

Space, Security, and the New Nuclear Triad

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MISSILES ARE THE PRODUCTS OF dreamers: scientists like Konstantin Tsiolkovsky, Robert Goddard, and Werner von Braun built rockets to explore the heavens.¹ Those early dreams have taken humans to the moon, mapped stars, and connected nations. But as has occurred all too often, the same technologies that benefit humanity are pressed into service as weapons—50 years ago the Soviet Union first showed that the power of the atomic bomb could be hurled into space on intercontinental missiles.

Although the term *revolution in military affairs* is now too often used indiscriminately, the Soviets rightly considered the ability to reach through space to instantly destroy an enemy as the first and only true “revolution.” The marriage of nuclear bombs and long-range missiles vexed the best strategic thinkers, and so the advent of the missile age generated myriad theologies of deterrence, limited options, and assured destruction, as strategists struggled for over a half century with a fundamental question: what are nuclear missiles supposed to *do*? The most essential answer, during the cold war, was that nuclear weapons were necessary to protect against a major exchange with another nuclear power. But with the cold war behind us, is this still the primary purpose of such systems?

U.S. policymakers may have this very question in mind as they reevaluate nuclear strategy and the military uses of space in the wake of new space technologies that are challenging previous notions—and taboos—regarding nuclear arms and space weaponization. In some cases, these technologies are specifically designed to seek maximum military advantage without resorting to nuclear force. A concept called Rods from God,

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for example, envisions a space-based platform carrying tungsten rods—up to 20 feet in length and a foot in diameter—that could be dropped on targets with the speed of a meteor, giving the targeted country less than 15 minutes' notice before hitting with the force of a nuclear bomb. Whether one considers these plans prudent or provocative, they all reflect the same challenge of how to exploit both the power of nuclear arms and the possibilities of space to the advantage of U.S. national security.

CHANGES IN U.S. NUCLEAR STRATEGY AND SPACE POLICY

That U.S. defense thinkers see a synergy between nuclear strategy and space operations is clear from the mission statement of the U.S. military's Strategic Command (STRATCOM), the development of U.S. nuclear strategy since 2002, and the 2006-issued U.S. National Space Policy.² Indeed, these new strategies have explored how to use U.S. nuclear capabilities proactively as opposed to only for deterrence—causing many at home and abroad to question the United States' intentions. Whether new strategies and capabilities will in fact lend the United States more security, or alternatively (and counterproductively) provide the impetus for others to develop asymmetric responses to thwart or counter U.S. power, is a critical question.

In 2002, the Bush administration began reviewing U.S. nuclear strategy based on the recommendations of an ongoing Nuclear Posture Review (NPR) committee. With the intention of moving U.S. nuclear forces to a so-called “capabilities-based” posture to deal with multiple aggressors across a spectrum of contingencies, the traditional nuclear triad of bombers, missiles, and submarines was notionally replaced with a new triad of offensive capabilities (nuclear and non-nuclear), missile defenses, and a rather indeterminate commitment to a technological infrastructure that could adapt to future problems.

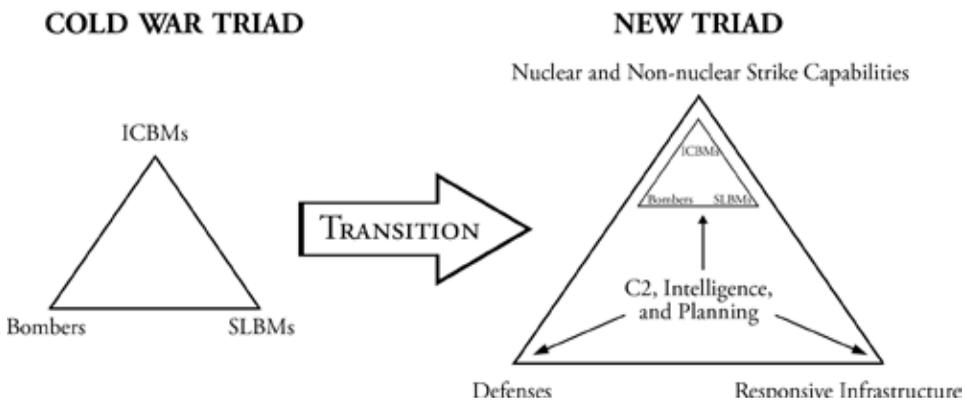
The traditional nuclear triad was intended to obviate any possibility that the Soviet Union could destroy all U.S. nuclear forces with a first strike. The triad concept ensured a “secure second-strike” capability, in which an enemy would be deterred by the knowledge that a certain number of U.S. nuclear forces would certainly survive the initial wave of attacks and exact a terrible—and more importantly, unacceptable—price on the aggressor. It would, in effect, make a successful first strike impossible, and thus discourage all but the most foolish or insane opponents.

The Nuclear Posture Review junked this system and created a new triad that is more a wish-list of capabilities than an actual strategy.

To its credit, this new triad tries to compensate for non-nuclear threats, smaller nuclear powers, rogue missile programs, and other challenges that have emerged since the collapse of the Soviet Union. But the result is a farrago meant to integrate just about

all aspects of U.S. power: nuclear deterrence, conventional capabilities, missile defenses, and a catch-all concept of a “responsive infrastructure” meant to counter unanticipated threats.³ In practice, the fuzzy language of responsiveness probably means maintaining a large (and expensive) technological base capable of quickly being directed toward solving emerging problems.

A CAPABILITIES-BASED CONCEPT: THE NEW TRIAD



The new triad offers a portfolio of capabilities and the flexibility required to address a spectrum of contingencies

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Other nations have found much to be concerned about in the ambiguity of this new triad. There is no telling whether responsiveness in the future may call for the aggressive use of nuclear weapons as a war-fighting tool. This ambiguity is multiplied in space, since nearly all space hardware systems are dual use—that is, they have utility to both civilian and military sectors. The line between offense and defense can easily become blurred when any long-range missile assigned putatively to a deterrent role can be used to carry out an offensive mission.

This is a particular problem with missile defenses. Many countries—China and to some extent Russia chief among them—see (or claim to see) the U.S. missile defense system as being better suited for destroying satellites than intercepting missiles. Similarly, the United States views Chinese improvements in launch technology as simultaneously benefiting both China’s manned space program and its ability to deliver nuclear weapons. The ambiguity of dual use means both these claims could be true.

In 2006, the United States unveiled a new National Space Policy (NSP) that could be reasonably viewed abroad as highly nationalistic at best and aggressively militaristic at worst.⁴ While ostensibly devoted to all aspects of space policy, its focus is clearly on military security. The new NSP represents a melding of space policy with

national security policy, and treats space as one more potential battlefield. To some extent, this is to be expected: space *is* a potential battlefield. But the current vision in Washington is clearly one based chiefly on the use of technology to protect space assets and to enhance the United States' ability to conduct military strikes anywhere around the globe, while rejecting arms control measures that might impede what some Washington policy makers consider an untrammelled right to operate in space as the United States sees see fit.

While a more aggressive national space policy might make sense from Washington's perspective, other nations have understandably questioned the strategic intentions of the United States. Even saying the words *nuclear weapons* and *space* in the same

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sentence has been something of an international taboo since the 1970s; what to one side might seem only to be a missile defense could appear to be a Trojan horse of offensive capabilities to the

other. Unfortunately, five years after the review and reform of U.S. nuclear policies, it now seems that these changes have inadvertently created a security dilemma, particularly with the People's Republic of China, in which actions taken by the United States to enhance its own national security have set in motion a counterproductive cycle of responses and counter-responses.⁵

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NUCLEAR STRATEGY AND U.S.–SINO RELATIONS

China has clearly replaced the Soviet Union as the focus of U.S. deterrent and defense planning: a presumed threat from China and North Korea has provided justification for the staggering amounts spent on missile defense development.⁶ While caution about the Chinese and North Korean intercontinental ballistic missile (ICBM) programs is healthy and even prudent, North Korea has yet to get a long-range missile past the Sea of Japan and the Pentagon's analyses of Chinese space ambitions have been alarmist to the point of raising issues of credibility.⁷

Nonetheless, the United States has attempted to enhance its security against China, often with serious unintended consequences. One such consequence arises from the Nuclear Posture Review's blurring of what has traditionally been a bright line between nuclear and non-nuclear systems. Addressing fellow Nobel Laureates, 1995 honoree Sir Joseph Rotblat, co-founder and past president of the Pugwash Conferences, described in 2002 the danger inherent in the NPR:

It makes nuclear weapons the tool with which to keep peace in the world . . . In

a reversal of the previous doctrine, whereby nuclear weapons have been viewed as weapons of last resort, the new Nuclear Posture Review spells out a strategy which incorporates nuclear capability into conventional war planning. Nuclear weapons have now become a standard part of military strategy, to be used in a conflict just like any other explosive.⁸

Rotblat's concerns are echoed by both U.S. and foreign analysts.⁹ Chinese scholar Wang Zhongchun wrote in 2007, "Though the U.S. government has yet to give a clear definition of its new nuclear strategy we can see from a series of important U.S. strategy documents that the U.S. nuclear strategy is expanding its role."¹⁰ It would be surprising if such considerations do not play into Beijing's own nuclear policy calculations.

The NPR has also created a point of contention with China on U.S. nonproliferation policy. While pursuing an increasing number of nuclear options itself over recent years (such as the now-cancelled "bunker buster" small nuclear warhead), the United States is blocking some states, such as Iran, from obtaining nuclear technologies while apparently encouraging others, such as India, to develop them.

The United States understandably has the right to decide who its friends and enemies are and who would be more threatening with nuclear weapons, but the United States has also committed itself to a firm defense of the Nuclear Non-Proliferation Treaty as a global norm. This conflict of interests has led observers such as Council on Foreign Relations analyst Michael Levi to charge that the U.S. follows an "incoherent" nonproliferation policy, one that explores "a range of new nuclear weapons concepts while counseling others that nuclear weapons are anachronistic."¹¹ Defenders of the administration's approach note that the United States is—finally—making a distinction between democracies and other regimes while supporting the underlying assumptions of the democratic peace theory, with Washington signaling in 2006 its willingness to reward democracies with a deal providing nuclear technology to India.

Chinese analyst Wang Zhongchun suggests that China has no intention of letting Washington shape the proliferation regime to its own likings. China's nuclear strategy, he writes, seeks to

deter other countries from using nuclear weapons against China; oppose the nuclear threats of enemies and counterattack against any major nuclear attacks; develop a lean and effective nuclear force and support comprehensive and complete nuclear disarmament. China's nuclear strategy is mainly defensive, directional, passive and limited.¹²

Zhongchun sees developments in the United States as creating new challenges for China. "Once the system [of missile defense] is complete, the United States will obtain a strategic deterrent force with both offensive and defensive capabilities, which could

pose serious challenges to the limited nuclear deterrent capabilities of medium-sized countries.”¹³ Not surprisingly, he concludes, “China should avoid sacrificing its interests to satisfy U.S. nonproliferation requests.”¹⁴

Finally, there is the issue of U.S. nuclear “primacy,” which is an obvious concern to the Chinese (and even to the better-armed Russians). Primacy is the notion that the United States has attained a nuclear capacity so immense that it cannot be challenged or

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defeated by any power or coalition of powers. More worrisome is the idea that the United States could, if the situation arose, destroy any potential challenger’s nuclear deterrent in a single, sweeping strike. For those who see the United States increasingly as a rogue

power, primacy is alarming, guaranteeing the United States the freedom to act for its own purposes, noble or otherwise.

While U.S. primacy can often be tempered by the realities of counterbalancing diplomatic and economic force—a lesson Washington learned during the 2003 Iraq war debate in the United Nations—there are few such obstacles in the nuclear arena. As U.S. scholars Keir Lieber and Daryl Press pointed out in 2006, “Unless Washington’s policies change or Moscow and Beijing take steps to increase the size and readiness of their forces, Russia and China—and the rest of the world—will live in the shadow of U.S. nuclear primacy for many years to come.”¹⁵ This is a development that the Chinese in particular do not intend to take lightly.¹⁶

There are several ways in which U.S. nuclear primacy could significantly affect U.S.–Sino security relations. Lieber and Press argue that the growth of U.S. nuclear counterforce capabilities will pressure China to reduce the vulnerability of its own arsenal, potentially going as far as to pre-delegate some launch decisions to subordinate commanders.¹⁷ They also worry that the Chinese leadership might redress its vulnerability by putting its small nuclear force on alert, thus inadvertently increasing the likelihood of a preemptive attack by the United States. “America’s growing nuclear counterforce capabilities,” they write, “are a double-edged sword for the United States—raising the danger of renewed arms races and crisis instability, but also conferring real benefits for the United States.”¹⁸

But while it may be true that the United States could destroy the Russian or Chinese nuclear arsenals in a single strike, it is difficult to imagine exactly what, short of an imminent attack on North America, would impel any U.S. president to order such a strike. The politics of such an attack make no sense, and so despite recent chest-thumping from both the Chinese and the Russians, it is unlikely that Beijing and Moscow are actually worried about global nuclear war. Indeed, the size and accuracy of the U.S.

missile force is probably less worrisome to other countries than the possibility of the unrestrained exercise of U.S. power not on earth, but in space.

SPACE WEAPONS

Since 2006, the United States has spent more than \$90 billion on attempts to develop a missile defense system to stop incoming nuclear warheads from reaching U.S. soil. If successful, the United States would finally achieve a kind of “trifecta” of continental security: nuclear primacy; a conventional military force virtually unbeatable in direct confrontation; and a missile shield that could, at the least, induce great uncertainty in an attacker. The issue here is not whether defenses will work, but whether U.S. leaders will act as if they do. This is reminiscent of the situation in the 1980s, when the Reagan administration heralded the Strategic Defense Initiative (dubbed “Star Wars” by its critics) as an umbrella to defend the United States against nuclear attack. The Soviet worry was not necessarily that U.S. defenses would work, but rather that Washington would be emboldened by a belief in the superiority of its own technology.¹⁹ Rightly or wrongly, the fear that the United States will throw its already considerable weight around is why other countries must, and do, take U.S. missile defense efforts seriously.

In January 2007, Washington announced that it was placing a missile defense radar network in the Czech Republic, and intended to start formal talks with Poland on deployment of similar systems there. In response, Russian president Vladimir Putin said, “We must think, and are thinking, of ways to ensure our national security. All our responses will be asymmetric but highly effective.”²⁰ Putin, who almost certainly knows that a defense system in Eastern Europe would be useless against Russian missiles, nonetheless later went on to warn that one Russian response might be to retarget nuclear weapons against Europe. The U.S. insistence that these defenses were oriented against threats from the Middle East (which, technologically, are the only threats they could stop anyway) was not enough to allay Russian fears—such is the level of paranoia missile defenses inspire.

There are even concerns that missile defense worries will hamper the ability of United States and Russia to negotiate a follow-on to the Strategic Arms Reduction Treaty (START), which is due to expire in 2009. Without a follow-on, the United States’ ability to monitor Russian missiles will be significantly hampered. To be clear, Russia is not concerned with missile defense because they believe that a major nuclear exchange in Europe is likely. Far more probable, they fear that U.S. missile defenses are just one part of a larger package of U.S. programs meant to hide offensive intentions behind the ambiguity of dual-use space technology.

This is where the issue of space is most salient. The problem is not with missile

defense per se since theater missile defenses (TMD) have always been acceptable to both Moscow and Washington—as shown by agreements reached between Russia and the United States in the 1990s regarding trajectories where TMD might be used. But the nature of long-range national missile defense technology raises fears that such programs cloak the development of global-strike and space weapons. This does not represent a new militarization of space. Space has been militarized since the advent of missile technology in the 1940s. Military use, however, has been limited to force enhancement missions to increase the potential success of terrestrial operations, such as using GPS for precision guided munitions; satellites for reconnaissance; and command, control, and communications. But weaponization, the active application of force in space to either terrestrial or space based targets, is a different issue that has until now been taboo. From a legal perspective, according to the 1967 Outer Space Treaty, which the United States has signed and ratified, only the stationing of weapons of mass destruction (WMD) in orbit is prohibited, not weapons in general, but here technology has outpaced law. Would Rods from God, for example, qualify as a WMD if it achieves the destructive power of a nuclear weapon? Might space become a permanent stationing point for weapons systems that skirt treaty definitions put in place forty years ago?

Concerns about U.S. intentions in space were heightened by the bold language of the 2006 U.S. National Space Policy, summarized by a British newspaper as a document in which “the U.S. declares space the 51st state.”²¹ To be fair, the new policy recognizes that “those who effectively utilize space will enjoy added prosperity and security and will hold a substantial advantage over those who do not.” But the document clearly emphasizes the military uses of space. “Freedom of action in space,” the policy states, “is as important to the United States as air power and sea power.”²² References to air and sea power hearken back to the 2001 Rumsfeld Space Commission Report’s statement that just as the air, land, and sea become arenas of military conflict, it is inevitable that space will as well. If space becomes a battleground, nations will need weapons capable of operating there.

To this end, the United States has consistently avoided treaties banning space weapons. Normally, this was done indirectly by refusing to cooperate with such proposals rather than opposing them. In 2006, the United States for the first time explicitly voted against such a treaty at the United Nations’ Conference on Disarmament. The U.S. position that has been promulgated in various statements by U.S. administration officials is that such treaties are not needed because there is no arms race in space. Why this logic is supposed to be persuasive has never been clear; no one has ever tried to colonize Jupiter, but the United States signed a treaty in 1967 renouncing sovereign claims over the planets anyway. It is hard to see why the absence of a problem means that no measures should be taken to prevent it from arising in the future.

The Chinese, whose nuclear arsenal and space capabilities are obviously inferior to those of the United States, might be expected to be the most adamant opponents of weaponizing space. But in January 2007, the Chinese handed advocates of space weaponization a great gift. They foolishly—and recklessly—destroyed one of their own defunct weather satellites in low-Earth orbit, thus joining the United States and the Soviet Union as nations with a proven satellite-killing capability.²³ In one single, ill-advised act, Beijing injured its own credibility as an opponent of space weapons and gave ammunition to those who support space weapons to ensure security. It was also quite literally reckless in that it created more than one thousand pieces of space debris, putting other space assets, including their own satellites and the International Space Station, in potential jeopardy for years to come.²⁴ The technology they used was strikingly similar to current U.S. missile defense technology, which was likely intended to prove, as the Chinese have long emphasized, that long-range missile defenses are just as well suited for offensive as for defensive purposes.

The initial U.S. response was one of denial. U.S. Ambassador Christine Rocca told the Geneva Conference on Disarmament on 13 February, “Despite the anti-satellite test, we continue to believe that there is no arms race in space, and therefore no problem for arms control to solve.”²⁵ Denying the need for a treaty not only downplayed the gravity of the incident but also left the door open for further development of space weapons. Senator John Kyl, for one, issued a statement on 29 January 2007 arguing that the United States needed “to have the capability to eliminate a hostile satellite when necessary.”²⁶

In fact, the Defense Department’s fiscal year 2008 budget request includes multiple programs that could provide anti-satellite and space-based weapons capabilities.²⁷ Programs of this nature (not all of which are even funded under the aegis of the Defense Department) include the XSS microsatellite program, the Demonstration of Autonomous Rendezvous Technology (DART), the Space-Based Interceptor Testbed, the Autonomous Nanosatellite Guardian for Evaluating Local Space (ANGELS) program, and the Near Field Infrared Experiment (NFIRE) program.²⁸

Beyond these research and development programs, there are also operational programs underway with potential military uses in space. For example, there are currently 11 long-range, ground-based missile interceptors deployed in silos in California and Alaska. Whether these will ever work, or ever can, is an open question; former Pentagon director of operational test and evaluation Philip Coyle has described long-range missile defense as something like “trying to hit a hole in one—except the hole is moving at 17,000 miles an hour.”²⁹ And as analyst John Pike has pointed out, even if such a system worked perfectly—and not at 50-50 odds as it has in highly choreographed test settings—one or two incoming missiles could be shot down, but any more fired

simultaneously would drop the odds significantly.³⁰ Since inaccurate missiles launched by a rogue state or a small nuclear power would almost certainly be targeted at population centers rather than hardened targets, missing even one warhead would mean the deaths of millions of Americans.

Regardless of these limitations, the U.S. interceptors were declared operational in 2006, coinciding with the North Korean attempt to launch the intercontinental *Taepo-Dong 2* missile. Like its predecessor, the missile crashed into the ocean forty

North Korea test-fired a missile it was not sure could fly while the United States activated a system it was not sure could catch the missile.

seconds after launch, but the North Korean determination to launch it succeeded only in lending credence to the arguments of U.S. missile defense advocates. The United States should be grateful that the North Korean rocketry performed so poorly; otherwise, it might have been forced to fire an interceptor, only to reveal that the emperor has no clothes. The whole affair was an unsteady game of chicken in which North Korea test-fired a missile it was not sure could fly while the United States activated a system it was not sure could catch the missile. In the end, it was the North Koreans who failed, but it could as easily have been the United States.

Some U.S. missile defense advocates believe that the United States can outspend China, forcing the People's Republic into a spending race reminiscent of the Soviet Union's doomed attempt to compete with the Strategic Defense Initiative. But the Soviet economy was teetering on the brink of collapse in the 1980s, and if the Chinese test proved anything, it is that space assets, by their nature, cannot be made technically invulnerable by anyone. Furthermore, the Chinese are not the Soviets, and they are not likely to be as foolish as Moscow's ideologues were in allowing themselves to be drawn into a spending contest. As already pointed out, the Chinese do not need to obtain parity with the United States; all they need to do is develop inexpensive ways to thwart U.S. advancements. The United States will be in an arms race against itself.

Still, the United States can take away two key lessons from China's ASAT test. First, there is an urgent need to improve our "space situational awareness," or SSA, which refers to the ability to know what is flying around in orbit at any given moment. Space may seem deceptively calm when viewed from a pleasant hill on a starry night, but everything from useful satellites to dangerous junk is whizzing about, and it all needs to be tracked. Unfortunately, the 2008 Air Force budget request essentially ignores SSA requirements, and in fact cuts funding from a planned total of \$216.9 million to \$187.8 million. It also zeros out the Commercial and Foreign Entities Program that allows the Air Force to share and receive debris tracking and collision avoidance data from commercial and foreign space operators.

Second, the United States must accept that there are limits to its technological

ability to protect valuable space assets. Rather than succumbing to the temptation of matching one demonstration of saber-rattling with another, the United States needs to diversify its options for dealing with space threats. To be sure, the vulnerability of space assets can be protected by its ability to reconstitute those assets quickly. But, arms control must be included as one of the key U.S. tools for protecting space assets.

The United States' objections to a space weapons treaty usually center on definitional issues created by the dual-use nature of space technology and potential verification difficulties. Rather than focus on what technology can or cannot be developed, it is more useful to focus on how the technology can be used for the good of all. For example, part of the justifiable outrage heard around the world after the Chinese ASAT test focused on the debris created. That debris will put international commercial, civil, and military assets at risk for years. A multilateral agreement prohibiting the deliberate creation of space debris, which would be easier to negotiate, perhaps, than a weapons treaty, could go a long way toward accomplishing goals of common global interest. Beyond a moratorium on generating space junk, creating rules of the road for space operations and threat identification—much as we have for other areas of military operation—would be a solid first step toward regulations that support U.S. security goals.

CONCLUSION

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The United States faces several problems regarding space and nuclear strategy, some of which are of its own creation. Competitors to the United States view U.S. nuclear strategy as being based on primacy with a war fighting—rather than deterrent—intent. The United States' nonproliferation policy is interpreted as inconsistent at best. There is strong political backing to develop a long-range missile defense system, yet such systems are far better suited to offensive capabilities due to the cost and technical difficulties associated with their defensive mission. Fueling perceptions that the United States is determined to approach the use of space aggressively, Washington's new National Space Policy supports and in fact relies on the development of space weapons to defend space assets, a position that raises understandable concerns about U.S. intentions for the future of space development. The United States has done little to allay these concerns, choosing instead to assert broad rights in space while consistently rejecting UN efforts to create an anti-space weapons treaty.

The current U.S. approach, it seems, is designed to overwhelm the potential efforts of other countries in space, making it unfeasible for them to compete and thus deterring them from even trying. It is a strategy that rarely succeeds, tending to breed asymmetrical responses rather than head-on competition. Why build battleships, for example, when submarines are cheaper and even more deadly to a dreadnought than another surface vessel? It is especially questionable whether such an approach can curtail

an arms competition in space.

There are relatively simple answers to most of these problems, but they would require no small amount of courage from both ends of the political spectrum in the United States. First, the United States could allay fears about the intentions of its ballistic missile force by slashing its own inventory of such weapons, perhaps to less than 500, and returning to an overtly deterrent posture. The idea of fighting a major nuclear war in a globalized world is absurd even under the most stressful conditions, and the Russians and the Chinese, despite their bluster, surely know it; we are no longer in a contest for the control of the entire world as we were during the cold war. A reduced inventory should be coupled with a promise, particularly to rogues like North Korea, that the few weapons we have will be used, and used with firm calculation aimed not only at the military neutralization of the aggressor but eventual regime change, should nuclear weapons ever be used against the United States or its allies.

Conservatives might well be uncomfortable with a posture of minimum deterrence, and liberals might quail at cold-blooded promises to retaliate with nuclear arms as the first step in deposing the enemy regime, but this is actually a non-partisan issue. If even one U.S. city were destroyed by nuclear attack, the U.S. public would demand complete retaliation, and would not settle for less. Furthermore, this is warning that would need to be given not to the Russians or the Chinese, who are mature powers and are no doubt well aware of the consequences of a nuclear exchange, but rather to those rogue leaders who live (as we now know Saddam Hussein did and as Kim Jong-il probably still does) imprisoned in the isolation of their own delusions.

Second, the United States should abandon missile defenses. The United States should never trust unproven technology to stop an attack that could kill millions of our citizens. And we should face reality: we cannot develop a system anytime soon that will stop anything more than a few missiles (if that). Even a more robust system intercepting a small attack only needs to miss one target for an U.S. city to become a nuclear graveyard. Missile defense has become a kind of token, a rabbit's foot we hold on to because we hope it will work. Instead, we should take a more reliable route: the United States should forego missile defense against rogue nuclear missile programs and take the lead in eradicating such programs by diplomacy—especially regarding the uses of space—but also by force if necessary. Put simply, the U.S. will not need missile defenses if there are no missile threats to defend against.

Third, the United States should clearly and unambiguously renounce the weaponization of space. Instead, it should support development of rules of the road as a first step toward using all available policy tools to protect its space assets, rather than relying only on technological means. Recognizing the dilemma created by dual-use technology, international fears about U.S. intentions can be assuaged by a no-first-use

statement—with a flip side that says any country that employs space weapons against terrestrial or space-based U.S. assets will bear the full brunt of U.S. reprisals. Critical to all of these efforts will be enhancement of U.S. space situational awareness capabilities.

In the end, the U.S. approach to space and nuclear arms must be considered not only in terms of technical potential, but also in the context of potential responses from other nations. Unfortunately, that contextual aspect of others' responses has been largely ignored, with reliance instead placed almost exclusively on U.S. technical capabilities. Such strategies carry significant risks, including the possibility of generating unintended, and highly counterproductive, consequences. 

NOTES

1. The views expressed in this article are those of the authors only and do not represent the official position of the Department of the Navy, the Department of Defense, or the U.S. government.

2. The United States Strategic Command's stated mission is to "provide the nation with global deterrence capabilities and synchronized DoD effects to combat adversary weapons of mass destruction worldwide. Enable decisive global kinetic and non-kinetic combat effects through the application and advocacy of integrated intelligence, surveillance and reconnaissance (ISR); space and global strike operations; information operations; integrated missile defense and robust command and control." United States Strategic Command, "United States Strategic Command," <http://www.stratcom.mil/>.

3. John R. Harvey, "Seeking a Responsive Nuclear Weapons Infrastructure and Stockpile Transformation," (paper presented to the National Academy of Sciences Symposium on Post Cold-War Nuclear Strategy: A Search for Technical and Common Ground, 11 August 2004), www7.nationalacademies.org/cisac/Harvey_Presentation.pdf

4. See Joan Johnson-Freese, "The New U.S. Space Policy: A Turn Toward militancy?" *Issues in Science & Technology*, no. 45 (Winter 2006) for further discussion on this point.

5. For more on the concept of the "security dilemma," see John Herz, "Idealist Internationalism and the Security Dilemma," *World Politics* 2, no. 2 (January 1950).

6. Hans M. Kristensen, Robert S. Norris, and Matthew G. McKinzie, *Chinese Nuclear Forces and U.S. Nuclear War Planning* (Washington, DC: The Federation of American Scientists and The Natural Resources Defense Council, 2006), 7.

7. See, for example, Gregory Kulacki and David Wright, "A Military Intelligence Failure? The Case of the Parasite Satellite," Union for Concerned Scientists, 16 August 2004, http://www.ucsusa.org/global_security/china/a-military-intelligence-failure-the-chinese-parasite-satellite.html.

8. Joseph Rotblat, "The Nuclear Threat is Real," (address to the 3rd Summit of Nobel Peace Laureates, 19–20 October 2002), <http://www.pugwash.org/reports/nw/nuclear-threat-rotblat.htm>.

9. For more on the problems of strategic nuclear warfighting, see, for example, Robert Jervis, *The Illogic of American Nuclear Strategy* (Ithaca, NY: Cornell University Press, 1984).

10. *China Security*, "Nuclear Challenges and China's Choices," Winter 2007, 55.

11. "America's misguided nuclear strategy," *International Herald Tribune*, 6 March 2006.

12. Wang Zhongchun, "Nuclear Challenges and China's Choices," *China Security* 3, no. 1, (2007), 60.

13. Zhongchun, "Nuclear Challenges and China's Choices," 61.

14. Zhongchun, "Nuclear Challenges and China's Choices," 61

15. Keir A. Lieber and Daryl G. Press, "The Rise of U.S. Nuclear Primacy," *Foreign Affairs* 82, no. 2 (March/April 2006), 43.

16. For the Chinese perspective, see Zhongchun, "Nuclear Challenges and China's Choices."

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