

STATEMENT BY
THERESA HITCHENS
DIRECTOR
THE WORLD SECURITY INSTITUTE'S
CENTER FOR DEFENSE INFORMATION
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HOUSE OVERSIGHT AND GOVERNMENT REFORM COMMITTEE
ON
WEAPONIZING SPACE:
IS CURRENT U.S. POLICY PROTECTING OUR SECURITY?
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I would first like to thank the Honorable Chairman, and the Subcommittee, for inviting me to speak at this very important hearing. The future security of space, and U.S. policy and strategy for ensuring that security, is one of the most critical issues of the 21st Century. There can be no doubt that mankind's burgeoning use of space has resulted in economic development and scientific discovery that has benefited global society in ways unimaginable to even our grandparents' generation. It is not an understatement to say that our modern way of life is entirely dependent on satellites and the use of space: TV broadcasts, the Internet, long-distance telephone service especially in remote areas, weather prediction and disaster monitoring, tele-education and tele-medicine, ATM machines and inter-bank money transfers, timing signals that coordinate cellphone and computer operations, navigation at sea, in the air and on the ground – all rely on satellites.

Space is also one of the most globalized arenas of human interaction and commerce. There are some 845 working satellites, owned and/or operated by 41 nations.¹ About a

¹ Union of Concerned Scientists Satellite Database,
http://www.ucsusa.org/global_security/space_weapons/satellite_database.html.

dozen nations are capable of launching their own satellites, and a number of others are seeking that capability. The commercial satellite industry alone produced \$88.8 billion in revenue in 2005,² although only five major multinational telecommunications companies provide the bulk of commercial satellite bandwidth to users.³ Civil space agencies routinely cooperate in experiments, the International Space Station being only one example. Satellite technology is also inherently dual use – commercial imaging satellites, for example, can also be used by militaries for reconnaissance; many nations routinely use commercial providers for military communications, including the United States (about 80 percent of U.S. military communications flows over commercially provided bandwidth.)

Suffice to say that the specter of warfare in space – especially warfare involving destructive anti-satellite weapons that would produce tons of dangerous and indiscriminate space debris – would endanger all space operations, civil, commercial and military. As the world's preeminent space power, the United States would have the most to lose in a world bristling with space armaments and thus it is in U.S. national interests that space not be weaponized. The U.S. position as the leading space actor at the same time behooves the U.S. government to take a positive leadership role in seeking to ensure future access to and use of the space environment for all. Unfortunately, U.S. space policy and posture is heading in the opposite direction: toward embracing space weaponization and away from international diplomacy that could dampen future threats to space assets.

U.S. National Space Policy, Strategy, Military Doctrine and Posture

2006 NSP vs. 1996 NSP

After four years of review, the administration of President George W. Bush released a revised U.S. National Space Policy (NSP) – the first in a decade – in October of last year. The NSP, which was signed Aug. 31, 2006, but not released until Oct. 6, supersedes the

² Satellite Industries Association press release, "Commercial Satellite Industry Continues to Grow," June 14, 2006, <http://www.sia.org/PDF/06142006PRStateofSatelliteIndustryReport.pdf>.

³ These are: Intelsat, headquartered in Bermuda; SES Global, Luxembourg; Eutelsat, France; Loral Skynet, U.S.; Inmarsat, London.

previous 1996 policy signed by President Bill Clinton. Administration and Pentagon officials consistently have downplayed the significance of the new NSP as little more than a continuation of the Clinton policy. While it is true that much of the previous policy language was incorporated into the text, the wording of the new NSP is strikingly different in emphasis and tone – changes that aggregate into a much more unilateral and military-focused approach. In seeking to assert unhindered U.S. rights to act in space, including attacks against the space assets of potential adversaries, the new policy at best ignores the rights of other space-faring nations under current international accords and agreements. The document also further distances the United States from international efforts and instruments aimed at establishing collective security in space.

Indeed, the Bush administration focus on national security space with an emphasis on military power and competition (versus the Clinton-era focus on civil and commercial space with an emphasis on diplomacy) is clear from the introduction to the 2006 NSP: **“In this new century, those who effectively utilize space will enjoy added prosperity and security and will hold a substantial advantage over those who do not. Freedom of action in space is as important to the United States as air power and sea power.”**

While the Clinton policy also articulated the controversial policy of “space control” that includes reserving the right to attack adversary space assets and capabilities, the Bush policy more forcefully emphasizes U.S. intentions to “deny” potential enemies the use of space “in a hostile manner.” It also, for the first time, asserts that the United States intends to “dissuade and deter” other space powers from even developing capabilities to hold U.S. space assets at risk – a statement that smacks of a preemptive strategy. The new NSP stops short of endorsing a strategy of war-fighting “in, from and through” space, and does not overtly authorize development and deployment of anti-satellite or space-based weapons. However, when read in concert with earlier military space doctrinal documents and statements by U.S. officials, U.S. intentions to pursue an array of so-called “counterspace” capabilities for targeting satellites as well as space-based weapons technologies seem clear.

The policy's central theme – protecting U.S. rights to “unhindered” action in space – is not new, that goal was also embedded in the 1996 policy. However, in contrast to the Clinton policy, the Bush policy reads as strongly unilateral, dismissive of other nation's rights, and as casting doubts on the spirit, if not the letter, of the 1967 Outer Space Treaty (OST) to which the United States is a signatory. One key example regards language in the respective 1996 and 2006 policies on the rights of free access to, free passage in, and free use of space, central tenets of the OST.

- **Clinton NSP:** “The United States rejects any claims to sovereignty by any nation over outer space or celestial bodies, or any portion thereof, and **rejects any limitations on the fundamental right of sovereign nations** to acquire data from space. The United States considers the **space systems of any nation** to be national property with the right of passage through and operations in space without interference. Purposeful interference with space systems shall be viewed as **an infringement on sovereign rights**. (Emphasis added.)
- **Bush NSP:** “The United States rejects any claims to sovereignty by any nation over outer space or celestial bodies, or any portion thereof, and **rejects any limitations on the fundamental right of the United States to operate in and acquire data from space**. The United States considers space systems to have the rights of passage through and operations in space without interference. Consistent with this principle, the United States will view purposeful interference with **its space systems as an infringement on its rights**.” (Emphasis added.)

It should be noted that the Clinton language above was essentially a hand-me-down from President Ronald Reagan's National Space Policy (first crafted in 1982 and revised in 1988), that had also been maintained by President George H. W. Bush. Thus, the emphasis in the 2006 NSP on U.S. rights vs. generic rights in space represents a break with historic precedent. In addition, some analysts see the insertion of the language asserting “a fundamental right” for U.S. **operations** in space (as opposed to access to) as inconsistent with the OST, which lays out principles for space operations that include “peaceful purposes,” consistency with international law, and non-interference in other's space operations.

The most controversial language in both the Clinton and Bush space policies is the section asserting a U.S. right to “deny” adversaries the hostile use of space. On the face of it, the U.S. claim of a right to deny others the use of space seems directly contrary to the OST principles of freedom of access and use for all. This U.S. claim also raises the question of whether the United States supports the rights of others to deny what they might consider the hostile use of space by an adversary or competitor, including the United States itself – a question that no U.S. administration has yet to answer. Finally, both the Clinton and Bush policies could be read as endorsing the offensive use of anti-satellite weapons. That said, overall, the Clinton language is nuanced and couched, while the Bush language is more strident and assertive:

- **Clinton NSP:** “**Consistent with treaty obligations**, the United States will develop, operate and maintain space control capabilities to ensure freedom of action in space, and, **if directed, deny such freedom of action to adversaries**. These capabilities **may also be enhanced by diplomatic, legal or military measures to preclude an adversary’s hostile use** of space systems and services.” (Emphasis added.)
- **Bush NSP:** “The United States considers space capabilities – including ground segments and supporting links – vital to its national interests. Consistent with this policy, the United States will preserve its rights, capabilities and freedom of action in space; **dissuade or deter others from either impeding those rights or developing capabilities to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to U.S. interests.**”

Most striking in the new Bush language above is the statement that the United States will seek to “dissuade or deter” others from “developing capabilities” to impinge on U.S. freedom of action in space. Given that almost all space technology is inherently dual use (i.e., applicable to both military and nonmilitary, as well as both weapons and non-weapons, uses), it is highly unclear exactly what capabilities the United States might consider threatening and seek to suppress – an uncertainty that has given pause to both allies and potential military competitors alike. Indeed, *The Times of London*, a

conservative and generally pro-American voice in the British media, called the Bush NSP “comically proprietary in tone about the U.S.’s right to control access to the rest of the solar system.”⁴

In addition, an interesting difference between the Clinton and Bush language is the change from “if directed,” to “if necessary” regarding actions to “deny” space to adversaries. While the Clinton language was at the time widely interpreted to mean that any type of “counterspace” activity by the U.S. military would require direct presidential approval, the Bush “if necessary” language seems to remove that caveat.

Another revelatory fact about the 2006 NSP is that, in contrast with its predecessor that speaks positively of the role of space-related international instruments and treaties, the only reference to collective security regimes/practices is negative:

- **“The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing and operations or other activities in space for U.S. national interests.”** (Emphasis added.)

In many ways, this broad rejection of limitations on U.S. actions in space is extraordinary. The United States is bound by numerous international agreements and treaties that in some ways limit its “freedom of action,” whether economic (such as the World Trade Organization regulations), political (human rights laws) and military (including restrictions on naval activities on the high seas, requirements regarding the conduct of military exercises, and use of chemical and biological weapons.) The idea that the U.S. use of space, deemed a “global commons” by the OST, should be singularly exempted from any future rules or limitations is unprecedented.

⁴ Bronwen Maddox, “America wants it all – life, the Universe, everything,” *The Times*, Oct. 19, 2006, <http://www.timesonline.co.uk/article/0,,30809-2410592,00.html>

In sum, the bellicose rhetoric of the 2006 NSP represents a significant shift from past declaratory policy. Joan Johnson-Freese, chair of the National Security Decision Making Department at the Naval War College, in a recent article provided this terse assessment: “The blunt and even confrontational language of the new policy puts the United States at odds with the priorities of the other space-faring nations. ... The language ... is so broad that it reads more like a blanket claim to hegemony in space.”⁵

Military Space Strategy & Doctrine

A National Space Policy, as with any presidential policy, must be read as a capstone guidance document, and thus cannot be judged in a vacuum. In the case of U.S. national security and military space, numerous other documents underpin the NSP by articulating how the presidential policy should be implemented, and the military mission and capabilities requirements that flow from presidential decisions. Interestingly, under the Bush administration, a number of these “subordinate” military documents were actually issued in advance of the new NSP – even though it was known throughout the national security space community that a new policy was being formulated. The most pertinent, and of the most concern regarding the future of U.S. military space operations, are the “Joint Doctrine for Space Operations”, published by the Office of the Joint Chiefs of Staff in August 2002,⁶ and the U.S. Air Force “Counterspace Operations” doctrine published in August 2004.⁷ Both of these documents are as of May 2007 still operable.

The Joint Doctrine reportedly took more than a decade to complete, and is important in that it lays out the parameters of inter-service activities and missions in space. It also takes precedence over any single service doctrinal documents regarding space operations. The Joint Doctrine lays out four primary mission areas for military space operations: **“space control, force enhancement, space support and force application.”**

⁵ Joan Johnson-Freese, “The New U.S. Space Policy: A Turn Toward Militancy?” *Issues in Science and Technology*, Winter 2006, 33-36.

⁶ Joint Publication (JP) 3-14, *Joint Doctrine for Space Operations*, 9 August 2002, http://www.dtic.mil/doctrine/jel/new_pubs/jp3_14.pdf

⁷ Air Force Doctrine Document (AFDD) 2-2.1, *Counterspace Operations*, 2 August 2004, http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_2_1.pdf

- **“Space control operations** provide freedom of action in space for friendly forces while, **when directed, denying it to an adversary**, and include the broad aspect of protection of U.S. and U.S. allied space systems and negation of enemy adversary space systems. Space control operations encompass all elements of the space defense mission and **include offensive and defensive operations** by friendly forces to gain and maintain space superiority and situational awareness if events impact space operations.” (Emphasis added.)
- **“Space force enhancement** operations multiply joint force effectiveness by enhancing battlespace awareness and providing needed warfighter support. ...”
- **“Space support** operations consist of operations that launch, deploy, augment, maintain, sustain, replenish, deorbit and recover space forces, including the command and control network configuration for space operations. ...”
- **Space force application** operations consist of attacks against terrestrial-based targets carried out by military weapons systems operating in or through space. **Currently, there are no space force application assets operating in space.”** (Emphasis in original.)

Up until now, most U.S. military space operations have fallen into the “space support” and “space force enhancement” categories, although in recent years there has been more interest in the Air Force and national security community in protective measures for satellites, ground stations and up-links and down-links. Even more recently, especially in the wake of the Jan. 11, 2007, Chinese test of an anti-satellite weapon, U.S. military officials have been emphasizing the need for improved “space situational awareness,” i.e. the ability to “see” and know what is going on in space (a mission that under the Joint Doctrine would fall in the “space control” category). None of these missions are at all contested. Rather, it is the offensive aspects of “space control” and the concept of “space force application” that long have been controversial in U.S. policy-making circles.

Indeed, one of the first Air Force Space Command planning documents to emerge in the wake of the 1996 Clinton space policy, the 1998 “Long Range Plan,” was opaque as to policy governing anti-satellite weapons for “negation” of enemy assets – that is the

offensive part of “space control.” It noted: “The United States will need to develop national policies supporting space warfare, weapons development and employment, and rules of engagement” for the plan’s vision of future negation capabilities to be fulfilled – and later stresses that Space Command should advocate for such new policies. This seems to indicate that, in the Air Force’s view, U.S. national policy in 1998 did not support such developments.

With regard to space strike weapons, the Long Range Plan was unequivocal: “At present, the notion of weapons in space is not consistent with U.S. national policy.” It later notes that “no capability can be implemented until the [National Command Authority] directs this to occur” – a statement that can reasonably be read as referring to a presidential decision.

Since the advent of the Bush administration, U.S. Air Force officials and military policy/doctrine documents have exhibited none of the tentativeness of the Clinton era. Instead, Air Force leadership has been vocally promoting a strategy of “space dominance” and “space superiority,” while advocating the need for the service to be given the tools for “space control” and “prompt global strike,” including space-based weapons.⁸ Current Air Force planning documents, such as the Air Force Space Command’s “Strategic Master Plan for FY06 and Beyond,” published in October 2003, also reflect changing views of the policy constraints regarding “space control” and “space force application.”⁹ With regard to “counterspace” – yet another term of art for the subset of “space control” that includes use of anti-satellite weapons, the document states: “There are presently no formal U.S. policies preventing development or deployment of [counterspace] capabilities. In actuality, the President’s National Space Policy, the DoD Space Policy and the Secretary of Defense’s policy on Counterspace all require development of ‘negation’ capabilities and deployment as needed to ensure freedom of access and operations in space. However, the President and/or the Secretary of Defense

⁸ Robert S. Dudney and Peter Grier, “New Orbit for American Space Power,” *Air Force Magazine*, Vol. 87, No. 2, February 2004, <http://www.afa.org/magazine/Feb2004/0204orbit.asp>

⁹ *Strategic Master Plan FY 06 and Beyond*, Air Force Space Command, Oct. 1, 2003, <http://www.wslfweb.org/docs/Final%2006%20SMP--Signed!v1.pdf>

approval will be required for any employment of force against enemy space assets... The major question in fielding [Offensive Counterspace] systems is the political will to do so.”¹⁰

And regarding conventional strike weapons based in space, the FY 06 Master Plan states: “Our vision calls for prompt global strike space systems with the capability to directly apply force from or through space against terrestrial targets. International treaties and laws do not prohibit the use or presence of conventional weapons in space. ... Non-nuclear prompt global strike space capabilities are being studied. Our nation’s leadership will decide whether or not to pursue the development and deployment of conventional, space-based systems for global strike to fully exploit the advantages of space.”¹¹ This obviously differs from the “Long Range Plan’s” statement that national policy rules out such weapons.

The “Joint Doctrine for Space Operations” and Air Force “Counterspace Operations” doctrine also serve to embed the “counterspace” and “space force application” missions into military strategy for space. In other words, these missions are now considered – at least by the U.S. military – as not only legitimate, but actually required by U.S. national policy.

The “Counterspace Operations” doctrine, indeed, provides the blueprint for how the U.S. Air Force intends to “deny” or “negate” adversary satellites and space systems. The first doctrinal document of its kind, it establishes target sets and types of operations that can be used to attack them. Gen. John Jumper, Air Force chief of staff, in the Foreword to the document, states: “**Counterspace operations have defensive and offensive elements...** . These operations may be utilized throughout the spectrum of conflict and may achieve a variety of effects **from temporary denial to complete destruction** of the adversary’s space capabilities.”¹² (Emphasis added.)

¹⁰ Ibid.

¹¹ Ibid.

¹² *Counterspace Operations, Foreward*

The document defines “offensive counterspace,” or OCS, operations as those that “preclude an adversary from exploiting space to their advantage. OCS operations may target an adversary’s space capability (space system, forces, information links, or third-party space capability), using a variety of permanent and/or reversible means.”¹³ As in the “Joint Doctrine,” the types of OCS are designated the “5 D’s”: “**deception, disruption, denial, degradation and destruction.**” The OCS section also designates specific target sets: **on-orbit satellites**, communications links, ground stations; launch facilities; command, control, communication, computer, intelligence, surveillance, and reconnaissance (C4ISR) systems, and “**third-party providers.**”¹⁴ Later in the document, under the section instructing how to go about targeting, weather satellites and satellite navigation systems are cited as specific potential targets.

Regarding “third party assets,” the document explains:

“Potential adversaries have access to a range of space systems and services that could threaten our forces and national interests. Even an adversary without indigenous space assets may use space through U.S., allied, commercial or consortium space services. These services include precision navigation, high-resolution imagery, environmental monitoring, and satellite communications. Denying adversary access to space capability and protecting U.S. and friendly space capability **may require taking the initiative to preempt or otherwise impeded an adversary.**”¹⁵

Possible “offensive counterspace forces” the U.S. Air Force might use are identified as: aircraft, missiles (including for anti-satellite attack), special operations forces, dedicated offensive counterspace systems (such as the Counter Satellite Communications System), and anti-satellite weapons (defined as including “direct ascent and co-orbital systems that employ various mechanisms to affect or destroy an on-orbit spacecraft”), directed energy weapons (including destructive lasers), network warfare operations, electronic warfare weapons, C4ISR systems, and surface forces.¹⁶

¹³ Ibid, p. 31.

¹⁴ Ibid, pp. 32-33.

¹⁵ Ibid, p. 33.

¹⁶ Ibid, p. 34.

Thus, the “Counterspace Operations” document makes it crystal clear that the U.S. Air Force now considers all satellites being used by adversaries as targets, including those commercially owned or owned by a neutral, third-party (possibly even allied) government. It also makes it clear that the U.S. Air Force sees any form of weapon -- whether terrestrially or space based, whether simply temporarily disrupting or whether destructive and debris-generating – as legitimate for attacking those targets. Finally, it raises the specter of U.S. preemptive attack against satellites.

Both the issue of targeting satellites owned by neutral or non-combatant parties and the potential use of preemptive attacks raise questions with regard to international law. While U.S. Air Force lawyers have sought to interpret international law as compatible with “counterspace operations,” there are many international legal scholars who disagree. While the particulars of this debate are beyond the scope of this hearing, it is important to note that the U.S. government stance on this issue is not universally accepted.

While the “Counterspace Operations” doctrine does not address “space force application,” the most recent Air Force doctrinal document, “Space Operations,” published Nov. 27, 2006, reiterates this mission as being required of the service under U.S. and Defense Department policy.¹⁷ It defines “space force applications” as **“those forces that deliver kinetic effects to, from, or through space.** While only ICBM systems currently fall into this category, future space systems, such as the common aerospace vehicle, land-based strategic deterrent [ground-based missile defenses], and conventional ICBM, could deliver combat effects to terrestrial and space targets.”¹⁸

This language lays out the possibility that U.S. Ground-based Midcourse Defense interceptors, 14 of which are currently in silos at Fort Greely, Alaska, and Vandenberg Air Force Base, Calif., could be used as anti-satellite weapons. It also postulates a future where weapons would be based in space to strike both satellites and targets on land, sea and air.

¹⁷ *Space Operations*, Air Force Doctrine Document 2-2, 27 November 2006, U.S Air Force, http://www.fas.org/irp/doddir/usaf/afdd2_2.pdf

¹⁸ *Ibid*, p. 32.

It is obvious that taken together, these military doctrine documents interpret current National Space Policy as not only endorsing, but requiring, a full-scale space warfare strategy on the part of the United States. This strategy includes possible preemptive action, and possible destruction of satellites using destructive, debris-creating weapons – weapons U.S. Air Force officials repeatedly have rejected in public statements as dangerous because of the indiscriminate threat to all space assets, including those of the United States, posed by space debris. Implementation of this articulated strategy would put the United States in the position of being the first nation to cross the Rubicon into space weaponization. It is inconceivable that any potential adversary would allow the United States to tread this path unchallenged. Further, such a U.S. move would also clear the way politically for other space-faring nations to adopt similar strategies and seek similar types of weapons capabilities – in other words, break the long-standing norm against the weaponization of space . Moreover, in order to develop and deploy the assets required to carry out a space warfare strategy, the U.S. military, especially the U.S. Air Force, would require robust new investment in weapons as well as back-up command and control and space situational awareness systems – investment on a scale that would dwarf current U.S. spending on national security space assets (although spending on U.S. spy satellites is classified, it is widely assumed that current national security space spending hovers at around \$50 billion annually).

Posture

While it is clear that U.S. declaratory policy (based on the 2006 NSP and currently applicable Pentagon policy and doctrinal documents) envisions a space warfare strategy and arsenal, what is less clear is whether the financial and bureaucratic commitment to developing an actual capability to implement this strategy and build such an arsenal exists. As of now, the United States has no declared anti-satellite programs, nor any public research efforts toward such weapons. Indeed, the Pentagon as only one declared “counterspace” system deployed – the Counter Communications System (CCS), which is

a mobile, high-power radio frequency jammer.¹⁹ The Air Force's Fiscal Year 2008 (FY 08) budget request contains \$2.4 million for "Offensive Counterspace" research and development, however, the budget documents state that "consistent with DOD policy," this research focuses on "temporary, reversible and localized means."²⁰ What policy is referred to is unclear, as none of the publicly available Pentagon policy documents related to space – nor any of the military space doctrinal documents – state such a preference (although the specific DOD "Instruction" on space control, "DOD Instruction S-3100.15, 19 January 2001, Space Control," is classified.) Finally, with regard to "space force application," the only funding included in the unclassified version of the Bush administration's FY 08 budget request was \$10 million dollars to launch development of a "Space-Based Test Bed" designed to test the feasibility of space-based missile defense interceptors. The Air Force has no such declared programs in its unclassified budget.

At the same time, there is ongoing U.S. research on myriad technologies that could enable the development of anti-satellite and space-based weaponry. A study by the Center for Defense Information, in concert with the Secure World Foundation, of the Pentagon's FY 08 budget request uncovered about a \$1 billion in unclassified efforts that could lead to various space weapons, such as a ground-based laser that could either 'stun or kill' a target satellite and micro-satellites that could ram or use directed energy against a target satellite – capabilities that the U.S. Air Force in the past has expressed interest in developing.²¹ In addition, an array of Missile Defense Agency projects, such as the development of Multiple Kill Vehicles and the autonomous fly-bys of the Near Field Infra-Red Experiment, could have applications for space-based anti-satellite weapons as well as for space-based missile defenses. The array of potential dual-use technologies

¹⁹ Peterson Air Force Base Fact Sheet: 4th Space Control Squadron, <http://www.peterson.af.mil/library/factsheets/factsheet.asp?id=4707>

²⁰ Theresa Hitchens, Victoria Samson, Sam Black, "Space Weapons Spending in the FY 2008 Defense Budget," Feb. 21, 2007, Center for Defense Information, <http://www.cdi.org/PDFs/Space%20Weapons%20Spending%20in%20the%20FY%202008%20Defense%20Budget.pdf>

²¹ Hitchens, Samson and Black, op cit; "The Air Force Transformation Flight Plan," November 2003, U.S. Air Force Future Concepts and Transformation Division, http://www.af.mil/library/posture/AF_TRANS_FLIGHT_PLAN-2003.pdf, in Annex D, described desired ASAT systems including an Air Launched Anti-Satellite Missile, Evolutionary Air and Space Global Laser Engagement (EAGLE) Airship Relay Mirrors, a Ground-Based Laser and a Space-Based Radio Frequency Energy Weapon.

being explored by the Air Force, the Defense Advanced Research Projects Agency, the Missile Defense Agency, and even NASA is dizzying; yet the actual monetary investment at the moment, at least in the unclassified budget, is quite small.

Of course, the lack of unclassified funding for space weaponry does not rule out the possibility of classified programs. Nonetheless, the low level of unclassified investment and the basic level of technologies being explored does seemingly point to a disconnect between robust U.S. declaratory policy and the ability to implement that policy. Further raising questions about actual U.S. plans for “offensive space control” was a recent article in *Aviation Week & Space Technology*, which quoted Air Force officials as indicating that any move in the direction of deploying anti-satellite weapons would require a White House decision to overturn a current policy against doing so.²² This directly belies the assertions contained in Pentagon policy and doctrinal documents characterizing anti-satellite warfare as a critical component in future conflicts. In sum, U.S. posture regarding “counterspace operations” seems currently uncertain.

Security Dilemmas and Risks

Current U.S. space policy, military strategy and posture unfortunately raise a number of risks to the future national security. The first problem is that the aggressive, unilateral tone of the Bush NSP and military doctrinal documents has raised concerns among allied and friendly nations, as well as promoted consideration of countermeasures and space-related weaponry by potential adversaries.

As for U.S. allies, with the exception of Israel, all allied nations are publicly wedded to preventing an arms race in space, and there are indications that European allies in particular may more concertedly seek to distance themselves from Washington across the civil, commercial and space arenas in large part due to concerns regarding U.S. military space policy. The European Commission and the European Space Agency were expected to approve a new “European Space Policy” on May 22, 2007, that highlights Europe’s

²² David A. Fulghum and Amy Butler, “U.S. Eyes China ASAT Fallout,” *Aviation Week & Space Technology*, World News & Analysis, April 30, 2007, pp. 27-29.

need to focus more on military uses of space, as well as to ensure Europe's "strategic independence." The draft policy cites the need for the European space industry to wean itself from reliance on U.S. suppliers, and stresses that Europe must maintain independent space capabilities to protect its own security.²³ There is also concern in U.S. civil space circles that the new NSP will even further erode NASA's ability to find international partners for its "Moon-Mars" initiatives – as reflected in an editorial in trade journal *Aviation Week & Space Technology* titled, "Jingoism Will Get Us Nowhere in Global Space Affairs."²⁴

Meanwhile, Russia, a potential U.S. military space competitor, has repeatedly expressed its concerns with the direction of U.S. military space plans. For example, Vitaly Davidov, deputy head of the Russian space agency Roskosmos, said of the new NSP: "This document can be seen as today as the first step toward a serious deepening of the military confrontation in space. ... Now the Americans are saying they not only want to go to space but that they want to dictate to others who else is allowed to go there."²⁵ Indeed, in June 2005 – when media reports of the NSP review surfaced – Russian Defense Minister Sergei Ivanov threatened that Russia would "take retaliatory steps" if any country were to deploy weapons in space.²⁶

China's Jan. 11, 2007 destruction of an aging weather satellite, the FY-1C, in the first dedicated anti-satellite test in more than 20 years has further raised the specter of an anti-satellite arms race. While China may be pursuing anti-satellite weapons for what it sees as a military requirement in any future confrontation with the United States over Taiwan rather than as a direct response to U.S. space policy, statements by Chinese officials both before and since the test make it clear that they see U.S. intentions to weaponize space as

²³ "Communication from the European Commission to the Council and the European Parliament: European Space Policy," COM(2007)212, Brussels, 26 April 2007, Commission of the European Communities, http://ec.europa.eu/enterprise/space/doc_pdf/com_en.pdf

²⁴ "Jingoism Will Get Us Nowhere in Global Space Affairs," *Aviation Week & Space Technology*, Oct. 30, 2006, p. 58.

²⁵ "Russian Official Says New U.S. Space Policy Will Lead to Military Confrontation," *Moscow News*, Nov. 30, 2006, <http://www.mosnews.com/news/2006/11/30/spacecritic.shtml>

²⁶ "Russia warns US about weapons in space: Minister vows retaliatory steps over technology threat," *Associated Press*, June 2, 2005, <http://www.msnbc.msn.com/id/8073961/>

a threat. If nothing else, U.S. declaratory policy gives Beijing an excuse to pursue a similar course. China's actions – despite its public dedication to the non-weaponization of space – make it abundantly clear that a U.S. space dominance strategy will not go unchallenged.

In other words, the United States finds itself on the horns of the classic security dilemma with regard to space: the more the United States seeks “hard power” means to both protect itself in space and ensure that others cannot use space against it, the more threatening U.S. intentions seem and the more others will seek to counter U.S. actions. Worse yet, U.S. space policy is goading others into military responses at a time when U.S. posture and capabilities to counter-respond remain incomplete. Whereas the United States currently benefits the most from the status quo in space and has the most to lose from space weaponization, U.S. policy is causing that status quo to crumble with no operational plan and little actual capability to handle the consequences of doing so. As one retired Air Force officer recently quipped: “Rather than speaking softly and carrying a big stick, we're yelling loudly and left the stick at the store.” This situation is quite possibly the worst of all possible worlds for U.S. national security.

Diplomatic Isolation

This problem is compounded by the decade-and-a-half-long resistance by the U.S. government to engage in robust diplomacy regarding legitimate military space operations, and Washington's long-standing refusal to allow discussions at the United Nations of measures to prevent an arms race in outer space (PAROS). The latter position in particular has been hardened by the new NSP and the Bush administration's actions on the international stage. Rather than simply abstaining from the annual vote at the United Nations General Assembly on the need for a PAROS treaty, as has been the U.S. stance for the past decade, Washington in October 2005 for the first time voted “no” (the only “no” vote; Israel abstained and 160 countries voted “yes.”) More egregiously in the eyes of U.S. allies and friends, the United States also moved to block a resolution by Russia at the same meeting that would have allowed members to provide their views on the need for transparency and confidence-building measures in space. It is particularly hard to see

how opposing transparency and confidence-building in space in any way undercuts U.S. space security – indeed, it would seem that more transparency, especially regarding the Chinese space program, would be of great use to the United States. In fact, U.S. officials long have called upon China to provide just that. Thus, this action was seen by other space-faring states as needlessly stubborn behavior on the part of Washington.

The U.S. refusal for the past decade and a half to allow negotiations on PAROS at the UN Conference on Disarmament (CD) in Geneva has also generated ill will and frustration among other nations, in effect isolating the United States and putting Washington in the position of the “bad actor” rather than a constructive player. The U.S. stance against PAROS talks, as noted, hardened under the Bush administration – with the United States refusing an offer from China to trade Beijing’s willingness to negotiate a formal Fissile Material Cut Off Treaty for U.S. acquiescence to informal PAROS talks. In June 2006, John Mohanco, deputy director of the State Department’s Office of Multilateral Nuclear and Security Affairs, told the CD that PAROS discussions are unnecessary because “there is no arms race in outer space.”²⁷

Sadly, the Chinese anti-satellite test – rapidly followed by statements by Indian officials that New Delhi too would pursue anti-satellite capabilities²⁸ -- threatens to contradict that statement.

Finally, U.S. allies were not amused by the failure of the Bush administration to engage them in discussions, or even provide a pre-briefing, prior to the release of the new NSP. The inability of allies to engage U.S. military officials with regard to U.S. space plans and operations is a consistent sore thumb in relations, according to a number of European military space officials and diplomats.

²⁷ John Mohanco, deputy director for the Office of Multilateral Nuclear and Security Affairs, US Department of State, “US Statement at the Conference on Disarmament,” US Mission to the United Nations in Geneva, press release, June 13, 2006, <http://www.usmission.ch/Press2006/0613USstatementattheCD.htm>

²⁸ Vivek Raghuvanshi, “China’s ASAT Galvanizes Indian Efforts,” *Defense News*, April 9, 2007, 20.

This perception that the United States is a “brick wall” with regard to cooperative efforts toward space security could be seen as one factor in the growing momentum among other space-faring powers to pursue a new regime for “space traffic management” – that is, peacetime rules of the road for space operations that would likely include restrictions on military space operations as well. With the full backing of most European countries, including staunch U.S. ally Britain, the Committee on the Peaceful Uses of Outer Space in Vienna is expected at its next meeting in June to put forward a proposal for an ad hoc committee to flesh out possible elements of a “space traffic control” regime. It remains unclear whether the United States will seek to block that activity; although early indications from U.S. government officials is that Washington will accede, but perhaps seek to exempt military space activities from any future agreement as well as limit the discussions to a voluntary rather than legal regime.

Reversing a Failed Approach

It is fairly easy to see that the combination of aggressive U.S. declaratory policy and a lack of international diplomacy has completely failed to achieve U.S. goals in securing its own space assets, and is instead backfiring in negative ways. Certainly, if the aim of U.S. space policy has been to “dissuade and deter” others from obtaining the capabilities to threaten U.S. space assets – as stated by the Bush NSP – then the policy has failed from that perspective. China has tested an anti-satellite weapon, and is suspected of working on a ground-based laser to disrupt or possibly destroy U.S. imaging satellites. India is threatening to develop similar capabilities, which will no doubt spark an Asian anti-satellite arms race involving Pakistan, Indonesia and possibly others. While no nation (even China) may at this time have the economic or military clout to directly challenge the United States in the exercise of space power, a kinetic energy anti-satellite competition, based on ballistic missile technology, is well within the capabilities of most space-faring nations – indeed this method of attacking satellites is one of the most simple.

This would be a dire scenario. As the Chinese test has proven, even the testing of a single kinetic energy anti-satellite weapon creates enormous amounts of space debris. The U.S. Air Force has tracked and identified more than 1,000 large pieces (bigger than 10 cm in

diameter, i.e. slightly bigger than a baseball) emanating from the Chinese test, and NASA estimates that another 35,000 smaller bits down to 1 cm in diameter but that are impossible to track have been created. This debris will remain in Low Earth Orbit – the home to most weather and Earth imaging satellites as well as some U.S. spy satellites and the International Space Station – for up to 100 years. Unfortunately, even tiny pieces of debris can disable or destroy a satellite due to the high speeds of objects on orbit. And space debris is already a widely recognized danger, with the Committee on the Peaceful Uses of Outer Space seeking to establish methods to mitigate debris creation. According to David Wright, a physicist with the Union of Concerned Scientists, the probability of a severely damaging collision with debris over the five-to-10 year lifespan of a satellite is already near 1 percent for those in heavily used orbits (such as the 850 kilometer altitude where the Chinese satellite was destroyed) and the Chinese test alone has raised that probability by about 25 percent. A shooting war in space thus would be disastrous, and in no space-faring nation's interest. Even the threat of a potential anti-satellite weapons race has already rattled the space industry. A report by the consulting firm Teal Group on the potential impacts of the Chinese anti-satellite (ASAT) test found:

“About the last thing that the satellite market needs now is the uncertainty that will accompany any moves to start blowing up objects in space or arming military satellites with protective countermeasures. The added debris problem is bad enough. An ASAT weapons race will have the effect of increasing the financial risk of any satellite program, and this will undoubtedly be felt most within the commercial market through decreased investor confidence and (or) higher insurance rates.”²⁹

Further, other responses to counter perceived space threats are possible, such as increased efforts at computer intrusion, efforts to develop on-orbit anti-satellites or methods to attack launch facilities. Erosion of the norm against attacking satellites would mean that all satellites, commercial, civil and military, would become fair game. Thus, the United

²⁹ Marco Cacères, “Market Impact Brief: China’s ASAT Weapons Test,” Teal Group Corp., Arlington, Va., Jan. 22, 2007.

States now potentially faces a nightmare in space caused in no small part by its own behavior: a Wild West environment with every space-faring nation cocking a trigger, putting U.S. commercial, civil and military space assets more at risk than ever before.

Given the growing importance of space to every nation's economic development and national security, it is simply not realistic to believe that the United States can impose its will upon other space actors or that the United States can establish unchallenged military dominance in space. Instead, the perception that this is precisely what Washington has been trying to do has resulted in the isolation of the United States politically, engendering the widespread perception that the United States itself is the nation posing the biggest threat to global security in space. Indeed, at this point, even every legitimate step the U.S. military takes to protect its own space assets is now being seen as threatening to other nations. Further, U.S. allies are increasingly distancing themselves from Washington in the civil, commercial and military space arenas; Russia and China meanwhile are making in-roads in commercial and civil cooperation with Europe as well as developing nations. And other space-faring nations are seriously considering efforts to establish new rules for behavior in space without any input from the United States. In other words, the U.S. emphasis on the exercise of "hard power" in space is threatening U.S. ability to use space as a "soft power" tool.

How can this negative situation be reversed? As a first step, the U.S. government needs to establish a policy of engagement with other space-faring nations. At a minimum, the United States needs to do more to explain its views, policies and intentions to the rest of the world, in particular to allied and friendly nations. Moreover, Washington must discard the current unilateral, militarized approach in favor of establishing a foundation of collective security in space. In other words, the U.S. government must exhibit a willingness to take into account the security concerns of other space-faring nations and recognize that rejection of rules of behavior in space opens the door toward overtly negative actions, as the Chinese test attests. Keeping military options open, as the United States has been attempting to do in space, is at the same time closing the door to other options that might more cheaply and reliably ensure the safety of U.S. space assets. The

acceptance of some limitations on U.S. space operations would be in U.S. interests if those limitations were applied to all space actors. It is thus in U.S. interests to support international efforts to establish “rules of the road” that spell out what is acceptable and unacceptable behavior in space, and a specific “space traffic management” regime for peacetime operations.

Generic “rules of the road” for space are embodied in the work by a number of U.S. NGOs promoting a “code of conduct” for space, including The Henry L. Stimson Center and CDI.³⁰ These include measures to improve space situational awareness; traffic management; notification and consultation measures; provision for special caution areas; constraints against the harmful use of lasers; debris mitigation measures; and measures that increase the safety of, and reduce the likelihood of damaging actions against, satellites.

The framework of a “space traffic management” regime has also already been developed under studies by the American Institute of Aeronautics and Astronautics (AIAA) and the International Academy of Astronautics (IAA). The IAA “Cosmic Study on Space Traffic Management,” published in early 2006, defines space traffic management as follows:

Space traffic management means the set of technical and regulatory provisions for promoting safe access into outer space, operations in outer space and return from outer space to Earth free from physical or radio-frequency interference.³¹

The study panel, which included U.S. State Department and NASA representatives, looked at the scientific and technical, as well as regulatory, aspects of what the report defined as the three phases of space traffic management: the launch phase, the in-orbit operation phase and the re-entry (or end-of-life) phase. The study also reviewed current

³⁰ See The Henry L. Stimson Center website, Space Security Program, <http://www.stimson.org/space/?SN=WS200702131213>; and Theresa Hitchens, “Future Security in Space: Charting a Cooperative Course,” Center for Defense Information, 2004, <http://www.cdi.org/program/document.cfm?documentid=2638&programID=85>

³¹ Corrine Contant-Jorgenson, Petr Lála and Kai-Uwe Schrogl, eds., “Cosmic Study on Space Traffic Management,” International Academy of Astronautics, 2006, p. 10, <http://iaaweb.org/iaa/Studies/spacetraffic.pdf>

structures for maritime and air traffic management that could provide examples for space traffic management. Finally, the study made a number of specific recommendations for rules that would help guarantee safe passage for all satellite operators. These rules include data sharing regarding satellite orbits, notification of launches and orbital maneuvers, “zoning” and right-of-way provisions for satellites on orbit, debris mitigation measures, and agreed procedures for de-orbiting.

The earlier 2001 AIAA study identified similar requirements, as well as the issue of removing debris from the crowded Geostationary belt where most communications satellites reside.

Thus, there is a body of work by industry practitioners, scientists, academics and government representatives that could kick start discussions at the Committee on the Peaceful Uses of Outer Space. The United States should not only NOT block such discussions, but should participate in a robust manner. Indeed, if Washington were to take a leadership role in this effort – as the U.S. government has done in the international discussions on space debris mitigation – it would go a long way to re-establishing the United States as a responsible actor in space.

Secondly, the United States should immediately renounce the use of destructive, debris-creating anti-satellite weapons (solidifying the declaration by modifying Pentagon and military documents to rule out destruction as an acceptable “counterspace” method) and seek to negotiate an international ban on the testing and use of such weapons. As witnessed by the Chemical and Biological weapons ban treaties, there is ample precedent for action by the international community to bar weapons and military practices that result in indiscriminate damage. Again, it is in no one’s interest for space to become an unusable junk yard; the use of space is simply too important for modern society. Further, such a ban would be inherently verifiable as the creation of space debris is easily detected. And to be blunt, the United States itself is unlikely to use debris creating weapons in space because of the U.S. Air Force’s deep understanding of the dangers of space debris.

Starting negotiations on such a treaty may also require the United States to consider discussions of a wider ban on space-based weapons, as so strongly supported by so many other nations. It is true that the development of a workable, verifiable ban on orbital weapons will be extremely difficult due to the dual-use nature of most space technology and the challenges to discerning between threatening and benign technology. However, the difficulty of reaching such an agreement doesn't rule out the political benefits to the United States from being willing to at least discuss the possibilities. Thus, the United States has little to lose and possibly much to gain from, at a minimum, allowing informal discussions of PAROS at the Conference on Disarmament to proceed.

The engagement in diplomatic efforts to secure space does not, and should not, mean the United States should abandon efforts to protect its own assets. For one thing, it is clear that no treaty is 100 percent reliable, just as no weapon system is 100 percent reliable. Moreover, the U.S. military should not in any case be in a position where the destruction of one or even several satellites would be a single-point failure. Improved space situational awareness is an urgent need; passive protections for both military and commercial satellites (such as encryption) must be pursued; redundant non-space capabilities for communications and navigation should be explored along with the possibility of replacing single, large satellites with less vulnerable constellations of smaller ones; and capabilities for rapidly reconstituting lost space systems must be developed. Reducing U.S. vulnerabilities in space and making space systems more difficult to target obviously helps reduce potential threats.

The end goal of U.S. space policy and strategy should be clear, however: to prevent the world from sliding down a slippery slope to space weaponization that will endanger U.S. national security and indeed, the future of all mankind.