

Published: 1 March 2009
[Air & Space Power Journal](#) - [Spring 2009](#)

Guarding the High Ocean

Towards a New National-Security Space Strategy through an Analysis of US Maritime Strategy

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Editorial Abstract: By and large, the medium of space is still fairly unregulated. China's recent no-notice, unilateral targeting of a low-orbit weather satellite produced space debris that will cause ongoing navigation issues; this action will also redefine space as a contested medium. The author argues that such activity has geopolitical security significance and requires the United States to establish a consistent space strategy. By drawing parallels with and inspiration from US maritime strategy, he postulates a new model for space.

What is the nature of the medium of outer space from a geopolitical and “astropolitical” perspective? Is it a peaceful environment for shared exploration? Is it a free and open frontier for pursuit of commercial activities and intelligence collection? Or is it a military medium to be mastered in the pursuit of broader national and global-security objectives? The fundamental assertion here holds that space is necessarily *all* of these and that an effective US national-security space strategy would integrate ways, means, and ends to ensure the effective implementation of broader US national space policy that recognizes and supports all in a unified manner.

Unfortunately, no such wide-ranging and inclusive national-security space strategy currently exists.¹ This void appeared in sharp relief in January 2007, when China conducted a rather spectacular test of an antisatellite (ASAT) capability, destroying—without notice—an old weather satellite in low Earth orbit and producing a significant debris field in the process. In addition to sparking an international firestorm of criticism, this event also exposed the cognitive dissonance pervading the current US (and, to some extent, international) approach to space security. It seemed to highlight the dangers inherent in an unconstrained and uninhibited approach to space, one that could lead to disorder and chaos in the heavens. At the same time, the Chinese action confirmed the view of space as a contested medium, indicating that the concept of space as a sanctuary devoid of competition had become increasingly, perhaps permanently, untenable. Further, the event exposed the lack of established norms that typify the free and open space environment. (Nevertheless, the resultant debris cloud, though a significant hazard to space navigation, likely to remain for dozens of years, did not constitute a violation of any formal norm or existing agreement on space.)² To resolve these divergent views and circumstances, we need a coherent and integrated national-security space strategy to implement broader US space policy.

The argument here towards such a strategy proceeds in two parts: first, current geopolitical security issues and challenges demand a consistent approach to space and an accompanying national-security space strategy as never before. Second, the most recent US maritime strategy, published in October 2007, addresses many of these very same challenges from the maritime point of view, and its proposed imperatives, implementing actions, and priorities can inform an effective national-security space strategy—one that enables the United States to better ensure security through guarding the high ocean of space.

An Indefinable Ideology of US Space Security?

What, truly, is or has been the United States' ideological position with regard to security challenges in the space arena? Various attempts have sought to provide a useful taxonomy of space-security ideologies, conceptual frameworks, or schools of thought. In 1988 David Lupton defined four doctrines across the spectrum of potential space warfare, stretching from sanctuary to survivability to high ground to control school.³ More recently, Karl Mueller provided six such schools of thought on the narrower topic of space weaponization, ranging from the pure sanctuary idealist to the pro-weaponization space hegemonist.⁴ Most revealingly, neither analysis (as well as others like them) adequately and unequivocally states which position the United States, as a nation, advocated at any given time in its space history—chiefly because America has never really had a truly all-encompassing implementation strategy for national-security space policy and issues, one that integrates differing, but not necessarily incompatible, approaches. Such approaches include the civil view of space as a peaceful global commons, the commercial view of space as an open forum (mirrored in many ways by the intelligence community's desire for an "open skies" environment), and the Department of Defense's (DOD) view, led by the Air Force, of it as a medium for control and exploitation.⁵

To be sure, previous presidential administrations have disseminated numerous, broader US space *policies* (encompassing civil, commercial, military, and intelligence uses), and the second Bush administration released its own such policy in 2006. But no implementing space-security strategy has accompanied those policies, leaving national-security space with a policy-directed compass heading but somewhat rudderless in its ability to steer the policy course. For example, the current policy, a relatively short 10-page document, generally directs the secretary of defense to "develop capabilities, plans, and options to ensure freedom of action in space, and, if directed, deny such freedom of action to adversaries."⁶ But what are the end goals that identify the requirements for such capabilities, especially in consideration of the various approaches (civil, commercial, etc.) to space, mentioned above? And what ways and means should be employed (or *not* employed) to achieve them?

The acknowledged need for a national-security space strategy is not new.⁷ The 2001 Space Commission, chaired by Donald Rumsfeld before he became secretary of defense, recommended not only a revised US space policy but also an implementing strategy supported by broader space capabilities.⁸ At a forum on space and defense issues in early 2008, Cong. Jane Harman (D-CA) declared that, seven years after the Space Commission's report and a year after the Chinese ASAT test, "We still do not have an adequate space strategy."⁹ Similarly, a March 2008 memorandum from the Government Accountability Office warned the Senate's Committee on

Armed Services that the “DOD and the intelligence community have not developed, agreed upon, or issued a National Security Space Strategy” and that “without a strategy in place to link the defense and intelligence communities, future space programs, plans, and new space concepts . . . will be developed without the overarching strategic guidance that a national strategy could provide.”¹⁰

The Need for a Coherent Strategy—What Drives It?

Thus, as described above, the United States requires an implementing national-security space strategy to accompany its national space policy. In fact this need is greater than ever before, driven and reinforced by four key trends in the current geopolitical environment with regard to space. The first and perhaps most dominant trend is the enhanced degree to which spaceborne and space-related capabilities *are now integrated into terrestrial activities* of all kinds. During the first few decades of human activity in space, the medium was much more a separate stage, one of more abstract political and strategic activity.¹¹ That has changed quickly and dramatically; space has woven itself into the economic, sociocultural, and security fabrics of modern global society. In many ways, space capabilities are collectively the central nervous system of the global economy, delivering vital, information-based products (communications, imagery, precision navigation and timing, etc.) and underpinning economic infrastructure (banking, transportation, etc). In fact it is now essentially impossible to quantify how much human activity relies on space because it has cascaded into second- and third-order applications and beyond. Also, this intertwining of space and nonspace, particularly in the defense arena, has had the collateral effect of reshaping policy paradigms. The age-old debate over “weaponization of space” (which struggles even to define the basic terms *weaponization* and *space*, let alone shape the various positions around varying definitions) finds itself on the brink of obsolescence. Because treating the medium of space separately and distinctly from its terrestrial counterparts has become increasingly difficult, if not impossible, it is correspondingly almost impossible to practically discuss weaponization of space without the subject’s having embedded (and likely intractable) implications for terrestrial weapons and forces.¹² This new and ever-increasing inseparability of activities in or through space and the terrestrial environment—whether political, economic, military, or some other form of activity—demands a corresponding, integrated space-security strategy.

A second trend, the *proliferation of actors* gaining access to and conducting operations in space, includes not only nation-states but also transnational organizations and other nonstate actors. During the Cold War, space was essentially a bipolar medium, dominated by US and Soviet government-only activities. Now, however, many states (both developed and developing), corporations, and other actors have achieved or seek access to the space medium. Iran, for example, recently announced its intent to conduct its first space launch in 2009.¹³ Increasingly diverse commercial and private ventures, ranging from space tourism to privately sponsored contests (such as Google’s Lunar X Prize) are entering the space domain. Part of this proliferation stems from a decrease in the cost of getting to space: companies such as Surrey Satellite of the United Kingdom are providing smaller and more cost-effective satellites for whoever is interested in gaining a foothold in space.¹⁴ The overall proliferation of spacefaring actors presents a significantly different operating environment from the one of simple bipolar

presence that existed during the Cold War and its immediate aftermath. In many ways, it mirrors multipolar developments in terrestrial geopolitics, accompanied by the same challenges of complexity and increasing disorder.

The proliferation of spacefaring actors and the general increase in the use of space across the spectrum have given rise to a third trend: a growing need to *preserve the space environment*, chiefly due to an exponential rise in the number of artificial objects in orbit and the collective navigation hazard they represent. Operating satellites make up only a fraction of those objects; the vast majority is “space junk” (inoperative satellites, spent upper stages, and orbital debris from accidental or intentional collisions). This trend represents a common threat to all spacefaring actors, and we must address it through an effective strategy.

We see a fourth trend in a developing set of *resource shortages* in key areas of the space medium, most notably (1) in operating/maneuver space within or near the geosynchronous belt and (2) in the availability of electromagnetic frequency, but destined to spread to other resources as well. As demand for space access increases, competition for these dwindling resources will likely intensify, presenting yet another “threat” that a comprehensive strategy must address.

Thus, as now described by the confluence of these geopolitical trends, space (at least in terms of nearer Earth orbit) is no longer the boundless, desolate, and remote ocean of the twentieth century. Rather, it has become an increasingly crowded central sea, crisscrossed by shipping lanes filled with myriad traffic bound for far-off destinations—a medium that requires a fresh paradigm for making, planning, and executing security strategy.

The Applicability of the Maritime Model and a Review of Maritime Strategy

Given that we need a coherent national-security space strategy now more than ever, what strategic direction should it endorse, what should it encompass, and what kinds of ends, ways, and means should it employ? Are there any models to draw inferences from, especially ones that acknowledge some of these same geopolitical developments and resultant challenges mentioned above? The *maritime environment* may hold some answers or, at the very least, provide an initial framework for strategic thought.

Parallels exist between the space and maritime mediums.¹⁵ Ontological similarities include relative vastness, inhospitability to human habitation, and nearly homogeneous topology except for sparse scatterings of “terrain” defined more by their intersection with other domains than by their own features (e.g., littoral areas for the seas, the geosynchronous belt [defined by its orbital alignment with terrestrial rotation] for space). The two mediums also share conceptual similarities: both are widely seen and accepted as global commons and as more abstract, connective mediums linking more tangible regions of terra firma.

Beyond the ontological and conceptual similarities—and most relevant for discussion here—a practical convergence of geopolitical challenges can certainly inform responses to security issues in both arenas. The defining geopolitical factors described above regarding space have their

direct counterparts in the maritime domain. Just as space faces the trends of increased integration with other domains, the proliferation of actors, shared navigation hazards, and competition for scarce resources, so does the maritime environment confront similar challenges: (1) greater interconnectedness via globalizing dynamics, (2) increasing numbers and types of maritime actors, (3) heightened navigation challenges in increasingly crowded seas, and (4) intensifying competition for coveted maritime regions and resources. Wayne P. Hughes gives an example: “Going beyond long-standing disputes over fishing rights, in recent years the competition for seabed mineral resources has led to broad claims of ocean ‘ownership’ that increasingly will threaten freedom of navigation and breed maritime confrontation.”¹⁶ If there is a convergence in terms of strategic issues and challenges for both the seas and for space, can there also be a similar convergence in strategic responses? How is the United States addressing national-security issues in the maritime environment? And how can this inform possible approaches to a US national-security space strategy?

In the fall of 2007, the US chief of naval operations, along with the commandants of the Marine Corps and Coast Guard, released a new maritime security strategy entitled *A Cooperative Strategy for 21st Century Seapower*.¹⁷ This new strategy first identifies the “challenges of a new era,” highlighting all of the factors identified above regarding the maritime environment: increasing and more diverse maritime activity that undergirds the global economy, a growing number of transnational actors, shared security challenges, and so forth. It then identifies six key tasks (also called strategic imperatives) for maritime security: (1) “limit regional conflict with forward deployed, decisive maritime power,” (2) “deter major power war,” (3) “win our Nation’s wars,” (4) “contribute to homeland defense in depth,” (5) “foster and sustain cooperative relationships with more international partners,” and (6) “prevent or contain local disruptions before they impact the global system.” Declaring that it will implement these imperatives through forward presence, deterrence, sea control, power projection, maritime security, and humanitarian assistance / disaster response, the strategy concludes with three implementation priorities: “improve integration and interoperability,” “enhance awareness,” and “prepare our people.”¹⁸

But what are the overarching themes or principles woven into this new maritime strategy that transcend the maritime environment and suggest applicability to the space domain? Are there broader currents of thought that might translate into similar arguments for a space-security strategy? The first such overarching theme—one that serves as the foundation for the rest of the strategy—entails an evaluation of the current global strategic context that recognizes the globalized interconnectedness of the world: “Because the maritime domain . . . supports 90% of the world’s trade, it carries the lifeblood of a global system that links every country on earth.”¹⁹ Moreover, it affects not only economies but also “human migration patterns, health, education, culture, and the conduct of conflict.”²⁰ Robert Rubel, involved in the early development of the maritime strategy, describes this as a “big idea” that developed during gaming activities to develop the strategy, adding that the “existing global system of trade and security . . . provided both the context for the new strategy and the intellectual glue that tied together all regions of the world.”²¹

A second overarching theme unequivocally emphasizes sea power as an essential means to deter, fight, and win the nation’s wars. No reader of the new maritime strategy can help noticing the

primary focus on “the use of sea power to influence actions and activities at sea and ashore” and a mandate that “seapower will be globally postured to secure our homeland and citizens from direct attack and to advance our interests around the world.”²² The first four of the six key tasks or strategic imperatives in the strategy (listed above) concentrate on the direct application of sea power; central to this primary focus is the need for effective sea control since “the ability to operate freely at sea is one of the most important enablers of joint and interagency operations.”²³ Rubel describes this as the “war-winning power” dimension of the strategy.²⁴

A third key theme deals with recognition that an important function of sea power involves contributing to the maintenance of stability and international law: “Our challenge is to apply seapower in a manner that protects U.S. vital interests even as it promotes greater collective security, stability and trust. . . . Maritime forces enforce domestic and international law at sea.”²⁵ In a sense, this theme unifies the first two, demonstrating that, in the interconnected global system, sea power can be used not only to project military power in wartime but also to maintain order and assist in prevention of war since “the creation and maintenance of security at sea is essential to mitigating threats short of war.”²⁶

A fourth theme—the one that has received the most attention since the strategy’s release—describes the new emphasis on the cooperative approach, acknowledging that the United States cannot conduct effective global maritime security (especially as described in the third theme, above) on its own since “we also join navies and coast guards around the world to police the global commons and suppress common threats. . . . No one nation has the resources required to provide safety and security throughout the entire maritime domain.”²⁷ Indeed, the word *cooperative* is part of the very title of the document. The first of the strategy’s three implementation priorities—to “improve integration and interoperability,” mentioned above—clearly intends to enhance such cooperation. Rubel describes this theme within the strategy as “catalytic” as opposed to “coercive” or “brute force,” aimed at “cooperating to protect the global system.”²⁸

A closely related fifth theme recognizes the need for enhanced awareness, which holds that “there must be a significantly increased commitment to advance *maritime domain awareness*” (emphasis in original).²⁹ Again, cooperation is necessary to achieve a safe level of transparency so that “new partnerships with the world’s maritime commercial interests and the maritime forces of participating nations will reduce the dangerous anonymity of sea borne transport.”³⁰

Lastly, in the course of this analysis, it is prudent to ask whether the maritime strategy got it right. Did it miss any major themes or concepts? In the short time since its release, the strategy has also undergone scrutiny and received some criticism. Former Navy secretary John Lehman (who produced the last enduring maritime strategy in the 1980s) declares it a “bravura performance” but observes that it lacks a fourth implementation priority, “Field the Right Gear,” which would translate the broader imperatives into better defined capabilities.³¹ (In fairness, Rubel explains that, to avoid an early degeneration into an equipment debate, “the strategy project banned any discussion of force structure.”)³² Also, retired rear admiral William Pendley suggests that the strategy lacks proper prioritization and focus, “fails to differentiate clearly and prioritize present-day threats,” and similarly “lacks even a prioritization of capabilities.” In

particular, he points to a lack of discussion on sea basing, which he sees as imperative if the United States is to maintain a global maritime presence.³³

Towards a National-Security Space Strategy: Analysis and Recommendations

In light of this review of the new maritime strategy, and against a geopolitical backdrop that presents similar security challenges in both mediums, some basic principles to inform an effective national-security space strategy can follow. First, although I have noted the increased integration of space activities with terrestrial ones, it would be helpful for a new space strategy to recognize, as the maritime strategy does, that its integration *is part of a broader globalized framework and context of increasing interconnectedness and interdependence* that transcends technologies and economics—and that it involves “human migration patterns, health, education, culture, and the conduct of conflict,” mentioned above. In fact, I argue that such recognition of omnipresent interconnectedness is even more important for space, which, due to its global nature, has the capability to directly and more immediately affect *all* terrestrial regions—in a sense, its littoral areas are everywhere. This also suggests that space, like the seas, actually *enables* globalization through the connectivity and capabilities it delivers around the world.

Second, given an acknowledgement of this broader strategic context, I also recommend that just as the primary focus of sea power capabilities is to deter, fight, and win the nation’s wars, so must the United States *maintain primary focus on the ability to field and apply space power with freedom of action* to continue to do the same in support of terrestrial operations. That is, making a substitution in the wording of the new maritime strategy, “The ability to operate freely [in space] is one of the most important enablers of joint and interagency operations.”³⁴ And, just as maritime capabilities enable sea control, so must space capabilities enable space control. This will likely resemble what Rubel describes (again, making appropriate substitutions in his wording) as the Corbettian approach (after Julian Corbett, the noted sea power strategist), in that it will require “control of [space]—at least in the new sense of [space] security and [space] domain awareness—[to] be exercised day in and day out.”³⁵ Addressing the ways and means employed to achieve this desired end of effective space control will present a key challenge to a national-security space strategy.

Third, just as the new US maritime strategy recognizes the role of sea power not only in supporting military operations but also in maintaining stability and enforcing international law, so should a space strategy *consider how space power and capabilities can contribute to greater stability and enforcement of norms in the space environment*. A false dichotomy in some current space thinking frequently places “freedom of action” and “norms” in opposition. The maritime strategy (indeed, one could argue, the entire history of security activities on the seas)³⁶ demonstrates that the two are actually synergistic—that those capabilities which demonstrate sea power and exercise sea control also serve to regulate and preserve the maritime environment for all actors within it. With this line of reasoning comes an imperative to *transition the aging “weaponization” debate from a capabilities-based argument to a norms-based one*—the question should not concern “what weapons or capabilities” but “what enforcement actions.” Further, as is the case in the sea environment, the establishment of internationally accepted

norms for routine traffic and operations need not encroach upon necessary freedom of action for military and other security operations. In fact, such norms can actually contribute to addressing security challenges effectively by enhancing visibility and predictability—and by providing the basic framework for routine activities (e.g., commercial, civil, and private) that security actions, should they become necessary in times of war or other crisis, can “steer clear of” and avoid.

This, of course, presumes the existence of a coherent body of norms to enforce in the first place—some “rules of the road” for space roughly analogous to general laws of the sea. Unfortunately, very few such norms, regulations, and universally recognized rules exist; thus, a fourth key recommendation is to *pursue appropriate international norms for all spacefaring actors to better meet growing challenges in the increasingly crowded and diverse orbital environment*. Many continue to find it surprising how little truly exists in the realm of international space law and regulation. Again, much of this stems from the Cold War approach to space as a detached and boundless medium, and the few norms agreed upon by the superpowers were limited to larger issues involving nuclear weapons or lunar bases.³⁷ Little has really changed, and international agreements remain at a bare minimum. To this day the International Telecommunication Union agreements allot orbital slots for geosynchronous satellites only by frequency, not by physical location. Thus, multiple satellites operating at different communications bands can, and often do, occupy orbital positions in close proximity to one another, with no clear “right of way” rules or norms for conjunction (intersection of orbits) avoidance. Such minimum norms should start with a “best practices” of space operations, such as specifying right-of-way rules during conjunctions, standards of responsible station-keeping behavior in geosynchronous orbit, and procedures for disposing of satellites at the ends of their useful lives. A need also exists for a more formal agreement on preventing space environmental contamination caused by debris from either planned or unplanned collisions.³⁸

Such norms can be established through bilateral and multilateral agreements between nations, but perhaps the most effective approach would involve the establishment of an organization at the international level that can set reasonable and acceptable standards for *all* spacefaring actors. Such an organization might model itself after the United Nations’ (UN) International Maritime Organization, whose framework for maritime security offers a good model for establishing reasonable norms for routine traffic and activities, while acknowledging operations of military and other security-related forces in the same medium.³⁹

A fifth and related recommendation springs from the maritime strategy’s overarching theme of cooperation. To enhance security in the space domain, the United States should continue *to pursue cooperative relationships*, especially to achieve the goals of increased norms of behavior and enhanced awareness, mentioned above. The 2001 Space Commission report includes this as a key recommendation: “The U.S. will require . . . engaging U.S. allies and friends, and the international community, in a sustained effort to fashion appropriate ‘rules of the road’ for space.”⁴⁰ Such cooperation begins with simple agreements and sharing of information to achieve greater transparency, especially in the space domain’s equivalent of “maritime commercial interests.” The need for greater “space situational awareness” coincides with the repeated theme in the maritime strategy of achieving “enhanced awareness.” But cooperation could also extend to direct linking of space-mission capabilities: Col Tom Doyne has proposed, at least conceptually, the idea of a “100-satellite constellation” (a modification of the cooperative

“1,000-ship Navy” concept in current maritime discussion) of networked space capabilities shared by multiple spacefaring actors, all in the interest of promoting security and increasing awareness.⁴¹

A sixth recommendation for a new space strategy addresses the criticism levied at the new maritime strategy by former secretary Lehman and Rear Admiral Pendley. Specifically, *we should articulate and prioritize, in view of identified ends and ways, desired capabilities that would constitute the means* of executing a new national-security space strategy. Although Rubel correctly cautions that a premature focus on capabilities and force structure can doom effective strategy making, it is equally insufficient, in an environment of constrained resources, to fail to prioritize among the means available to ensure an optimal mix of capabilities within the envelope of the possible.

Further, one must consider the inevitable question, *Who should be responsible for developing a US national-security space strategy?* Answering that question lies beyond the scope of this article, but it is instructive to observe that the new maritime strategy was endorsed not only by the chief of naval operations but also by the commandants of the Marine Corps and the Coast Guard. Such a collective interagency approach is commendable, but one must note the absence of the geographic combatant commanders, who have a clear stake in the employment of maritime forces in their areas of operations. Certainly a new national-security space strategy will also have multiple stakeholders across government agencies—which it should acknowledge. The question of the involvement of combatant commanders appears more simplified for space since the US Strategic Command commander is the single such commander assigned operational responsibility for the space medium.

Finally, it may be useful to examine some of the comparative analysis here for yet another medium of interest to national security: *cyberspace*. Certainly many of the same convergent challenges in the maritime and space domains (e.g., proliferation of actors, including transnational organizations, integration into global infrastructure, etc.) can apply to cyberspace as well, and may aid a separate effort to define an effective national-security cyberspace strategy.

Conclusion

The preceding analysis and recommendations are consistent with the overarching goal of establishing an integrated national-security space strategy that recognizes space as an interconnected and interdependent environment for exploration, commerce, and military operations. This is also precisely how the United States views the maritime environment; thus, the new US maritime strategy provides a useful point of departure for the needed space-security strategy. The current similarities in geopolitical challenges faced in both mediums also compel constructive comparison. However, employing the maritime domain as a metaphor for the space-domain comparison can go only so far. Ultimately, an effective national-security strategy will have to chart its own final course of ways, means, and ends to contribute to achieving greater national-security objectives.

Just as the Chinese ASAT test in 2007 exposed the lack of an integrated strategy, so might another event help point the way towards one. The recent US shutdown of an ailing spy satellite

offers a good example of a unified security approach to space and responsible space operations. Operation Burnt Frost, executed on 20 February 2008, involved the firing of a Standard Missile 3 from a naval vessel in the Pacific Ocean to destroy a malfunctioning reconnaissance satellite and, more precisely, its full tank of hydrazine fuel that posed a potential health hazard upon reentry.⁴² In accordance with many of the recommendations listed above, the operation (1) employed effective space-control capabilities, (2) did so in a transparent manner emphasizing cooperation and awareness (the United States gave full notification to the world), and (3) pursued a constructive, security-enhancing (in this case, humanitarian) end—mainly, to minimize the danger of a reentering satellite while also minimizing any collateral effects.⁴³ This event stands in sharp contrast to the Chinese ASAT test a year earlier, which occurred without prior notice or coordination with the greater spacefaring community and which left behind a long-term navigation hazard in the form of a gigantic cloud of space debris. The US operation thus stands as a prototypical example of how US space capabilities, guided by an effective, integrated national-security space strategy that incorporates many principles of current maritime strategy, can serve to guard and preserve the high ocean of space.

[Feedback? [Email the Editor](#)]

Notes

1. As described later in this article, there have been many recent calls for a national-security space strategy, so the idea of producing one is not new. Work on a draft strategy, spearheaded by the Pentagon's National Security Space Office, has actually gone on for several years but has never been published. As I argue here, it is time to publish and implement such a strategy to properly drive the priorities, activities, and resources in the national-security space arena.
2. Suggested guidelines on mitigation of space debris have appeared, most notably ones proposed by the Inter-Agency Space Debris Coordination Committee (IADC), of which the China National Space Administration (the Chinese civil space organization) is a member. But no formal agreements or regulatory language existed. Since the Chinese ASAT test, the United Nations (UN) Committee on the Peaceful Use of Outer Space and the UN General Assembly have adopted voluntary guidelines as proposed by the IADC, but this still does not reach the threshold of "regulated norms."
3. See Lt Col David E. Lupton, *On Space Warfare: A Space Power Doctrine* (Maxwell AFB, AL: Air University Press, 1988), <http://aupress.au.af.mil/Books/Lupton/lupton.pdf>.
4. See Karl P. Mueller, *Totem and Taboo: Depolarizing the Space Weaponization Debate* (Arlington, VA: RAND Corporation, 2002), <http://www.gwu.edu/~spi/spaceforum/TotemandTabooGWUpaperRevised%5B1%5D.pdf>.
5. The "open skies" approach to space dates back to the Eisenhower administration and the first US forays into space for national-security purposes, dominated by a requirement to gather overhead intelligence on the increasingly hermetic Soviet Union. See, inter alia, Lester F. Rentmeester, "Open Skies Policy and the Origin of the U.S. Space Program," *Air Power History* 51, no. 2 (Summer 2004): 38–45,

[http://web.ebscohost.com/ehost/pdf?vid=6&hid=117&sid=bc6c7b54-4839-4c66-844f-03f0ce847735 %40sessionmgr108](http://web.ebscohost.com/ehost/pdf?vid=6&hid=117&sid=bc6c7b54-4839-4c66-844f-03f0ce847735%40sessionmgr108).

6. *U.S. National Space Policy* (Washington, DC: Office of Science and Technology Policy, Executive Office of the President, White House, 2006), 4, http://www.globalsecurity.org/space/library/policy/national/us-space-policy_060831.pdf (accessed 18 September 2008).

7. The term *national-security space* traditionally includes both defense (represented by the DOD) and intelligence (represented by the broader intelligence community) aspects of US space activities. But it could certainly be considered more inclusive as other government agencies develop stakes in space-security matters.

8. Donald H. Rumsfeld et al., *Report of the Commission to Assess United States National Security Space Management and Organization* (Washington, DC: Commission to Assess United States National Security Space Management and Organization, 11 January 2001), xvi, <http://www.dod.mil/pubs/space20010111.pdf>. Col John E. Hyten also remarks on this in “A Sea of Peace or a Theater of War? Dealing with the Inevitable Conflict in Space,” *Air and Space Power Journal* 16, no. 3 (Fall 2002), <http://www.airpower.au.af.mil/airchronicles/apj/apj02/fal02/Fall02.pdf>, noting that “the United States still lacks a coherent, long-term space vision. Although the current national policy (1996) provides top-level guidance for each of the nation’s space sectors—civil, commercial, intelligence, and military—it does not fully integrate the US space program or provide a long-term vision” (80).

9. Cong. Jane Harman (remarks at the Center for Strategic and International Studies’ National Space Forum, Washington, DC, 7 February 2008).

10. Davi M. D’Agostino, director, Defense Capabilities and Management, to Hon. Bill Nelson, chairman, and Hon. Jeff Sessions, ranking member, Subcommittee on Strategic Forces, Committee on Armed Services, United States Senate, memorandum (GAO-08-431R Defense Space Activities), 27 March 2008, 3, 10, <http://www.gao.gov/new.items/d08431r.pdf>.

11. Walter A. McDougall’s *The Heavens and the Earth: A Political History of the Space Age* (New York: Basic Books, 1985) is still perhaps the best single-volume history of the early space age, colorfully explaining how the early US and Soviet activities in space were dominated by political and strategic objectives.

12. John Sheldon makes a good case for the impossibility of separating space-security issues from terrestrial ones in “There’s No Such Thing as ‘Space Security,’?” *Space News*, 13 August 2007.

13. Victor Zarbosky, “Iran’s SLV Program: 1st Reactions and Implications,” *Space News*, 2 March 2008, 29.

14. Richard Wilson, "EADS Astrium Buys Surrey Satellite," *Electronics Weekly*, 8 April 2008, <http://www.electronicsweekly.com/Articles/2008/04/08/43483/eads-astrium-buys-surrey-satellite.htm>.
15. Of course, some significant differences between the maritime and space environments cannot be overlooked or oversimplified.
16. Wayne P. Hughes Jr., "Implementing the Seapower Strategy," *Naval War College Review* 61, no. 2 (Spring 2008): 50, <http://web.ebscohost.com/ehost/pdf?vid=7&hid=103&sid=22240624-5811-4deb-9dd7-130af46194e6%40sessionmgr104>. These similar geopolitical challenges also appear in the new US maritime strategy. Some of these current challenges may force a reexamination of the UN Convention on the Law of the Sea, last updated in 1994.
17. *A Cooperative Strategy for 21st Century Seapower* (Washington, DC: United States Marine Corps, United States Navy, United States Coast Guard, October 2007), <http://www.navy.mil/maritime/MaritimeStrategy.pdf>. See also Ann Scott Tyson, "New Maritime Strategy to Focus on 'Soft Power,'" *Washington Post*, 17 October 2007, <http://www.washingtonpost.com/wp-dyn/content/article/2007/10/17/AR2007101700536.html>.
18. *Cooperative Strategy*, [3–16].
19. *Ibid.*, [2].
20. *Ibid.*, [4].
21. Robert C. Rubel, "The New Maritime Strategy: The Rest of the Story," *Naval War College Review* 61, no. 2 (Spring 2008): 71, <http://web.ebscohost.com/ehost/pdf?vid=7&hid=115&sid=c413425f-fa2a-4471-9337-a865dc3b5eef%40sessionmgr103>.
22. *Cooperative Strategy*, [6].
23. *Ibid.*, [11].
24. Rubel, "New Maritime Strategy," 76–77.
25. *Cooperative Strategy*, [2, 12].
26. *Ibid.*, [12].
27. *Ibid.*, [12, 5].
28. Rubel, "New Maritime Strategy," 77.
29. *Cooperative Strategy*, [14].

30. Ibid.

31. John Lehman, "A Bravura Performance," US Naval Institute *Proceedings* 133, no. 11 (November 2007): 22–24,
<http://web.ebscohost.com/ehost/detail?vid=6&hid=105&sid=11f4e683-155f-44e2-97d8-c74e2285aa2b%40sessionmgr104&bdata=JnNpdGU9ZWZWhvc3QtbGl2ZQ%3d%3d#db=mth&AN=27473509>.

32. Rubel, "New Maritime Strategy," 72.

33. William T. Pendley, "The New Maritime Strategy: A Lost Opportunity," *Naval War College Review* 61, no. 2 (Spring 2008): 63, 66, 68,
<http://web.ebscohost.com/ehost/pdf?vid=7&hid=113&sid=ded757b1-ce47-46d0-8499-2328d2e5f196%40sessionmgr107>.

34. *Cooperative Strategy*, [11].

35. Rubel, "New Maritime Strategy," 73. Another characteristic of Corbett's approach is the concept of "concentrating" capabilities when needed. For space capabilities, inherently global in nature, this concentration is not spatial but more likely focused on limited time, spectrum, and collateral effects.

36. Modern navies (the British Navy in particular) set the conditions for emergence of a global free-trade system and enforced norms against piracy and other violations at sea. How can space-control capabilities do the same in space? See R. Joseph DeSutter, "Space Control, Diplomacy, and Strategic Integration," *Space and Defense* 1, no.1 (Fall 2006): 29–51.

37. The Outer Space Treaty of 1967, one of the few such agreements during the Cold War, does not forbid all weapons in space—only nuclear devices (and military presence on the moon).

38. See note 1.

39. The International Maritime Organization has a Naval Security committee as well as a Naval Architectural group. The existing UN Committee on the Peaceful Use of Outer Space is a large, ad hoc committee whose mission is "to review the scope of international cooperation in peaceful uses of Outer Space, to devise programmes in this field to be undertaken under United Nations auspices, to encourage continued research and the dissemination of information on Outer Space matters, and to study legal problems arising from the Outer Space." "UN Committee on the Peaceful Uses of Outer Space to Hold Forty-Sixth Session in Vienna, 11–20 June 2003," United Nations Information Service, 6 June 2003, <http://www.unis.unvienna.org/unis/pressrels/2003/os260.html>. The UN committee does not (yet) institutionalize international norms, as does the International Maritime Organization or the International Civil Aviation Organization.

40. Rumsfeld et al., *Report of the Commission*, 17–18.

41. Thomas Doyne, “Taking a Cue from the ‘Thousand Ship Navy’—21st Century Combined Space Operations: A ‘100 Satellite’ Solution,” draft, Fall 2007.

42. Gen Kevin Chilton, commander of United States Strategic Command (remarks at the Air Force Association’s Air Warfare Symposium, Orlando, FL, 21 February 2008), <http://www.stratcom.mil/Spch&test>.

43. This action resembles maritime-security acts such as scuttling adrift vessels that pose navigation hazards.

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