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The Weaponization of Space: Divided Viewpoints, Uncertain Directions

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by Barry Rosenberg

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Setting the Stage

In 2000, the United States of America was one of only three countries that abstained from approving the United Nations resolution entitled: "Prevention of An Arms Race in Outer Space." This very public declaration against any international curbs on its efforts to develop a ballistic missile defense shield or any number of weaponized systems that could be placed into orbit around earth was seen by much of the world as a further signal that the U.S. not only intended to continue its research into the militarization of space, but planned to accelerate and deploy such a system regardless of political repercussions or the technical limitations and cost of such systems.

The events of September 11th, followed by war in Afghanistan and Iraq, have slowed the administration of President George W. Bush in its efforts to develop space-based weapons, but the work is still very much at the forefront of the government's military policy and is expected to once again take precedence if the president is elected to serve a second term and if near-term conflicts are successfully resolved.

Reaction from the international community has been swift and not unexpected. China, in particular, has said it might be forced to respond to the American space weapons program by building additional ballistic missiles to counter the perceived threat, and could turn its nascent manned space program toward militarization. China's long-time foe, India, has said it would, in turn, respond to a Chinese space weaponization program with one of its own.

Despite the current administration's interest in space-based weapons, it is important to note that the weaponization of space is not necessarily a Republican plank alone. It may have received its biggest boost beginning with President Ronald Reagan and continuing with his successor, President George H. Bush, but it didn't completely disappear under the eight-year leadership of Democratic President Bill Clinton.

"We shouldn't put this at the Republicans' door," says Susan Eisenhower, chairman of the Washington, D.C.-based policy research center, the Eisenhower Institute. "There is enormous concern that our ability to wage warfare on the ground is directly proportional to the use of our assets in space. That fact remains whether you are a Democrat or Republican."

"There are many different viewpoints about the usefulness of putting weapons in space, and a divide between the use of legal measures such as treaties to regulate behavior and the development of deterrent capabilities," Eisenhower adds. "The division may be sixty-to-seventy percent along party lines, but it's not one hundred percent."

Eisenhower also points out that, "This is a subject to get out in front of because nothing substantial has happened yet. The cost of putting weapons in space is prohibitive relative to the net gain in security—besides the fact that the technical capability isn't there. Even defining what a space weapon is, is challenging."

In this context, it is important to consider that millions of people around the world have become dependent on space for all manner of communications as well as day-to-day activities and services—including television broadcasts, telephone signals, Internet connectivity, mobile messaging, navigation, and even credit card payments and access to ATM machines—so there is ample argument, on a worldwide basis, for that frontier to be used for the good of all. Another implication of the mixed use of space is that there

is a clear need for both a national and international conversation and plan of action about the future use of this arena, since it is clear that the weaponization of space is an issue that will not go away regardless of whether Democrats or Republicans control the White House or Congress. Questions abound: should the U.S., for example, go it alone and do whatever we want in terms of using, developing and weaponizing space? Or should the nation work toward international protocols that control or even ban space weapons outright? Will scientists and policymakers make these decisions for the American people, or should there be a national debate on these issues? And if so, what does the public need to know in order to begin an informed dialogue?

Another consideration to add to the conversation is the problem of space debris. Last year's tragic destruction of the space shuttle Columbia spread wreckage across many states. What would have happened if the shuttle had broken up before making its descent, thus releasing thousands of pieces of debris into orbit around the earth where they could threaten communications satellites, surveillance satellites, the International Space Station, the Hubble telescope and future space shuttle flights? How should the danger of space debris be dealt with, and what is its connection to the issue of weaponization of space?

All these factors point to the present being an opportune moment to promote analysis and dialogue about the ramifications of weapons in space and the effect that such systems might have on global peace and security, an issue that is of concern to Carnegie Corporation of New York, which has a long history of supporting efforts to ameliorate threats to international security. "One of the hallmarks of this foundation's work has been an emphasis, over many decades, on promoting international understanding, cooperation and tolerance," says Vartan Gregorian, president of Carnegie Corporation. "In that connection, we realize that it is imperative to use advanced technologies to promote links between nations, not to increase the divisions that already exist."

From the Cold War to the War on Terror

Since the launch of the Soviet Union's Sputnik satellite, the fear of one country controlling the "high ground of space" has been a real concern for many nations of the world. That possibility has been checked, however, by treaties, by the exorbitant cost of developing space-based weapons and launching them into orbit and by the technical hurdles that need to be overcome to make such systems work.

For the most part, the weaponization of space stayed on the back burner until the presidency of Ronald Reagan, who proposed a space-based weapons program—the Strategic Defense Initiative (SDI)—that came to be known as his "Star Wars" plan. Over the years, President Reagan's weaponization of space proposals have evolved from a multi-tiered nationwide missile defense umbrella, which he said would render nuclear weapons "impotent and obsolete," to a limited, two-site system under President Clinton, with an emphasis on research into "theater" defenses designed to deal with short-to-medium-range ballistic missiles from "rogue states."

The missile defense effort under President George W. Bush encompasses the strategy of defending against missiles from rogue states such as North Korea and Iran but revives the Reagan-era approach of land-, sea- and space-based defenses. In all, the U.S. government has spent approximately $70 billion on

Star Wars-type research since the Reagan presidency. And while space-based interceptors for missile defense may be the space weapons being planned first, the Pentagon is now considering a much broader array of space weapons outside of the missile defense program, including ground-based and space-based anti-satellite weapons and even space-based weapons to strike targets on earth.

Difficult Definitions, Dual Applications

The discussions around the issue of space-based weaponry are far from black and white, or right or wrong. Even defining the phrase "weaponization of space" is open to interpretation. There are differing opinions about exactly what constitutes a weapon in space. Much of the technology associated with the weaponization of space also has applications on the ground as well as in commercial observation and communications satellites. Although it may be stretching the point, some critics even suggest that President Bush's call for a manned mission to Mars is a way to fund dual-use technologies such as propulsion systems that have civil applications but could also become part of a space-based weapons system.

There are weapons that can be developed to operate in the medium of outer space in order to strike at other on-orbit assets such as communications satellites, or strike at countries or facilities or troops on the earth itself. Others are designed to be launched from the earth but strike satellites in orbit.

By definition, ground- and sea-based missile interceptors are not considered "space-based" weapons, because they are both launched from and land on the earth—even though some of those systems conduct their intercept with the target in space. The anti-missile system now being built by the U.S. in Alaska, for example, conducts the intercept in space at about 200 km, but is generally not included in the discussion of space-based weapons. Still, many are not sold on ground-based systems and consider them wasteful and destabilizing for many of the same reasons that space-based systems are expensive and politically troublesome.

The primary concern about the Bush missile defense program for critics of U.S. military plans in space is not the current ground-based effort but instead, the planned development of space-based interceptors. "Space-based interceptors are a problem because they break the taboo of putting shooting weapons in space," says Theresa Hitchens, vice president of the Center for Defense Information.

Proceeding with plans for space weapons is considered by many to be an action that can't help but upset delicate political and military balances that have existed for decades between the U.S. and countries like Russia and China, as well as have a potentially destabilizing effect on international relations between the U.S., its allies and its adversaries. Development of space-based weapons, which have the inherent offensive capability of knocking out a nation's surveillance satellites, makes it very difficult to convince space-faring nations—and not just past adversaries such as Russia, but also allies that include Japan and Israel as well as nations like China, with which the U.S. has had a problematic relationship—that America is interested in peace and cooperation. As a result, those countries could decide to keep their missiles on high alert, or build and stockpile additional weaponry to counter the American space-based missile shield, or design, test and launch their own space-based weapons.

New Life for the Weaponization of Space

There has been a rapid movement toward the weaponization of space under the Bush administration, regardless of technical feasibility and cost. The administration has given the U.S. Air Force and private military contractors a green light to pursue continued research and development with a near-term eye toward deployment.

"Given the inertia of the military, once those things are in motion it will be difficult to turn back," says Stephen Del Rosso, senior program officer in the International Peace and Security program of Carnegie Corporation. "The current situation is that if Congress doesn't wake up, billions of dollars could be squandered on systems that don't work and will create more problems."

Notwithstanding the claims of some officials and defense analysts, Hitchens adds, "Space weapons would be a negative for U.S. national security and international security."

Many believe that the Bush administration's primary justification for development of space-based weapons—to protect against ballistic missiles from rogue states or accidental launches from Russia and also to protect our own space assets such as Global Positioning System (GPS) satellites—is flawed, and would serve to make the nation less secure in the long run. No country is actively pursuing this technology except the U.S. Rather than protecting assets like GPS, many believe that the American push toward weaponization of space is likely to harm the very assets they wish to protect by sparking an arms race in space.

"Among Democrats, there is a broad concern about missile defense, whether it is space-based, ground-based or sea-based," says Jeffrey Lewis, graduate research fellow at the Center for International and Security Studies at Maryland [University]. "There are enough people who support missile defense against rogue states. But space-based systems are especially worrisome because you don't need to invest in a global system in order to shoot down missiles from North Korea."

Many believe that part of the problem with space-based missile defense systems is that the mandate for development of such systems exceeds the rogue-state argument, which goes like this: if the concern is that a rogue nation such as North Korea might launch one or two ballistic missiles at America, then a ground-based system such as the one now being built in Alaska should be sufficient to counter that threat. If that is the case, then why spend billions of dollars on a space-based system consisting of hundreds or thousands of interceptors that would cover the entire planet when you're only worried about defending against countries like North Korea and Iran?

Others, like Keith Payne, for example, the former Deputy Assistant U.S. Secretary of Defense for Forces and Policy, with responsibility for the nation's nuclear weapons policy (and who is perceived as an advocate for the proactive use of military force, including, if necessary, targeted nuclear strikes), believe otherwise. He argues that we don't know where the next threat will come from, hence a space-based missile shield is needed to counter the unknown threats of tomorrow.

"But that is certainly not the situation now," says Lewis. "This is an incredibly expensive endeavor."

From Security to the Destabilizing Effect of Anti-Satellite Weapons

The small leap from developing a space-based missile defense system designed to counter threats from ballistic missiles to one that can destroy surveillance and communications satellites in orbit around the planet may be deceptively small, an argument made by many critics of such systems. Interceptors being developed as weapons against ballistic missiles could also be easily rejiggered to target satellites. In fact, anti-satellite weapons might be even more destabilizing then anti-missile systems because simple anti-satellite systems require less sophisticated technologies—meaning they can be developed faster and cheaper—and would cause considerable consternation for the nations with vulnerable on-orbit assets.

"Ballistic missile defenses will have a latent capability against satellites once they are built," says Michael O'Hanlon of the Brookings Institution. "You can make a distinction between shooting down a missile and a satellite, but once you can do the first thing it is not hard to do the second thing. In essence, we are developing anti-satellite weapons without calling them that."

War games have shown that the introduction of space-based anti-satellite weapons contributes to what is called "crisis instability," which means that the use of such weapons tends to propel the crisis to greater danger. Destroying a nation's surveillance and communications satellites is equivalent to taking out its eyes and ears, and would likely lead to a desperate military response by the nation "in the dark."

"A nation without its eyes and ears would have to assume the worst, and could resort to the use of nuclear weapons," says Hitchens. "Anti-satellite weapons are proactive weapons, and people will respond [at the very least] by developing asymmetric systems such as computer hacking and terror attacks."

The eyes-and-ears argument is graphically illustrated when examining how greatly the U.S. military relies on satellite-guided missiles for conventional warfare. For the most part, such weapons use the orbiting Global Positioning System for guidance and targeting.

Thirteen years ago, during the Persian Gulf war in 1991, not a single weapon used by the U.S. military was satellite guided, according to a study published in the *Joint Forces Quarterly*. The percentage of GPS-guided weapons versus unguided or laser guided rose to only three percent in 1999 during the military intervention in the former Yugoslavia. Less then three years later, however, after 9/11, the number of GPS-guided weapons used by the U.S. military in Afghanistan had risen to nearly one-third (32 percent). By the time of the Iraq war in 2003, the percentage of satellite-guided weapons used by the U.S. military had doubled—to 68 percent.

Given that kind of dependence on satellite technology, it is not difficult to imagine how the U.S. would react if the GPS satellites that control its weaponry were blinded or destroyed. Many observers say that such an action would almost certainly force the U.S.—or any nation in such a predicament—to respond with the full might of its military.

"Other countries will want to use satellites for targeting objects on the ground and for passing that information along to weapons on the ground," says O'Hanlon. "And it is not just the U.S. and Russia with that capability. It is expected that countries like China will want to do that as well. However," he continues, "we won't be comfortable letting those

satellites go on functioning in a conflict. If we're not confident our jamming would be successful then there would be a strong inclination to shoot them down."

Project such a scenario out by 20 years, when the number of countries with orbiting satellites will be significantly larger, and the quantity of satellites in orbit will be much greater. Now throw into the mix one or more countries with anti-satellite capabilities, and it is easy to see how a military conflict can turn into a tragic conflagration.

Nations like China are particularly concerned with U.S. aspirations toward space weaponry and they see the potential weaponization of space as a way for America to dominate the arena and capture its benefit for itself. China's drive to place an astronaut in space, which it accomplished in 2003, has been stoked, in no small part, by U.S. dominance of space.

The Chinese have shown the technical capability to match that of the Western powers when it comes to mastery of space flight, and if the U.S. places anti-satellite weapons in space then many believe it is likely the Chinese will at least attempt to follow suit. If that were to occur, and China did place weapons in space, then India has said it would follow suit, leading down a dangerous path that could easily result in a new arms race.

"The U.S. military is utterly dependent on low-earth orbit for command and control of war," says Susan Eisenhower. "There is a legitimate concern that command and control for conventional warfare is vulnerable. Our ability to wage conventional warfare is threatened by the fact that critical assets in the command and control structure are in space. And we are not the only country with valuable assets there."

Says Dean Wilkening, director of the Science Program at Stanford University's Center for International Security and Cooperation, "Basing weapons in space is something we won't see anytime soon. But we should be quite concerned about terrestrial assets that could interfere with or attack resources in space."

One such system is the airborne laser, which is now being built by Boeing. The high-energy laser is carried aboard a modified Boeing 747-400F cargo plane, and would be capable of locating, tracking and shooting down missiles in the boost phase of their flight. Most agree that it would not be a stretch for such a system to be used to shoot down satellites in low-earth orbit.

"There are serious problems with anti-satellite weaponry," says Wilkening. "How do we ensure the security and viability of military and commercial space-based assets? To start an arms race in space sounds like an extremely expensive waste of money, and maybe the U.S. ends up a loser because we are more dependent on these assets than some others."

Space Debris and International Cooperation

The area of orbit around the earth is already a crowded resource that needs to be managed, which means close cooperation among the space-faring nations. And to the extent that such cooperation requires leadership, nations wishing to take on such a role must face the expectations of many that they act as caretakers of a shared resource that should be available for the benefit of all nations. In that respect, say critics, developing space-based weapons while the rest of the world decries such work tarnishes the moral authority of the United States.

Notes Jeffrey Lewis, "In an orbital environment that requires collaboration to manage, attempting to weaponize space without regard for other overarching principles relating to the use and development of space as a resource will make it difficult for the U.S. to obtain the cooperation of other nations."

One area where cooperation seems both reasonable and vital involves the control and tracking of space debris—everything from paint chips to hand tools orbiting the earth at thousands of miles per hour and posing an ongoing hazard. Presently, space-faring nations don't have effective enough systems to track and avoid collisions with orbiting debris and there is no political framework in place to allow cooperation on such efforts.

In April 2004, the Center for Defense Information, Pugwash Conferences on Science and World Affairs and the Monterey Institute of International Studies Center for Nonproliferation Studies convened a conference supported by Carnegie Corporation that addressed this issue, among others. The goal of the conference was to identify aspects of space security and management where the U.S. and other nations could work together toward a common goal.

"You can't run before you walk," says Theresa Hitchens. "The U.S. has not wanted to talk about a space weapons ban, let alone develop a treaty. People have been talking past each other. Space is a global place, and is also used by research and commercial interests. It would be a mistake at this point to fixate on the goal of a space treaty, so you take other steps instead. The point is to get people together who don't normally get together in order to begin laying a foundation."

Adds Susan Eisenhower, "The bigger issue for space security is looking at ways to create a sustainable international system for operation in space. We've got to find a way to create an international system that will recognize security for everybody."

"For the value of assets in orbit," she continues, "space is a strikingly unregulated environment. There are huge commercial investments in space operating right along with military assets that have different objectives. There are a lot of things we can do to engage the international community to develop some rules for the road."

The Discussion Continues

The Bush administration has been preoccupied with the wars in Afghanistan and Iraq, and, as a result, has not devoted the same amount of time to the pursuit of the weaponization of space that it did upon taking office. As a result, some programs that seemed formerly to be a priority have been downgraded in importance. The status of the Pentagon's space-based laser systems, for example, was revised downward by the administration from an acquisition program to a research-and-development program extending out to the year 2020.

Still, to many observers, continued interest in the development of space-based weapons reinforces America's go-it-alone attitude, even if Secretary of Defense Donald Rumsfeld isn't talking about weaponization of space with the same urgency as he did before September 11th. However, it is unlikely that the present state of affairs—where the Bush administration has put space-based weapons on the back burner—will last for much longer. Indeed, in its 176-page report, *Transformation Flight Plan*, released in late 2003—and which highlights the use of space throughout—the U.S. Air Force, says Theresa Hitchens, "makes it clear that the time for that debate to begin was yesterday."

Pressure from the Pentagon will no doubt continue. "The technology is such that it is very hard to verify that other countries aren't developing small space weapons like microsatellites," says Michael O'Hanlon of Brookings. "That ongoing uncertainty will increase the Pentagon's desire to have such systems as well."

To policy observers, what is most troubling is the fact that there have been few real give-and-take discussions involving the pros and cons of space weaponization—either in Congress, the general media or among the public at large.

"The U.S. military is proceeding apace down a path toward space weaponization in what is essentially a public policy vacuum," says Hitchens. "There has been little debate among policy and lawmakers about the enormous strategic implications of a world with space weapons, and a unilateral U.S. move to become the first to acquire them. While many would argue that space weapons could give the United States an undeniable near-term edge in a military conflict, many others would argue that space weapons pose far too many risks and costs to be worth what would likely be only a temporary benefit."

Under the United Nations Outer Space Treaty of 1967, space itself belongs to no one country. It is an

The Argument for the Weaponization of Space

- Because we don't know where the next threat will come from—North Korea, Iran, an accidental launch from Russia or somewhere else—a space-based missile shield is needed in order to counter the unknown threats of tomorrow.

- Rogue states pose only a modest threat to the U.S., so only a more affordable, limited, space-based defense shield is necessary, as opposed to a much costlier shield that would be needed if the goal was to protect against a non-accidental nuclear attack from Russia, for example.

- Recent conflicts have shown that deterrence policies are not enough to keep certain nations from pursuing hostile actions against the West. As a result, the U.S. cannot rely on deterrence and must develop a defense.

- Defense contractors building anti-missile technology experienced early failures in the testing of those systems, but many of those failures have been reversed, and successful "kills" during testing have now been demonstrated.

- It has been nearly two years since the U.S. withdrew from the 1972 ABM Treaty, which prohibited the development of an anti-missile system. Detractors of that policy move said Russia would react harshly to such actions. Russian President Vladimir Putin did not react negatively, and U.S./Russian relations remain good.

- Leading by example—in other words, if the U.S. doesn't develop space weapons then neither will our adversaries—is flawed thinking. Countries or groups wishing to do America harm will do so regardless of U.S. policy related to the weaponization of space.

area where economic, environmental and military uses must coexist and where globalization is a worthy goal. At this moment in time, where areas of potential danger and conflict seem so clear, the opportunity to solve problems before they become unsolvable and their consequences unstoppable, seems one that the United States, along with its allies and even those who would otherwise see themselves as foes, should be willing to seize. Certainly, it is an opportunity that global leaders, with an eye to the future, have an obligation to address.

The Argument Against the Weaponization of Space

■ Continued research, development and eventual deployment of space-based weapons could lead to an arms race in the orbital environment around earth, much as research, development and deployment of land-based nuclear weapons led to a decades-long arms race. The nuclear powers of China and India have said they might have no choice but to develop anti-satellite weapons should the U.S. do so.

■ No nation on earth is as dependent on space-based assets such as surveillance and communications satellites as is America—in both the commercial and military arena. As a result, the U.S. has a great deal to lose should those on-orbit assets become targets in a future arms race in space.

■ Like ground-based nuclear weapons, space-based weapons are first-strike "use-them-or-lose-them" assets. The inclination would be to use such weapons if they were threatened, which could escalate small conflicts into larger, more serious ones possibly involving the use of nuclear weapons.

■ The war in Iraq has created a political chasm between the U.S. and its allies. Most nations are on record as opposing development and deployment of space-based weapons. A unilateral movement on the part of the U.S. to weaponize space in the face of worldwide opposition will serve to isolate America to an even greater extent.

■ America engages in few more costly and technically challenging endeavors than development of new weapons systems. Even Pentagon analysts acknowledge that development and introduction of space-based weapons will cost billions of dollars, present extremely difficult technical challenges and take years to accomplish. And after spending the money to develop the weaponry, there is no guarantee it will be technically sound or effective.

■ Damage from debris in space is already a major concern for the space shuttle, low-earth orbit satellites, and the International Space Station. Testing of space weapons and their potential use against enemy satellites—possibly resulting in the creation of a huge quantity of debris orbiting the earth—could irreparably damage on-orbit assets owned by the U.S. and all other space-faring nations, and possibly have a long-term effect on the ability of those assets to provide important surveillance and communications capabilities.

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