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**Weapons in Space: The Urgent Need For Arms Control -
Three Reasons Why We Can't Wait
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Introduction

New developments with various space weapons systems are moving them to the front burner of United States military procurement. With the United States pursuing a national defense strategy which asserts a priority for preemptive strikes, concern for space weapons must be a higher priority for arms control than before. Within the decade the United States could have space attack weapons capable of being launched from platforms in space or from the land, sea or air. The first of such space weapons is likely to come from missile defense, including space-based interceptors which could be used for offense as well as defense once they are deployed in space. Also, the Rumsfeld Defense Department has adopted a new procurement philosophy called *capability-based acquisition*. It means just the opposite of what one might think. It means deploying systems with little or no demonstrated capability so as to speed the pace of deployments. An advantage of this approach from the DOD point of view is that you don't need a real threat to justify deployment; you can deploy something just to deploy it, even if it doesn't work very well.

This new approach is being applied to missile defense in the President's decision to deploy by the end of fiscal 2004, near Fort Greely in Alaska and at Vandenberg, AFB, in California, the Ground-based Midcourse Defense system (GMD), formerly known as National Missile Defense (NMD).¹ This new procurement approach is also being applied to missile defense in space, and to space weapons with attack capabilities as well. The Bush Administration is now labeling both its ground and space-based initiatives as "an initial defensive capability", while also calling these deployments "test beds".² This confuses policy makers and allows the Administration to have it both ways, calling these systems "deployments" when that suits their needs and calling them "test beds" when a less aggressive posture is useful. Regardless, the intention of the Administration to deploy weapons with attack capability in space is clear.

U.S. military space funding

Two years ago, Secretary of Defense Donald Rumsfeld designated the U.S. Air Force as the lead agency for overall Department of Defense space operations and development. The DOD space budget has increased from \$14.3 billion in Fiscal Year 2001 to the Bush Administration's request for \$20.4 billion in Fiscal Year 2004, and is planned to climb to \$28.6 billion in 2008. ³ So far, spending for space weapons with anti-satellite attack (ASAT) capabilities is still relatively small, in the millions, not billions, but at the rate the United States is increasing its military investments in space, the funding for space weapons could soon be in the billions also.

The Fiscal Year 2004 budget request includes about \$8.5 billion for unclassified space programs, an increase of \$600 million over 2003. ⁴ Thus, over half of the U.S. defense space budget is classified, and difficult for the U.S. Congress, non-governmental organizations, or international bodies to oversee or monitor.

New developments in space weapons

The DOD Missile Defense Agency has put forward an aggressive program for boost-phase missile defense. Spending on space-based boost-phase activities is slated to increase from \$177 million in Fiscal Year 2004 to \$501 million in 2007. ⁵ Overall spending for missile defenses of all types is now about \$10 billion.

Last December, the Missile Defense Agency (MDA) announced plans for a new kinetic energy interceptor for boost-phase missile defense. At the same event, the MDA also announced that it planned to begin work on a space-based interceptor "test bed" beginning in 2004. ⁶ This announcement showed the nexus between missile defense and space-based weapons, by connecting the new kinetic energy interceptor for missile defense with space-based interceptor testing. ⁷ The announcement followed by just a week the announcement that the MDA would be expanding its deployment near Fort Greely, Alaska, of a Ground-based Midcourse Defense system. The nexus between missile defense and space weapons also can be seen in the substantial - and common - defense industrial base being employed on both programs. ⁸

And last summer, the Army Space and Missile Defense Command began a program to develop small space-based interceptors that could be carried aboard satellite launch platforms in space. ⁹ Such miniature kill vehicles on satellite launchers could be fired against incoming enemy ballistic missiles or could attack satellites or other space-based targets by crashing into them at very high speeds. At speeds of thousands of miles per hour, the kinetic energy of the impact is as if an explosive bomb had attacked and hit the target.

The U.S. Army also has an anti-satellite (ASAT) program, called Kinetic-Energy ASAT. This program is to develop ground-based interceptors that could be launched atop existing Minuteman ICBMs or other missiles to attack satellites in space. As described by the publication *Inside Missile Defense*, "KE-ASAT is an interceptor system designed to destroy, using hit-to-kill technology, or temporarily disable hostile satellites."

The fact that there are no "hostile satellites" and no real threat of them seems not to matter. While the KE-ASAT program is building satellite attack weapons that are to be launched from the ground, in conjunction with the Army's program to also develop space-based interceptors, the Army's preparations for war in space are undeniable.

In addition to space warfare funding in the Fiscal Year 2004 budgets of the Missile Defense Agency and the U.S. Army, the U.S. Air Force received support for generic funding for research and development of Space Control Technology (\$14.7 million) and Counterspace (\$82.6 million).¹⁰ Concepts for total space control, and space dominance, range from relatively "simple" concepts involving low-cost space vehicles to exotic ideas such as controlling the weather on the battlefield. According to one report, "Air Force space thinkers are studying ways to 'harness the immense powers of the environment' for military purposes. Putting a yoke on lightning, wind and rain to turning tornadoes on a dime can keep in check, slow down, and even halt an enemy's operations on the battlefield." ¹¹

Other space weapons under development include the Space-based Laser, the Space-based Radar, a Common Aerodynamic Vehicle that could be launched into space from a ballistic missile or an aircraft, and a variety of Directed Energy Technologies, such as high power lasers and high power microwave devices that could have applications either on land, sea, aboard aircraft, or in space.

None of these space warfare programs are adequately explained in the Administration's budget request documents, and many are scarcely mentioned. Other space weapons programs are highly classified. This can create the impression that there are no space weapons to worry about yet, or that they are so far off as to not be urgent from an arms control point of view.

Space weapons and missile defense

Near-term US missile defense is focused on both theater and U.S. homeland missile defense systems. The theater systems include surface-based (land and sea) missile defenses such as the Army's Patriot PAC-3 and THAAD programs, and the Navy's Theater Wide, all of which use kinetic-kill technology. U.S. homeland systems include surface-based (again land and sea) national missile defenses. However, the Administration has declared the goal of being able to shoot down missiles of all ranges - short, medium and long, in all phases of their flight - boost, midcourse and terminal, and to do this from land, from sea, from air, and from space. The Administration prefers not to use the distinctions between theater and "national" homeland defense systems, noting, as Secretary Rumsfeld has put it, that "what's 'national' depends on where you live".

Each of these missile defense systems will rely on both Ground-based and Space-based sensors. The US is also focused, longer term, on air-based boost-phase (kinetic kill, and further out laser) missile defense capability.

None of these missile defense programs are primarily ASAT although some will have ASAT capability from the outset. The prime ASAT technology is that which would base interceptors in low earth orbit in space, such as the so-called Brilliant Pebbles program.

A complicating aspect of the debate about the weaponization of space is the dedication of the current Bush II administration to deploy space-based missile defense systems capable of intercepting or shooting down Intercontinental Range Ballistic Missiles. Land- and sea-based systems capable of such intercepts would almost automatically be capable of also intercepting satellites in low earth orbit. And of course a space-based laser or space-based kinetic kill vehicle system would have such capability as well. The Brilliant Pebbles concept, first articulated clearly and funded in the Bush I administration, also could be used either for missile defense or as an attack system to kill satellites in orbit. This system could consist of some 1500 small satellites in low-earth orbit, with thrusters on each small satellite designed to direct it upon command toward a military target. Scientists at Lawrence Livermore National Laboratory and at Los Alamos have estimated recently that the Brilliant Pebbles system could be fielded in 3 to 5 years for a cost of \$5 to 7 billion. ¹²

While originally intended as defenses against enemy ICBMs, Brilliant Pebbles, the Space-based Kinetic Kill system or the Space-Based laser, if deployed, would be the first step toward an arms race in space.

Shooting down a satellite in low-earth orbit is easier than shooting down an ICBM in mid-course that may be equipped with various decoys and counter-measures. In the case of an attacking ICBM, the defender may not know the exact trajectory or the nature of countermeasures used. In the case of orbiting satellites, they are essentially sitting ducks whose orbit paths are known precisely and predictably. By design, missile defense systems are "shooters", and some will have an inherent capability to attack space assets as well as defend against enemy missiles.

Missile defenses whether ground, sea, aircraft or space based, will also involve communications and reconnaissance assets in space. These capabilities will also be able to be shifted to offensive purposes. Currently the United States relies on its Defense Support Program (DSP) satellites for warning of missile launches and for tracking. The Space-Based infrared satellites (SBIRS) will replace DSP while adding new capabilities to discriminate and characterize enemy ICBM targets in flight. Having fallen behind schedule and gone way over budget, the SBIRS program has been renamed the Space Tracking and Surveillance System (STSS). In any case STSS (SBIRS) will be an important part of missile defense, especially National Missile Defense. These satellites will comprise a surveillance and tracking system, not an offensive strike weapon, but they easily could become part of a larger overall network of military space assets used more broadly than for missile defense per se. Missile defenses in general will be developing and will rely on a substantial infrastructure in space, and arguably this infrastructure would increase the likelihood of an arms race in space.

Capability-based acquisition and space weapons

Last December, when President George W. Bush announced his breathtaking decision to deploy a national missile defense by 2004, Defense Secretary Donald Rumsfeld explained that at first those defenses wouldn't be very good. The capability would not be defined by the classic military phrase "Interim Operational Capability", namely something new with proven warfighting worth, but rather capability, as Rumsfeld put it, "with a small 'c'". Nevertheless, he said, even at first this new missile defense would be "better than nothing". [13](#)

The President's decision to deploy missile defenses is a remarkable example of a new procurement philosophy at the Pentagon called "Capability-based acquisition." It means just the opposite of what one might think. For that reason, one news reporter joked that it ought to be called "Acquisition-based capability." Some have called it "Slogan-based acquisition".

Also, the Chairman of the Joint Chiefs of Staff has circulated a new draft Instruction on the Joint Capabilities Integration and Development System. It officially eliminates military *requirements* and replaces them with "*capabilities*", and talks about "crafting capabilities within the art of the possible", "full-spectrum interoperability", "Born Joint", and - sadly - phases out Mission Needs Statements and Operational Requirements Documents.

In addition to speaking of *capability-based acquisition*, you also will hear U.S. defense officials speak in terms of *spiral development* or *evolutionary acquisition*. The terms are used more or less interchangeably, and except for the fact that they all describe an interactive approach for building capability, no one in the Pentagon seems to know what they really mean or how to implement them in practice.

The spiral development model originates with Professor Barry Boehm, director of the University of Southern California Center for Software Engineering. In his concept and teaching, spiral development includes rigorous testing - software testing - as an important and regular occurrence in each and every loop of the spiral. Unfortunately in the DOD, spiral development is seen as a way to avoid testing and cut corners, with successive loops of the spiral containing little or no testing.

The traditional DOD approach - sometimes called "fly before buy" - is to wait to procure a new military system until it has successfully demonstrated that it can work in realistic operational tests designed to simulate real-world conditions. For major defense acquisition systems, the law requires that full rate production cannot begin until the system has been through realistic operational testing and the results reported to the Secretary of Defense and the U.S. Congress. In practice, if the added military utility turns out to be only marginal, such systems are usually cancelled.

But major military development programs can take decades, and in an attempt to speed the process, "capability-based acquisition" was conceived. The idea is to get new capability to the warfighter faster, and to build that capability gradually in steps over time. The Military Departments have used this approach successfully for many years in developing significant upgrades to existing systems in successive blocks or models. However, these block upgrades themselves also can take a decade or more, and so capability-based acquisition aims to further streamline the process by shortening development times still further, and by accepting marginal

improvements in military value that might not have been considered worthy of funding in the past.

However, as the President's missile defense decision shows, "capability-based acquisition" can mean buying new equipment which has not been through realistic operational testing, and with little or no demonstrated military utility. Neither the Ground-based Midcourse Defense system to be deployed near Fort Greely in Alaska and at Vandenberg, AFB, in California, nor its sea-based X-band radar, to be deployed on Navy platforms, has gotten far in its developmental testing, and neither has begun, let alone completed, more stressing and realistic operational tests.

In fact, the "capabilities based" approach is a clever way to avoid test failures that might slow down or interfere with a program, assuming Congress acquiesces, which so far it has. Additionally, the "capabilities-based" approach avoids the embarrassment of having to name putative "enemies", such as Russia, China or various rogues, present or future, in public before Congress and the international community. This, of course, is contrary to the traditional U.S. national security focus on real threats - both the capabilities and intent - of supposed U.S. adversaries.

The President's decision on missile defense shows that "capability-based acquisition" can mean buying systems whose arms control and proliferation implications have not been thought through, either. The significance of the "North Korea Centric" GMD system and what it might do to provoke North Korea, or particularly China, to further build their nuclear capability is not acknowledged, let alone addressed by the Administration. As planned, the GMD system is focused toward North Korea. And yet as presently designed and demonstrated, the GMD system would have questionable effectiveness even if North Korea had the capability to launch ICBMs at the United States (which it currently does not) and even if North Korea announced in advance the exact moment of its attack. Nevertheless, the system is being developed and deployed as if there were no international consequences whether it worked or didn't.

The declared goal of the Bush Administration is to deploy (a) a ground-based national missile defense "test bed" in Alaska and California by 2004, with a sea-based component - an X-band radar on a platform- by 2005, and (b) a space-based "test bed" of three to five orbiting satellites armed with kinetic -kill interceptors in the period 2008 to 2014. Even with a "capabilities-based" procurement approach, these early dates are likely to slip for technical reasons. Further, Congress may not support them or may severely condition them, particularly the latter. For example, last May the House Committee on Armed Services "reestablished a bipartisan consensus on 'fly before you buy'", requiring the Department of Defense to conduct realistic operational testing of the Ground-based Midcourse Defense system. However, this requirement does not take effect until after the first 20 ground-based and first 20 sea-based interceptors have been deployed. [14](#)

Also in May, during deliberations in the U.S. Senate on the Defense Authorization Bill, Senator Jeff Bingaman (D, New Mexico) proposed an amendment that would have required specific authorization from Congress before the Missile Defense Agency could design, develop, or deploy hit-to-kill interceptors or other weapons for placement in space. However, Senate Armed Services Committee Chairman John Warner (R, Virginia) developed a compromise that allowed

the program to proceed using \$14 million out of the total amount authorized to be appropriated for ballistic missile defense system interceptors overall.

Accordingly, the international community should understand that while the target dates for deployment may be ambitious goals for the U.S. Executive, compromises in the U.S. Congress may have little effect on early deployment, once the Executive branch decides to deploy.

International issues and opportunities

The ABM Treaty provided very real arms control restraints on ASAT programs through the prohibitions on the development and testing of ABM components (sensors and interceptors) that were sea-, air-, or space based. These constraints ended in June 2002, and it is utterly unrealistic to believe (or hope) that any outer space arms control regimes that the US will accept in the foreseeable future will limit them, with one type of exception. Missile defense constraints will have to be handled on their own merits, separately, with the exception being (i) testing or deploying space-based interceptors, (ii) testing against orbiting satellites and (iii) testing satellites on targets below (i.e., on the ground or sea, or in the air). This area of exception should become the focus of the international community in dealing with the weaponization of space. It will surely be an area of intense review by Congress.

The Bush administration has announced that the Outer Space Treaty (OST) suffices for its needs. A prime reason is that the OST does not prohibit anything that the US is pursuing. Nuclear weapons orbiting in space are not part of its agenda, even long term. The Bush administration has been silent on the continuing treaty constraints on the US in the bilateral START I, and multilateral CFE which now has thirty parties, against interfering with national and international means of verification. NTM is understood to include, but is not limited to, reconnaissance satellites in orbit.

Given the 2004 and particularly 2008-2014 "test bed" target dates of the Bush administration, leadership by governments and NGOs alike is needed. The international community can make progress by beginning to formulate measures to prevent the weaponization of space. This means additional forums to the CD, which the US is likely to continue to veto for space negotiations during the Bush years. It could include Track II sessions as well as intergovernmental forums outside Geneva. ¹⁵ It also means practical early steps that could be taken with the hope that the US might join (e.g., space debris mitigation) or not block (such as a UN resolution on non-interference on non-weapon satellites), as well as preparatory work that could not be implemented as long as the Bush policies prevail in Washington, (such as limits on permissible military assets in space, and allocations of space among various space users). It would be useful for all to understand that the best is the enemy of the good, and that step-by-step approaches are likely to be most successful, even over the longer term.

Such steps could include: (1) states parties to the OST, now about 100, seeking universal adherence by all states by the end of the decade; (2) cooperative efforts on debris management and other confidence building measures being accelerated and publicized; (3) the United Nations General Assembly (UNGA) adopting a resolution on non-interference with peaceful satellites in

orbit, which would neither be legally binding nor define key terms such as "peaceful" but would be understood to include all types of current satellites; (4) the UNGA in a subsequent session adopting a non-binding resolution banning tests against satellites in orbit; (5) states parties to the OST convening a review and amendment conference, separate from the CD, to adopt a formal interpretation, an amendment or a protocol, prohibiting the orbiting in space of any weapons, not just those armed with weapons of mass destruction (WMD); and (6) non-governmental organizations (NGOs) convening Track II conferences, including governmental representatives, to explore in detail comprehensive approaches to space security, including verification measures, a process to keep a multilateral convention up-to-date with technical and other changes, and an effective compliance mechanism, all as prelude to a comprehensive, legally binding agreement.

Conclusion

Weaponization of space is not now a major public concern. Other matters - such as the war in Iraq and the role of the UN, ongoing developments involving North Korea, and particularly the Israeli-Palestinian situation - appear more critical and time urgent. In addition, there appears to be an understanding, in reality a misunderstanding, that the potential weaponization of space is decades away. To the contrary, new funding for space weapons and for missile defense in the United States, along with a new military procurement approach, called *capability-based acquisition*, is creating an urgent need for an arms control regime for attack weapons in space.

1. New Space Weapons Systems are being developed in the United States and funded by Congress. It is true that funding of space weapons is at present limited, but this could change quickly if there were another terrorist attack similar to 9/11, just as 9/11 itself was seen by advocates of missile defense as a reason to boost missile defense funding. Congressional support for orbiting space weapons is as yet untested, and could be slowed by those members of Congress supportive of NASA and the international space station, and particularly increasing concerns with the rising budget deficits. Conversely, political change could accelerate increased funding for space weapons. Arms control enthusiasts may wish and hope that Democrats in the House, Senate or even White House in 2004 may slow or even block some missile defense programs and space weaponization. However, it is plausible, even more likely, that President Bush will be re-elected with greater Republican support in Congress. If that were to happen, the 2008 early goal of the Bush administration for a rudimentary "test bed" in orbit with three or so satellites armed with kinetic-kill interceptors would be seen in an entirely different light.

2. Missile Defense is the First Wave in which the US would introduce Weapons with Attack Capabilities into Space. Kinetic-kill interceptors are now the favorite mode of interceptors of those supportive of missile defense in the US, and are to be used in near-term as well as proposed for longer-term programs. Space-based kinetic-kill interceptors such as Brilliant Pebbles, championed by those who served in the first Bush Administration and are now in the current Bush administration, are justified as providing world-wide capability of "boost phase" intercepts of intercontinental ballistic missiles targeted on the US. It would be a modest step, indeed, to test an orbiting anti-missile "test bed" system against actual satellites in space.

3. Capability-Based Procurement will Shorten the Time Lines for "Test Bed" and Deployed Weapons in Space. Since the founding of the American Republic in 1789, Presidents and Congress have struggled over their roles in national security. During the past century the role of the President has steadily strengthened. The ultimate Congressional strength remains its annual power over the purse, but strong Presidents frequently prevail even here. A current example of the tension is the DOD's "capabilities based" procurement philosophy, arguably an appropriate approach in time of war. The Bush administration rests its case for such an approach now on the claim that the US is and will remain for years at war with terrorism and, accordingly, extraordinary measures are required. If Congress acquiesces, an issue not yet squarely faced, then attack weapons with unproven capabilities will be in orbit sooner rather than later. Once there, it will be more difficult to argue from an arms control perspective that the US should not improve this type of technology.

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