air University Press, 1998), 49.
21. Klein, *Corbett in Orbit*, 62.

22. Alfred Thayer Mahan, *The Influence of Sea Power upon History, 1660–1783* (New York: Hill and Wang, 1963), 2.

23. Lupton, *On Space Warfare*, 4. A collection of airpower definitions, including those by Gens Billy Mitchell and H. H. Arnold, is found in John Cobb Cooper, *Explorations in Aerospace Law: Selected Essays by John Cobb Cooper*, ed. Ivan Vlasic (Montreal: McGill University Press, 1968), 17–35. Mahan's elements of sea power are contained in Mahan, *Influence of Sea Power*, 22–77. For another comprehensive definition of sea power, see E. R. Potter and Chester W. Nimitz, eds., *Sea Power* (Englewood Cliffs, NJ: Prentice Hall, 1960), 19.

24. Lupton, *On Space Warfare*, 15.

25. Ibid., 35.

26. Ibid., 36.

27. Ibid., 36–37.

28. Ibid., 37.

29. Ibid., 86.

30. James E. Oberg, "Toward a Theory of Space Power: Defining Principles for U.S. Space Policy" (lecture, Army & Navy Club, Washington DC, 20 May 2003), www.marshall.org/pdf/materials/140.pdf (accessed 2 June 2009).

31. Oberg, 3.

32. Ibid., 15–16.

33. Dolman, *Astropolitik*, 143.

34. Ibid., 157.

35. Ibid.

36. Quoted in Dolman, *Astropolitik*, 149.

37. Dolman, *Astropolitik*, 157.

38. Ibid., 158.

39. Klein, *Corbett in Orbit*, 62.

40. Ibid. Klein references John B. Hattendorf, "The Uses of Maritime History in and for the Navy," *Naval War College Review* 56, no. 2 (Spring 2003): 19.

41. Klein, *Corbett in Orbit*, 63–66. Parenthetical references are to Julian S. Corbett, *Some Principles of Maritime Strategy,* introduction and notes by Eric J. Grove (Annapolis, MD: Naval Institute Press, 1988).

42. Klein, *Corbett in Orbit*, 66.

43. Ibid., 66–69.

44. Mario R. DiNunzio, *Theodore Roosevelt: An American Mind* (New York: Penguin, 1994), 174.