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WEAPONIZING SPACE: IS CURRENT U.S. POLICY PROTECTING OUR NATIONAL SECURITY?

HEARING

BEFORE THE

SUBCOMMITTEE ON NATIONAL SECURITY AND FOREIGN AFFAIRS

OF THE

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

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WEAPONIZING SPACE: IS CURRENT U.S. POLICY PROTECTING OUR NATIONAL SECURITY?

WEDNESDAY, MAY 23, 2007

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON NATIONAL SECURITY AND FOREIGN AFFAIRS,
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM,
Washington, DC.

The subcommittee met, pursuant to notice, at 2:05 p.m. in room 2154, Rayburn House Office Building, Hon. John Tierney (chairman of the subcommittee) presiding.

Present: Representatives Tierney, McCollum, Platts, and Foxx.

Staff present: Leneal Scott, information systems manager; Dave Turk, staff director; Andrew Su and Andy Wright, professional staff members; Davis Hake, clerk; A. Brooke Bennett, minority counsel; Christopher Bright, minority professional staff member; Nick Palarino, minority senior investigator and policy advisor; and Benjamin Chance, minority clerk.

Mr. TIERNEY. Good afternoon, everybody. Thank you for joining us here today. I am pleased that our witnesses are able to make it here today.

I want to briefly take care of some business, if I might, before we get started.

A quorum is present for the subcommittee hearing on Weaponizing Space: Is the Current U.S. Policy Protecting our National Security? The hearing will come to order.

I ask unanimous consent that only the chairman and ranking minority member of the subcommittee make an opening statement, provided that the ranking minority member can delegate that to another Member. Without objection, so ordered.

I ask unanimous consent that the hearing record be kept open for 5 business days so that all members of the subcommittee may be allowed to submit a written statement for the record. Without objection, so ordered.

I ask unanimous consent that the following written statements and materials be placed into the hearing record: a statement by Mr. David McGlade, the CEO of Intelsat General Corp.; a written statement from Iridium Satellite LLC; a written statement from Dr. Jeffrey Lewis of the New America Foundation; a written statement from Dr. James Clay Moltz, the deputy director of the Center for Nonproliferation Studies at the Monterrey Institute for International Studies; and two articles from Space News International

and two articles from Defense News authored by Dr. Michael Krepon from the Henry L. Stimson Center.

Without objection, so ordered.

[The information referred to follows:]

DefenseNews
October 16, 2006 www.defensenews.com

Space Responsibility

by **Michael Krepon**, co-founder, and **Michael Katz-Hyman**, a research associate at the Henry L. Stimson Center, Washington

While NASA Administrator Michael Griffin was in China to discuss space cooperation, a story appeared in Defense News that China had illuminated a US reconnaissance satellite with a ground-based laser on at least one occasion. Reporters from Space News subsequently confirmed this report from no less a source than Donald Kerr, the Director of the US National Reconnaissance Office. Shortly thereafter, the Bush administration finally released an unclassified version of the US National Space Policy, which had been in the works for over two years. The Bush policy reaffirms the Pentagon's option to "respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to US national interests."

Connecting these dots leads us to the most important space policy question facing this and future US administrations: What do we do about satellites that are absolutely essential and extraordinarily vulnerable? The Bush administration's answer is to maximize freedom of action to, from, and through space, while opposing the development of new legal regimes or arms control initiatives broadly defined that might impair US efforts to "control" space.

What makes the Bush administration's space policy different from those before it is the starkness of the choices it poses for space security. The new policy confines diplomacy to generating international support for the steps that Bush & Co. wish to take. This is a rather narrow pursuit, and one that the State Department has difficulty executing when US initiatives are deemed unwise by others.

To be sure, diplomacy can be a very weak reed in advancing US national security interests, whether in space, or on the ground. Alternatively, the use of force can also lead to very uncertain results that greatly penalize US men and women in uniform. Consequently, administrations usually shy away from stark choices between diplomatic instruments and the use of force. By framing this aspect of space policy as an either/or proposition, the Bush administration increases the likelihood that its preference will not enjoy a domestic consensus, and will therefore not be an enduring one. Stark dichotomies work well for wordsmiths, but they usually get policy makers into trouble.

It takes great hubris to believe that space, like some hostile environments here on Earth, can be controlled by military dominance. Asymmetrical space warfare is a game that a growing number of countries can play. The characteristics of sensors that make satellites so valuable also make them vulnerable to some forms of interference. Satellites, are typically sophisticated and expensive. Threats to satellites can be crude and inexpensive. A bag of marbles that costs two dollars, properly inserted into space, can wreck a satellite that costs hundreds of millions of dollars – or more.

The more we learn about space and the more we benefit from space, the more our options for space warfare are constrained. Early anti-satellite warfare techniques employed nuclear explosions. In 1962, the Kennedy administration discovered, as a result of the STARFISH test series, that atmospheric tests could create indiscriminate havoc to satellites in low earth orbit. In the 1970s and 1980s, kinetic kill ASATs were the instruments of choice. Now our sensitivity to the space debris problem, and the growing threat it poses to space operations, clarifies how unwise this choice is. Currently, the preferred techniques of what the Air Force euphemistically calls "counter-space" operations do not cause debris. But there are no guarantees that our foes will fight by our rules in space. The dictates of asymmetrical warfare suggest otherwise.

In addition to preparing to wage asymmetrical warfare, other space-faring nations can take pages out of

the Bush administration's play book. The lasing of satellites could serve a wide range of purposes, from benign to lethal. Lasers can be used for range finding, communication, information gathering, charging solar cells, dazzling, blinding, and damaging satellites. Lasing against one's own satellites to assess the damage that could result – as the Clinton administration did in 1997 – can move space-faring nations to the wrong end of this spectrum.

"Painting" someone else's satellite can similarly be provocative and unwise. We do not know if the Chinese laser test was preceded by similar US practices against Chinese satellites. But we, the Chinese, and Russians ought to know that playing paint ball in space can be a very dangerous game. Similarly, satellite jamming is not a new problem, but it is one that seems to be growing. Most recently Space News reported that Thuraya Satellite Telecommunications experienced extended intentional jamming that was traced back to a source located in Israel.

The central dilemma of US space policy – the essential and vulnerable nature of satellites used for national and economic security – is highlighted by recent developments. There is no exit from this dilemma. The more we seek to protect our satellites by the use of force in space, the more vulnerable our satellites will become if our own practices are emulated by others.

The dilemma requires compensating initiatives. Many of these steps—such as mitigating space debris and making sure satellite links are redundant and hard to jam – enjoy broad public support. But these initiatives still do not add up to a solution. The vulnerability of satellites to hostile acts is too great to be "solved," and that vulnerability will only be accentuated by the use of force to "protect" satellites.

Because satellites will remain so vulnerable to multiple means of attack, a rough calculus of space deterrence is already in place between advanced space-faring nations: If one country interferes with or damages another country's space assets, the aggrieved party has the means to retaliate. It may be galling for a nation that enjoys military dominance to again become reconciled to deterrence, but deterrence based on vulnerability in space is an inescapable fact of life. When space warriors pursue the flight testing and deployment of dedicated ASAT capabilities, they paradoxically reinforce deterrence while accentuating the satellite vulnerability they seek to escape.

Since vulnerability in space is so pervasive, we undermine space security whenever we close off avenues that can help prevent actions damaging to our satellites. By dismissing diplomacy, or relegating it to supporting a "do as I say, not as I do" approach to space, we forego negotiations to produce "rules of the road" for space that work in conjunction with other US initiatives to help protect satellites.

The United States Army, Navy and Air Force follow codes of conduct that govern military operations on land, sea, and in the air. A Code of Conduct for Responsible Space Faring Nations could also serve US national security interests while advancing our global economic interests. For example, common sense guidelines could provide pre-notification of unavoidable dangerous maneuvers in space, and help with space traffic management and debris mitigation.

President Bush reminds us repeatedly that great responsibilities fall to our great nation. So what does it mean to be a responsible space-faring nation? The Bush administration's national space policy gives us part of the answer – but only part. Responsible space-faring nations do not engage in practices that make satellites more vulnerable, and they do not foreclose a Code of Conduct to help secure the vital services that satellites provide.

DefenseNews
February 5, 2007 www.defensenews.com

Irresponsible in Space

by **Michael Krepon**, co-founder, and **Michael Katz-Hyman**, a research associate at the Henry L. Stimson Center, Washington

Beijing has done something very unwise and dangerous by smashing one of its satellites to smithereens. By now, the Chinese leadership has gotten a crash course about the lethal qualities of space debris. Chinese space watchers, like the rest of us, will be hard-pressed to know and track the extent to which they have made a mess of low earth orbit, nor how long it will take for this lethal, mutating debris cloud to burn up in the earth's atmosphere.

When satellites explode, the debris problem not only becomes geometrically greater, it also sets in motion a pinball effect, where the debris cloud shape-shifts and increases the potential for future collisions. For the duration of this process, one or more of the 300 plus satellites below the Chinese debris cloud, reflecting an investment of over $100 billion, could become road kill. Chinese taikonauts, US astronauts, and the International Space Station will also be more endangered as a result of the Chinese ASAT test.

All space operations produce some debris, but nothing remotely like the debris produced by smashing into a satellite. Our appreciation of this problem has grown alongside our understanding of climate change. Recent scientific reports suggest that some orbits are approaching criticality, where satellites might not be safe from debris hits. The United States space tracking system currently follows approximately 10,000 potentially lethal pieces of debris. The Chinese test may increase this number by perhaps ten percent or more.

China is not the only country that has tested anti-satellite weapons. The Soviet Union has tested satellite-killing devices perhaps twenty times, half of which were considered successful. During the Cold War, the United States tested anti-satellite weapons 36 times. One of these tests, in 1985, blew up an aging meteorological satellite. Seventeen years later, the last piece of debris from this test burned up in the atmosphere. Debris from the Chinese ASAT test, which occurred at a higher altitude, will take longer to clear out.

Satellites save more lives every day than we can imagine – assisting soldiers in harm's way, giving early warning to civilians in the path of an approaching hurricane, helping us to make emergency phone calls, and guiding ambulances to those in need when every second counts. It's hard to protect satellites, since the sensors that make them so valuable are also quite vulnerable to attack. So how can we best protect these vital national assets?

The Chinese test reminds us that satellite protection can become very difficult once weapons are introduced into space. ASATs that use kinetic energy are indiscriminate killers. The Pentagon learned this from the 1985 test, which is why it now favors using temporary and reversible effects, such as jammers and lasers, to mess up satellites that worry us. This would "solve" the space warfare debris problem – as long as everybody else fights by our rules. Beijing has just indicated that it can play by different rules. Another means of asymmetric, indiscriminate warfare in space is to detonate a nuclear weapon. The United States learned this lesson in 1962, after an atmospheric test series damaged or destroyed all satellites orbiting the earth.

At present, there are very few rules of the road relating to space. The Bush administration has adopted a muscular national space policy, and Air Force doctrine now calls for the ability to project power in, through, and from space. At the same time, the administration has refused to talk about rules that could impinge upon the military uses of space, claiming that this constitutes a slippery slope to limiting U.S. freedom of action. Administration officials have also asserted that there is no military space problem that needs to be discussed.

continued...

This last argument seems particularly unsound after the Chinese test. Diplomacy certainly has its limits, and is no substitute for military preparedness, but complete freedom of action can turn space into a shooting gallery, to every nation's detriment. Avoiding diplomatic engagement usually makes tough problems much worse, and puts Washington, not Beijing, in the dog house.

Increasing the safety of vital satellites is a topic worthy of discussion. Space, like military activities here on earth, needs a code of conduct to promote responsible activities and to clarify irresponsible ones. President Nixon authorized then-Secretary of the Navy John Warner to negotiate a code of conduct governing U.S.-Soviet naval operations. President George Herbert Walker Bush and Mikhail Gorbachev agreed to a similar code for ground forces operating in close proximity. President George W. Bush has endorsed codes of conduct to counter nuclear and missile proliferation. Rules of the road also make good sense for space – especially one that prohibits using satellites as target practice.

SPACE NEWS
INTERNATIONAL
February 12, 2007 VOLUME 18 ISSUE 6

An Arms Race in Space Isn't the Problem

by **Michael Krepon**, co-founder, and **Michael Katz-Hyman**, a research associate at the Henry L. Stimson Center, Washington

China's Jan. 11 anti-satellite (A-Sat) test has conjured up prospects of an arms race in space. The analogy that naturally comes to mind is the Cold War competition between the United States and the Soviet Union – a competition that included more than 50 A-Sat tests of various kinds. This analogy is not, however, analytically sound. The good news is that an arms race between the United States and China is unlikely. The bad news is that an arms race is not needed to mess up space.

In some respects, the superpower competition in space reflected the classic symptoms of a race, including tit-for-tat demonstrations of new and better capabilities. So why shouldn't the competition in space between the United States and China be any different? Actually, there are many reasons why Washington and Beijing are unlikely to engage in an arms race in space – at least in classic Cold War terms. A closer look at the U.S.-Soviet competition holds some clues as to what we might expect.

To be sure, both superpowers competed full-bore in manned spaceflight and in launching new and improved satellites for military purposes, but other aspects of the Cold War space competition could hardly be characterized as an arms race. Fifty-plus A-Sat tests sounds like a high number, but these tests occurred over three decades. During the same period, the Pentagon and the Soviet Ministry of Defense combined to carry out thousands of ballistic missile tests and, on average, one nuclear weapon test per week between the Cuban missile crisis and the fall of the Berlin Wall. A-Sat testing was very modest by these standards.

In addition, the Cold War arms race generated many thousands of deployed weapons. In contrast, rudimentary American and Soviet A-Sat weapons were considered to be deployed only during brief periods, after which they were mothballed. So even during the Cold War's space race, some aspects of the military competition were held back – and for good reason. Satellites were – and remain – linked to the nuclear deterrents of major powers. To mess with satellites would invite nuclear danger. Washington and Moscow separately decided that the Cold War competition was hot enough without adding A-Sats to a volatile mix. To symbolize this understanding, the superpowers agreed formally not to interfere with satellites that monitored treaty compliance.

If the Cold War space competition did not rise to the level of an arms race in some respects, there are strong reasons why the Chinese-U.S. competition can be even less intense. The Chinese leadership is smarter than the Soviet leadership. Beijing will not bankrupt itself in a military competition. Instead, the Chinese military will compete asymmetrically and cost-effectively. The People's Liberation Army (PLA) could employ temporary and reversible effects against U.S. satellites – the Pentagon's preference – or it could fight dirty, with kinetic energy weapons. Presumably one message of its crude A-Sat test was to clarify that, if push comes to shove, China will contest the Pentagon's objective of space control using weapons of its choosing.

Beijing's ambitions in space go well beyond this objective. China's space program is also intimately connected to its economic goals and status consciousness. Beijing's status has been damaged by creating an enduring hazard to space operations in low Earth orbit. Its economic ambitions also will be jeopardized if the Cold War taboo against destroying another nation's satellites is broken. The interconnectedness of the economic and military aspects of space power – another key difference from the Cold War – constitutes another reason why an arms race in space is unlikely.

The Pentagon also has learned important lessons from the Cold War. Back then, the United States had insufficient appreciation of the dangers of space debris. Now all stakeholders in space are keenly aware that

debris constitutes an indiscriminate, lethal hazard. This is why the Chinese test was so irresponsible – and why Congress would further damage America's standing and security by emulating Chinese misbehavior.

Perhaps the most important reason why an arms race in space between the United States and China is unlikely is because a race is not required to mess up essential satellites. A single nuclear detonation can do extraordinary harm, as can a modest arsenal of old-fashioned kinetic energy weapons. Neither China nor the United States needs to race to mess up space.

As creatures of habit, many of us will continue to talk about an arms race in space. But increased satellite vulnerability is likely to result in old-fashioned proliferation, not new-fangled arms races. The more insecure nations feel, the more likely they are to acquire weapons of punishment and deterrence. Consequently, if the Chinese test prompts more A-Sat testing rather than efforts to stop these practices, the natural result will be more vertical and horizontal proliferation. The military competition between Washington and Beijing will certainly heat up, but unlike the Cold War, this contest now takes the form of asymmetric warfare, not arms racing.

As the January Chinese A-Sat test demonstrates, the vulnerability problem in space is a global concern: All spacefaring nations stand to lose if a few operate irresponsibly. The most effective rejoinder to irresponsible behavior is not to mimic it, but to take the lead in laying out rules of the road that responsible spacefaring nations follow.

Irresponsible spacefaring nations interfere with another nation's space objects, use lasers in a harmful manner against space objects, and conduct activities, experiments or tests that result in the deliberate generation of persistent space debris.

Responsible spacefaring nations provide advance notice if there is reason to believe that their activities, experiments or tests may cause harmful interference with the operation of another nation's space objects. They share space surveillance data to the maximum extent possible to increase safety. They adopt and abide by the Inter-Agency Debris Coordination Committee guidelines on space debris. They seek to develop and implement a space traffic management system, and they provide accurate and timely launch notification and registration. They also consult with others before taking actions that could cause harmful interference with space operations.

The key elements of a code of conduct for responsible spacefaring nations have become clearer after the Chinese A-Sat test. The Bush administration can either engage and shape an international discussion of these provisions, or continue to sit on the sidelines, insisting on freedom of action in space – including the freedom to do great harm to satellites that are essential to national security and global commerce.

SPACE NEWS
INTERNATIONAL
March 5, 2007 VOLUME 18 ISSUE 9

Will the Bush Administration Endorse a Space Code of Conduct?

by **Michael Krepon**, co-founder of the Henry L. Stimson Center, Washington

President George W. Bush is not interested in winning a popularity contest on multilateral agreements dealing with space. To the contrary, the most recent United Nations resolution calling for the Prevention of an Arms Race in Space resulted in a 178-1-1 vote, with the United States voting in the negative and Israel abstaining. To be sure, vital U.S. national security interests ought never to be governed by votes in the General Assembly. But when, in the course of human events, as America's founding fathers said in the Declaration of Independence, the United States shows this much disregard for the "decent respect to the opinions of mankind," it might be wise to reassess U.S. policy and the reasoning behind it.

Support is growing for a specific kind of multilateral space agreement that borrows heavily from the Bush administration's own preferences. The mechanism in question is a Code of Conduct for responsible spacefaring nations that could either take the form of political compacts or executive agreements among like-minded states that wish to continue to enjoy the national security and economic benefits that satellites provide.

Like the Bush administration's Proliferation Security Initiative, a Code of Conduct for space could be designed by a core group of states to clarify responsible and irresponsible behavior. The core group might then invite any other spacefaring nation that wishes to abide by these high standards to join the group.

The European Union has now joined Canada in endorsing a Code of Conduct for responsible spacefaring nations. The commercial satellite industry also has expressed a strong interest in "rules of the road" for space.

The Bush administration has further distanced itself from America's friends and allies by continuing to insist that new multilateral agreements related to space are "unnecessary and counterproductive." No other nation in the world has adopted such a negative stance. Saying "hell no" to new multilateral agreements for space seems particularly questionable after China's irresponsible test of an anti-satellite (A-Sat) weapon that endangers spaceflight in low Earth orbit for decades to come.

George Washington's farewell address warned against indulging in "habitual hatred" resulting in a slavish animosity that leads the United States to "stray from its duty and interest." Rejecting a Code of Conduct for space because it smacks of arms control would seem to violate Washington's sound admonition. The Bush administration has not yet taken a position towards a Code of Conduct for responsible spacefaring nations. Because rules of the road for space make so much sense, and because the Bush administration has championed other codes of conduct to prevent proliferation, it might still join in the emerging consensus on this issue.

The administration's reasoning against new multilateral agreements for space boils down to five arguments, none of which applies to the Code of Conduct.

First, administration officials argue that there is no likelihood of an arms race in space, therefore, there is no need for new multilateral arrangements. It is true that an arms race is unlikely, since arms racing has now been replaced by asymmetric warfare. But an arms race is not needed to do lasting damage to space, as the Chinese A-Sat test demonstrated. We can now see clearly that it takes very few kinetic energy kill tests and A-Sat weapons to result in significant damage to low Earth orbit. New diplomatic initiatives are needed precisely because an arms race isn't needed to prevent the peaceful uses of outer space.

The second argument advanced by the Bush administration is that arms control is a vestige of the Cold War and not terribly relevant to contemporary security concerns. Again, there is partial truth in this argument, because classic arms control arrangements dealt with a superpower competition that ended with the demise of the Soviet Union.

What used to be known as arms control has now morphed into cooperative threat reduction agreements, including rules of the road clarifying responsible behavior. Semantic arguments aside, the administration has itself championed multilateral agreements in the form of codes of conduct to prevent proliferation, such as The Hague Code of Conduct, as well as the Proliferation Security Initiative. We do not have to argue over whether these codes of conduct constitute arms control to conclude that these creative arrangements were sensible initiatives.

A Code of Conduct for space also would be quite useful in making the Chinese kinetic-kill A-Sat test the very last of its kind. If codes of conduct relating to missiles and exports make sense for preventing proliferation – and do not, in the Bush administration's vocabulary, constitute arms control – then surely a code of conduct also makes sense for activities in space. After all, troubling activities in space also could prompt vertical and horizontal proliferation on the ground.

The third argument that the Bush administration advances against new diplomatic initiatives for space activity is that there can be no agreed to definition of what constitutes "space weapons." Moreover, verification is extremely problematic. Consequently, no multilateral agreement can be negotiated barring such weapons.

The administration is correct in pointing to the difficulties in defining and verifying space weapons. A code of conduct, however, focuses on activities, not on definitions of what constitutes a space weapon. For example, one key element of a Code of Conduct would surely be that responsible spacefaring nations do not engage in activities that deliberately produce persistent space debris, such as the Chinese A-Sat test.

This key element makes it unnecessary to define space weapons, since actions, not definitions, lie at the core of a rules of the road approach. Verification of noncompliance with this key element is quite straightforward, since it is very hard to hide the deliberate generation of persistent space debris.

The fourth argument advanced by the Bush administration to oppose new diplomatic initiatives for space is that the United States must preserve its right to self-defense – including the right to defend space assets. This argument is certainly valid, but it doesn't justify rejecting a Code of Conduct. With such a code, the United States still would possess more capabilities than ever before to deter and, if necessary, punish states that take actions against U.S. satellites. The right of self-defense, however, is more likely to be invoked, and will be more difficult to execute, if there are no agreed rules of the road for outer space.

Lastly, the Bush administration contends that new diplomatic initiatives are unwise because U.S. freedom of action in space must not be constrained. By this standard, the Nonproliferation Treaty, the Outer Space Treaty, President Ronald Reagan's Intermediate Nuclear Forces Treaty and President George H. W. Bush's Strategic Arms Reduction treaties were all dreadful errors in judgment, since every one of these agreements limit the U.S. military's freedom of action in some key respects.

Using the Bush administration's reasoning, the Geneva Conventions for U.S. armed forces also are unwise, as are codes of conduct long in place for the U.S. Army, Navy, Marines and gravity-bound Air Force. If freedom of action were the topmost U.S. national security objective, we would ditch all of these treaties and codes of conduct. Of course, no responsible political leader or public official would consider doing this. So why should we use this standard to oppose new diplomatic initiatives in space?

Mr. TIERNEY. Since the dawn of the space age, the U.S. leadership has put a man on the Moon, has allowed us to see to the edge of the universe, saved countless lives by helping to better predict hurricanes, and revolutionized the way the peoples of the world communicate.

Our country's leadership over the years in helping to establish a clear understanding among all nations that the peaceful use of space is of paramount importance has repaid us untold benefits, and it promises to increasingly do so in the future.

Our country owns or operates 443 of the 845 active satellites around our planet. It is a $100 billion a year industry. Global Positioning System technology is taking off, and even space tourism is becoming more and more of a reality.

And our military and intelligence capabilities have become huge beneficiaries of a weapons-free space. Without space, our smart bombs would not be precise. Without space, our troops in Afghanistan and Iraq would not have the real-time information they need. Without space, crucial intelligence gathering would simply vanish. Satellites have, quite literally, become the eyes and ears of our national security.

However, there are potentially ominous clouds on the horizon. Space experts, some of whom we will hear from at today's hearing, charge that over the last handful of years the current administration has undertaken a series of actions and changes in policies that could have a profound impact on the future of space and the future of our national security.

Exhibit A is President Bush's new space policy. Though the new policy had been widely anticipated for years, the unclassified version was stealthily posted on a Web site late on the Friday prior to Columbus Day weekend in 2006. The rest of the world, both our allies and our potential adversaries, took notice, particularly at its aggressiveness and unilateral tone.

The previous space policy spoke of the need for a "stable and balanced national space program," one in which "[t]he United States will pursue greater levels of partnership and cooperation in national and international space activities and work with other nations to ensure the continued exploration and use of space for peaceful purposes."

The Bush administration policy, on the other hand, treats space as one more battlefield besides air, land, and sea, and states unequivocally, "The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the right of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests."

But the aggressive and unilateral record of this administration is not just limited to the one document. For example, in 2002 the United States withdrew from the Anti-Ballistic Missile Treaty on the grounds that it needed greater capabilities against rogue states following the September 11th terrorist attacks.

In September 2004, then Under Secretary of State John Bolton stated, "We are not prepared to negotiate on the so-called arms

race in outer space. We just don't see that as a worthwhile enterprise."

In October 2005, the United States was the only country in the world to vote against a United Nations resolution calling on the need for a treaty to limit weaponization of space; 160 countries voted in favor.

The Air Force doctrine during the Bush administration has also been criticized as being overly unilateral and aggressive. Air Force doctrine and top officials repeatedly speak of "space dominance," with one document noting: "Space superiority provides freedom to attack."

Our hearing today will explore the Bush administration's space policies and actions and what impact they have had and will have in the future.

Will others in our world use the administration's language and actions as justification and cover to build their own weapons capabilities in space, thereby threatening the very assets and advantages we seek to protect? Or will other countries in the world ramp up their own space weapons capabilities no matter what United States policies and actions are? In other words, is the weaponization of space inevitable, and to think otherwise would only cause us to lose ground?

Our hearing will also explore the apparently successful anti-satellite missile test by China earlier this year. China has long been viewed as a potential competitor to the U.S. interest in space and a potential threat because of its emerging space program and the increased frequency of its satellite launches. We have watched them closely. We were well aware when they attempted two anti-satellite missile tests in 2005 and 2006.

So it should not have been a surprise to anyone when China used a ground-based ballistic missile to successfully hit their own orbiting weather satellite in January of this year. We knew when they were going to conduct the test and were certain which satellite they were going to hit. We stepped up monitoring of the satellite and Chinese launch pads. We knew that the test would cause thousands of shards of space debris to float around for decades in low-earth orbit, potentially harming everything and anything in their path.

But following the destruction of the satellite the silence was deafening. Though they didn't do anything to hide their launch preparations, the Chinese did not initially own up to the test, and the United States apparently decided not to do anything beforehand to try to prevent the Chinese test.

We understand that this single Chinese test alone raised the threat to satellites in frequent low-earth orbits by as much as 40 percent. This incident should caution all of us about the stakes of getting space policy correct.

What, if anything, could our country and our allies and our partners around the world have done to prevent all that debris? What should have done, if anything?

This hearing will explore the administration's space policies and actions and ask the simple question of whether this is the path we should be going down.

By alienating friends and potential adversaries alike, is the current approach weakening our national security through its actions and inactions toward space policy? Should our country take a leadership role in engaging our allies bilaterally and through multilateral institutions, such as the Conference on Disarmament and the Committee on Peaceful Uses of Outer Space, in order to preserve space for peaceful and commercial interests? Should we work with other countries to lay out rules of the road for space conduct; to put in place confidence-building measures and to work together to limit space debris?

Or is the administration's approach the only real option for us in a world in which it and some others contend international cooperation and treaties will only serve to weaken our national security assets and interests?

Up until the present, space has been a frontier that has been used peacefully by all of mankind, in many respects because it is inherently a global commodity.

As the undeniable leader in space, the U.S. actions and policies will play a huge role in shaping the future of space and how it impacts our economy, our science, our exploration, and our national security. We must act with a sense of responsibility here and ask tough questions now while this renewed interest in the weaponization of space is in its infancy. We must ask tough questions now, before it is too late.

Over the first 50 years of space exploration and use we know where U.S. leadership has taken us. This hearing will essentially ask where U.S. leadership should take us over the next 50 years.

[The prepared statement of Hon. John F. Tierney follows:]

Opening Statement of Chairman John F. Tierney
National Security and Foreign Affairs Subcommittee
House Oversight and Government Reform Committee

Oversight Hearing on "Weaponizing Space: Is Current U.S. Policy Protecting Our National Security?

May 23, 2007

Good afternoon, and thank you to everyone for joining us here today.

Since the dawn of the space age, United States leadership has put a man on the moon; allowed us to see to the edge of the universe; saved countless lives by helping to better predict hurricanes; and revolutionized the way the peoples of our world communicate.

Our country's leadership over the years in helping to establish a clear understanding among all nations that the peaceful use of space is of paramount importance has repaid us untold benefits, and promises to increasingly do so in the future. Our country owns or operates 443 of the 845 active satellites around our planet – a 100 billion-dollar-a-year industry. Global Positioning System (GPS) technology is taking-off and even space tourism is becoming more and more of a reality.

And our military and intelligence capabilities have become huge beneficiaries of a weapons-free space. Without space, our smart bombs would not be as precise. Without space, our troops in Afghanistan and Iraq would not have the real-time information they need. Without space, crucial intelligence-gathering would simply vanish. Satellites have quite literally become the eyes and ears of our national security.

However, there are potentially ominous clouds on the horizon.

Space experts, some of whom we'll hear from at today's hearing, charge that over the last handful of years the current Administration has undertaken a series of actions and changes in policies that could have a profound impact on the future of space and the future of our national security.

Exhibit A is President Bush's new National Space Policy.

Though the new policy had been widely anticipated for years, the unclassified version was stealthily posted on the web late on the Friday afternoon prior to Columbus Day weekend in 2006.

The rest of the world – both our allies and our potential adversaries – took notice, particularly at its aggressiveness and unilateral tone.

The previous space policy spoke of the need for, and I quote, a "stable and balanced national space program," one in which "[t]he United States will pursue greater levels of partnership and cooperation in national and internationals space activities and work with other nations to ensure the continued exploration and use of space for peaceful purposes."

The Bush Administration policy, on the other hand, treats space as one more battlefield besides air, land, and sea; and states unequivocally, and I quote:

> "The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the right of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests."

But the aggressive and unilateral record of this Administration is not just limited to this one document. For example:

- In 2002, the United States withdrew from the Anti-Ballistic Missile Treaty on the grounds that it needed greater capabilities against rogue states following the September 11 terrorist attacks.

- In September 2004, then Undersecretary of State John Bolton stated: "We are not prepared to negotiate on the so-called arms race in outer space. We just don't see that as a worthwhile enterprise."

- In October 2005, the United States was the only country in the world to vote <u>against</u> a United Nations resolution calling on the need for a treaty to limit the weaponization of space. 160 countries voted in favor.

The Air Force doctrine during the Bush Administration has also been criticized as being overly unilateral and aggressive. Air Force doctrine and top officials repeatedly speak of "space dominance," with one document noting: "Space superiority provides freedom to attack."

Our hearing today will explore the Bush Administration's space policies and actions, and what impact they have had and will have in the future.

Will others in our world use the Administration's language and actions as justification and cover to build their own weapons capabilities in space, thereby threatening the very assets and advantages we seek to protect?

Or will other countries in the world ramp up their own space weapons capabilities no matter what U.S. policies and actions are – in other words, is the weaponization of space inevitable and to think otherwise would only cause us to lose ground?

Our hearing will also explore the apparently successful anti-satellite missile test by China earlier this year. China has long been viewed as a potential competitor to U.S. interests in space, and a potential threat because of its emerging space program and the increased frequency of its satellite launches. And we have watched them closely. We were well aware when they attempted two anti-satellite missile tests in 2005 and 2006.

So it should not have been a surprise to anyone when China used a ground-based ballistic missile to successfully hit their own orbiting weather satellite in January of this year. We knew when they were going to conduct the test and were certain which satellite they were going to hit. We stepped up monitoring of the satellite and Chinese launch pads. We knew that the test would cause thousands of shards of space debris to float around for decades in low-earth orbit, potentially harming anything in their path.

But following the destruction of the satellite, the silence was deafening. Though they didn't do anything to hide their launch preparations, the Chinese did not initially own up to the test. And the U.S. apparently decided not to do anything beforehand to try to prevent the Chinese test.

Here are the repercussions of the Administration's decision to watch silently as the test took place. I'd like to play a short simulation of the debris caused by the Chinese test, which is posted on the web at CelesTrak.com and which uses debris data from the Air Force. And remember as you watch this video that a marble-sized piece of debris in low earth orbit would hit a satellite with the same force as a one-ton safe dropped from a five-story building on earth.

[Play short 1 ½ minute CelesTrak.com web video simulation of debris
http://www.celestrak.com/events/Xichang-ASAT3.wmv]

I understand that this single Chinese test alone raised the threat to satellites in frequent low-earth orbits by as much as 40 percent. This incident should caution all of us about the stakes of getting space policy right.

What, if anything, could our country – and our allies and partners around the world – have done to prevent all that debris? What should have been done, if anything?

This hearing will explore the Administration's space policies and actions and ask the simple question of whether this is the path we should be going down?

By alienating friends and potential adversaries alike, is the current approach weakening our national security through its actions and inaction towards space policy?

Should our country take a leadership role in engaging our allies bilaterally and through multilateral institutions, such as the Conference on Disarmament and the Committee on Peaceful Uses of Outer Space, in order to preserve space for peaceful and commercial interests? Should we work with other countries to lay out rules-of-the-road for space conduct; to put in place confidence-building measures; and to work together to limit space debris?

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Over the first 50 years of space exploration and use, we know where U.S. leadership has taken us. This hearing will centrally ask where U.S. leadership should take us over the next 50.

Thank you, and I now yield to the Ranking Member for an opening statement.

Mr. TIERNEY. I would now like to yield to the ranking member for an opening statement, Mr. Platts.

Mr. PLATTS. Thank you, Mr. Chairman. On behalf of Ranking Member Chris Shays and myself, we appreciate your holding this important hearing on a vitally important topic, and also that we have with us today two panels of witnesses, both representing the administration and outside experts.

Today's safe and secure access to space is essential for a wide range of commercial activities. Satellites are an integral component of telephone and television service. They also provide GPS services used daily by many Americans, and they aid in weather forecasting, mapping, and many other functions.

Space is also critical to American security. Satellites provide important capabilities to the intelligence community and the Defense Department. They are an indispensable tool on the global war on terror.

The integration of space capabilities into most aspects of modern military operations is one of the distinctive and essential ingredients of America's military prowess. Therefore, it is absolutely necessary that the United States and all other nations continue to enjoy safe and peaceful access to space. This makes some events in recent years very troubling. Most disturbing is what occurred in January, China fired a ballistic missile into space and destroyed one of its own outmoded satellites. This created a huge amount of debris in orbit and had the potential to damage or destroy other satellites.

Many experts wonder what motivated China to take such provocative action. They question whether China was signaling that it had dangerous capabilities which they might use against the United States in the event of some future crisis.

Today we will hear about the Bush administration's national space policy, which is meant to guide every aspect of America's endeavors in space. Some have suggested that the points it sets forth are a radical departure from past practice. Critics have claimed that it will cause other nations to threaten our space capabilities. Others vigorously disagree with all of these contentions.

We will be honored to hear from several experts with varying perspectives today. I look forward to their presentations, to their assessment of the Chinese action, and to their evaluation of the appropriate American response.

I am also interested to learn the perspective of the witnesses on the viability of arms control agreements or other regulatory efforts to restrain threats in space. I wonder if such treaties will be enforceable, and certainly question the effect of such treaties, given that terrorist groups would certainly not consider themselves bound by them.

Finally, I seek to find out what one means when referring to weaponizing space. I am not certain if this is an allusion to arms placed in orbit, weapons fired into space from the ground, or simply ground-based arms which travel through space.

Mr. Chairman, we stand together in recognizing the indispensable role which space plays in the American economy and the Nation's security. I look forward to hearing our witnesses' testimony and the opportunity to have questions thereafter.

Thank you, Mr. Chairman.

Mr. TIERNEY. Thank you.

I want to begin now, for our witness testimony section by introducing our witnesses on the first panel. We have representatives from both the Department of Defense and the Department of State. Ambassador Donald Mahley, the Deputy Assistant Secretary for Threat Reduction, and we have Major General James B. Armor, Jr., Director of the National Security Space Office within the Pentagon.

I want to thank you both for coming and welcome you to our hearing today.

It is the policy of this subcommittee to swear you in before you testify, so would you please stand and raise your right hands, and if there is anybody else that will be testifying with you, we ask that they also stand and take the oath.

[Witnesses sworn.]

Mr. TIERNEY. Let the record reflect that both witnesses answered in the affirmative.

With that, Ambassador Mahley, would you be kind enough to begin with your statement? I think you know from ample past experience it is a 5-minute clock. We try not to be too strict on that, but you need not read directly from your remarks if you do not care to. You can summarize it any way you wish. The remarks for both you and the General will be placed on the record, at any rate.

Thank you.

STATEMENTS OF DONALD MAHLEY, DEPUTY ASSISTANT SECRETARY FOR THREAT REDUCTION, U.S. DEPARTMENT OF STATE; MAJOR GENERAL JAMES B. ARMOR, JR., DIRECTOR, NATIONAL SECURITY SPACE OFFICE, U.S. DEPARTMENT OF DEFENSE

STATEMENT OF DONALD MAHLEY

Mr. MAHLEY. Chairman Tierney, members of the committee, staff, thank you very much. I greatly appreciate the fact that you have already indicated that my written statement will be placed on the record. I would, if I could, like to summarize it orally in just a few short sentences.

In accordance with the committee's request, my statement encompasses three topics: The administration's national space policy; China's January 11th anti-satellite test; and the administration's position on space arms control.

I would offer two caveats to my testimony at the outset. First, because it is an unclassified hearing, there is, of course, a certain limit on some discussion of some sensitive topics that will occur. Second, the Department of State does not execute the material elements of national space policy. For that information, I will, of course, defer to my very able colleague from the Department of Defense sitting to my left here.

In June 2002, the President directed an interagency review of national space policy. The resulting directive, signed by the President on August 31, 2006, and publicly released on October 6, 2006, supersedes the space policy directive signed by President Clinton nearly a decade earlier.

This policy reaffirms the basic principles articulated a half century ago by President Dwight Eisenhower, our Nation's commitment to a free exploration and use of outer space by all nations for peaceful purposes and for the benefit of all humanity.

U.S. space policy also continues to recognize the necessity to protect our assets in space. Defense and intelligence-related activities in pursuit of national security interests fall within the scope of and are consistent with the 1967 Outer Space Treaty's provisions mentioning the peaceful uses of space.

On January 11, 2007, the People's Republic of China conducted a test of an ASAT weapon that destroyed an old Chinese weather satellite in orbit. The administration has conducted numerous classified briefings to Congress in the wake of that test, and some even preceding it. The United States has sought an explanation from China regarding its test. To date, we have not received a satisfactory response.

And it is also true the Chinese test generated some 1,500 pieces of trackable debris, and is estimated to pose a risk to both human space flight and satellites for the next 100 years.

The Chinese proposals for arms control negotiations in outer space would only ban a ground-based ASAT weapons testing and use, not its deployment or development. An additional space treaty would not improve the existing legal regime which has functioned effectively for over 40 years. A number of U.S. administrations have recognized the futility of seeking additional formal space arms control agreements. However, in response to international interest, as Ambassador Roca recently noted in Geneva, the United States is prepared to discuss but not to negotiate outer space topics in the Conference on Disarmament.

I do thank you. I look forward to your questions.

[The prepared statement of Mr. Mahley follows:]

Statement of Ambassador Donald A. Mahley
Acting Deputy Assistant Secretary for Threat Reductions, Export Controls and Negotiations
Bureau of International Security and Nonproliferation
United States Department of State

Prepared for
House Committee on Oversight and Government Reform
Subcommittee on National Security and Foreign Affairs

Hearing on "Weaponizing Space: Is Current U.S. Policy Protecting Our National Security?"
May 23, 2007

Mr. Chairman, over the past year, Administration officials have briefed U.S. National Space Policy to Members and staff of both the House of Representatives and the Senate. Prior to its public release on October 6, the Administration briefed eight House and Senate committees on the President's National Space Policy. Since space is such a vital interest to our Nation, we welcome every opportunity to discuss this topic with the Congress, including at this hearing today. Per your Committee's request, my remarks will encompass three topics:

- The Administration's National Space Policy;
- China's January 11 anti-satellite test; and
- The Administration's position on space arms control.

THE PRESIDENT'S NATIONAL SPACE POLICY

In June 2002, the President directed the National Security Council to lead an interagency review of U.S. Government space policies. The review resulted in separate policy documents for the commercial remote sensing, space exploration, space transportation, and positioning, navigation and timing sectors. Once approved by the President, the review then focused on the overarching national space policy. The resulting directive -- signed by the President on August 31, 2006, and released to the public on October 6, 2006 -- supersedes the space policy directive signed by President Clinton nearly a decade earlier.

There is great continuity between the President's capstone National Space Policy and the space policy signed by President Clinton. This continuity reflects the Administration's reaffirmation of basic principles articulated a half-century ago by President Eisenhower at the dawn of the Space Age. Foremost among these principles is our Nation's commitment to the free exploration and use of outer space by all nations for peaceful purposes and for the benefit of all humanity.

Another critical continuity across Presidential administrations has been the recognition of the importance of space and the necessity to protect our space assets. For example, the Clinton Administration's policy stated that "the United States will develop, operate, and maintain space control capabilities to ensure freedom of action in space, and, if directed, deny such freedom of action to adversaries. The capabilities

may also be enhanced by diplomatic, legal, or military measures to preclude an adversary's hostile use of space systems and services." This necessity is enduring.

It is universally acknowledged that defense and intelligence related activities in pursuit of a country's national interests fall within the scope of, and are consistent with, the 1967 Outer Space Treaty's provisions mentioning the peaceful uses of space. At the same time, the United States must maintain its right of self-defense, as permitted under the United Nations Charter, to deter and defeat attacks on its space assets and to defend against the hostile use of space by another nation or terrorist group.

CHINA'S ANTISATELLITE TEST

On January 11, 2007, the People's Republic of China conducted a test of an anti-satellite (ASAT) weapon system that destroyed an old Chinese weather satellite in orbit. Despite China's claim that the ASAT test was a peaceful scientific experiment and was not directed at any specific state, the test has to date generated over 1,600 pieces of trackable debris that will present an increased risk to both human spaceflight and satellites for the next 100 years.

This successful test demonstrates China's capability -- should it choose -- to eventually deploy an ASAT system that could threaten satellites and crewed spacecraft of the U.S. and other nations. Furthermore, it is important to note that

China is pursuing a range of high-end, asymmetric military capabilities, including counterspace operations. It is also our assessment that China's interest in counterspace capabilities is not limited simply to a direct-ascent ASAT interceptor.

The Administration has sought to keep the Congress fully informed of these developments. In the wake of the ASAT test, senior civilian and military officials provided classified briefings to Members of the Strategic Forces Subcommittees of both the House and Senate Armed Services Committees, the House Foreign Affairs Committee, the House Permanent Select Committee on Intelligence, the Senate Select Committee on Intelligence, and the Defense Subcommittee of the House Appropriations Committee. Administration officials have also provided briefings on the test to a number of congressional staff.

The United States has repeatedly requested an explanation from China regarding its test. In addition to diplomatic channels, U.S. officials have requested that China provide an explanation through a range of technical and military channels. To date, the United States has not received a satisfactory response to our questions concerning China's motivations for the test, the nature of their pre-test analysis on possible debris. and China's plans for additional testing.

SPACE ARMS CONTROL

A number of countries, most notably China and Russia, also have pushed for international discussion of a treaty on the Prevention of an Arms Race in Outer Space (PAROS). The current Sino-Russian treaty proposal would only ban the testing and use of a ground-based ASAT weapon; it would not prohibit its research, development or deployment. It is our position that such a PAROS treaty would not improve the existing legal regime, which has fostered the peaceful exploration and use of space for 40 years.

An important continuity in space policy across the Carter, Reagan, George H.W. Bush, Clinton, and the George W. Bush administrations is recognition of the impossibility of formulating a space arms control agreement that would serve U.S. national security interests. In the late 1970s, the Carter Administration engaged in ASAT arms control negotiations with the then-Soviet Union. The ASAT negotiations failed for a number of reasons, including:

- The impossibility of effectively verifying compliance;
- The difficulties in defining what constitutes an ASAT; and
- The risk of "breakout" (e.g., covertly developing and/or deploying prohibited or constrained capabilities to gain a unilateral military advantage) from the agreement.

With regard to the definitional problem, negotiations were stymied by questions of what capabilities should be limited. Negotiators could not agree on whether "space weapons" included co-orbital interceptors, direct-ascent interceptors and various types of laser and other directed energy weapons. Finally, as negotiations progressed, the Carter Administration additionally recognized that ostensibly non-threatening satellites already in orbit could destroy another nation's satellites if they were deliberately maneuvered into a direct conjunction and collision.

Years later, the Clinton Administration declined to support negotiations in the Conference on Disarmament on a "Prevention of an Arms Race in Outer Space" (PAROS) agreement. In making its decision, the Clinton Administration concluded that the existing outer space legal regime was sufficient and that there was no "arms race" in space to prevent.

This position is shared by the Bush Administration, which has also stated that it will oppose the development of new, legally-binding arms control regimes or other types of restrictions that:

- Seek to prohibit or limit U.S. access to, or use of, space; or
- Impair the rights of the United States to conduct research, development, testing and operations in space.

Mr. TIERNEY. Thank you, Ambassador.

General.

STATEMENT OF MAJOR GENERAL JAMES B. ARMOR, JR.

General ARMOR. Chairman Tierney, Congressman Platts, members of the subcommittee, I am honored to appear before the subcommittee today as the Director of the National Security Space Office and the Executive Secretariat for the Department of Defense Executive Agent for Space.

It is a very timely issue to discuss national space policy and the policy implications of China's counter-space development, specifically their January 2007, anti-satellite test. I must admit I am heartened by both your comments in pointing out the critical importance to national security in space. I also appreciate having Ambassador Mahley at my side here to discuss the Department of State policy issues.

Our appearance today is our affirmation that space capabilities are vital to U.S. national interests and underscores the importance of continued unity of effort in implementing U.S. national space policy. I have been in the space business over 30 years, and every President since President Dwight D. Eisenhower has addressed space policy.

Each administration has evolved space policy to reflect the increasing maturity and cumulative experience of the Nation's activities in space. Basic policy tenets have remained remarkably consistent: free passage and peaceful use of space; compelling need for a strong civil, industrial, and national security space sectors; and that, since they are vital to national interests, the United States has the inherent right to defend those interests in space.

The current national space policy issued by the President last August addresses current opportunities, challenges, and threats facing the United States and our space capabilities. The policy provides direction as we conduct a host of space activities.

The evolution of space technology coupled with continued integration of space capabilities into our Defense forces has, as you noted, revolutionized U.S. military operations. Space technology has radically enhanced the effectiveness of our now smaller combat forces, and reduced collateral effects on non-belligerence.

Space capabilities enable us to employ our armed forces within the guidelines established by the international laws of armed conflict.

Space capabilities provide us with the eyes and ears that give us unmatched battlefield awareness, advanced warning and characterization of missile attacks, precise application of force, synchronization of our combat forces, and essential command and control functions.

More broadly, space capabilities form the bedrock of our Nation's infrastructure, including diplomatic, informational, military, scientific, and economic elements of our national power.

The new policy, consistent with previous national space policies, reaffirms longstanding principles: U.S. commitment to the use of outer space by all nations for peaceful purposes, continued encouragement to cooperate with others, strict adherence to existing international agreements regarding the use of outer space, rejec-

tion of any claim of sovereignty by any nation over outer space, the right to use or acquire data from space, and the free passage through and in space without interference.

The Defense Department's goal for space and space-related activities is to possess the necessary space capabilities to achieve our national security objectives. The Secretary of Defense is further charged with developing capabilities, plans, and options to ensure freedom of action in space and, if directed, to deny that to its adversaries.

Along these lines, our focus is on, first, space situational awareness, then preservation of our space capabilities, protection of our space capabilities, and, finally, protection of our terrestrial forces, our boots on the ground, if you will, from harm by adversary's space capabilities.

Many nations and organizations around the world have recognized the benefits of space, and with the growing availability of technology, the general economic prosperity, and longstanding free passage and useful peace of space created under the current treaties, space has become a critical enabler for the global economy. China is one such nation, and they are pursuing space capabilities on a very broad front—economic, scientific, military, intelligence. They should be rightly congratulated for the impressive technical achievement of becoming the third nation in history to conduct manned space flight.

Other nations have also recognized the asymmetric advantage in space power that the United States retains. Potential adversaries have and will continue to seek capabilities and to deny our advantage in space, and, as was made dramatically clear by China's test of an ASAT, space is now a contested environment. We believe China's testing of a direct ascent ASAT system, specifically the on-orbit destruction of a satellite that resulted in thousands of pieces of long-lived orbital debris, is not responsible behavior for a space-faring nation. It is inconsistent with China's stated position on preventing an arms race in outer space, its signed agreement to mitigate space debris, and the constructive relationship outlined by President Bush and President Hu.

China is developing a wide range of anti-access and aerial denial capabilities, such as direct ascent ASAT, radio frequency jammers, and other capabilities, as part of a general transformation of their military forces. In addition to the counter-space capabilities, China is developing and deploying modern intelligence, surveillance, and reconnaissance satellites with advanced command and control, communications, and targeting capabilities.

Today many nations are taking their first steps as space-faring nations. These nations should strive to adhere to international outer space legal guidelines and ensure they are ready to operate safely in space.

The United States has long urged the international community to focus on gaining universal adherence to current treaty guidelines. Not all countries have signed the Outer Space Treaty, for example.

Space activity is strategically significant to the health of our Nation's security, defense, and economic well-being. The U.S. Government and Department of Defense policies recognize that fact, and

access and use of space are central in preserving peace, protecting U.S. national security, and promoting civil and commercial interests. Space, bottom line, is vital to U.S. national interest.

I thank you for allowing me the opportunity to discuss the implications of the new national space policy and the anti-satellite test by China, and look forward to any questions you might have.

Thank you, sir.

[The prepared statement of General Armor follows:]

NOT FOR PUBLICATION
UNTIL RELEASED BY THE
SUBCOMMITTEE ON
NATIONAL SECURITY AND
FOREIGN AFFAIRS

Statement of

Major General James Armor

Director, National Security Space Office of the Department of Defense

Before the

House Committee on Oversight and Government Reform

Subcommittee on National Security and Foreign Affairs

On

"Weaponizing Space: Is Current U.S. Policy Protecting Our National Security"

May 23, 2007

Chairman Tierney, Congressman Shays, Members of the Subcommittee, it is my distinct honor to appear before the Subcommittee today with Ambassador Mahley as the Director of the National Security Space Office to discuss the National Space Policy and the policy implications of China's counter space developments to include its January 11, 2007, anti-satellite test. Our appearance here today is an affirmation of the continued efforts to assure space capabilities vital to U.S. national interest and underscores the importance of continued unity of effort in implementing the national space policy.

Every President since President Dwight D. Eisenhower has promulgated space policy. Although the policies have been evolutionary and reflect the increasing maturity and cumulative experience of the nation's activities in space, the key tenets have remained remarkably consistent. One such tenet is the compelling need for a strong national security space sector and the inherent right of self-defense to protect U.S. national interests in space. The current National Space Policy, issued by President Bush in August 2006, is the product of the first post 9-11 assessment of American space policy and reflects changes in opportunities, challenges, and threats facing the United States and its space capabilities. It continues to provide the vision and direction for the conduct of U.S. space activities and is based on a longstanding U.S. commitment to peaceful uses of outer space that allow defense and intelligence-related activities in support of national security.

The evolution of space technology coupled with continued integration of space capabilities into our defense forces has revolutionized defense operations by enhancing the effectiveness of smaller combat forces while concurrently reducing the potential for collateral effects on non-belligerents. Space capabilities enable unmatched battlefield awareness, advanced warning and characterization of missile attacks, precise application of force, synchronization of our combat forces, and essential command and control functions. Space capabilities also underpin many essential elements of the nation's infrastructure and enable diplomatic, informational, military, and economic elements of national power. Space capabilities are integral to U.S. economic, homeland, and national security. The new policy, acknowledging the strategic importance of space to the United States, goes beyond previous policies by identifying space capabilities as a top national priority and vital to U.S. national interests.

The new space policy, consistent with previous national space policies, reaffirms longstanding policy principles, namely: U.S. commitment to the use of outer space by all nations for peaceful purposes; international cooperation; and continued adherence to existing international agreements regarding the use of outer space. These principles also reaffirm that the United States rejects claims of sovereignty by any nation over outer space and any limitations on the fundamental right of the United States to use or acquire data from space, and that the United States retains the right of free passage through and operations in space without interference. Consistent with these principles, the United States views purposeful

interference with its space systems as an infringement on its rights and will take actions necessary to preserve its rights, capabilities, and freedom of action in space including denying, if necessary, adversaries the use of space capabilities hostile to U.S. national interests.

The National Space Policy provides the necessary framework for the United States to enable international cooperation, diplomacy, and required space control capabilities to protect its interests in space. The Secretary of Defense is charged with developing capabilities, plans, and options to ensure freedom of action in space, and if directed, to deny such freedom of action to adversaries. In implementing the National Policy, the Department of Defense balances the need for improved space situational awareness and protection of critical space assets with ensuring we retain the ability to deny an adversary access to space capabilities that can be used for purposes hostile to the U.S. national interests. Should diplomatic efforts fail, the current preferred approach to protect our terrestrial forces from space threats is through the use of temporary and reversible effects. The Department of Defense's goal for space and space-related activities is to continue to provide space capabilities that will ensure the United States has the space power necessary to achieve its national security objectives.

Consistent with its longstanding space policy principles, the U.S. respects and complies with international agreements on the use of space and believes the existing body of international treaties and agreements provide a sufficient legal regime for space. China's counter space developments do not represent a so-

called "arms race in outer space," and arms control is not a viable solution to the challenges posed by potential adversaries seeking to counter the U.S. advantage in space. Inherent complexities in defining what constitutes a "space weapon" and determining effective mechanisms to verify compliance are fundamental barriers to meaningful arms control measures in this area. Without a definition of a space weapon or viable verification measures, arms control negotiations result in loopholes and meaningless limitations that would exclude practical and important uses of space systems and endanger our national security.

The existing international legal framework for outer space, based primarily on the 40-year old Outer Space Treaty, continues to foster an environment that resulted in the expansion of peaceful uses of outer space around the world. Under the current legal regime and national space policy, the United States continues to be a leader in promoting the peaceful and responsible use of outer space through international cooperation, provision of space flight safety data via the space-track.org web site, providing space flight collision avoidance support for both manned and unmanned space missions, and establishing international space debris mitigation guidelines. The United States will continue to be the model for responsible behavior in space and will continue to encourage others to adopt similar behaviors and comply with the current legal regime.

Space is a critical enabler for U.S. forces and the global economy, and potential adversaries have and will continue to seek capabilities to counter this advantage. Chinese counter space initiatives reflect the acknowledgement of the

importance of space capabilities to U.S. national power. China's testing of a direct-ascent anti-satellite system and the on-orbit destruction of a satellite resulting in thousands of pieces of long-lived orbital debris, is not responsible behavior for a space-faring nation. This action is not consistent with: China's stated position on preventing an arms race in outer space; its strong desire for a treaty banning space weapons; and the constructive relationship outlined by President Bush and President Hu, including in the area of civil space cooperation. The contradictions between the China's statements and its actions raise legitimate questions about the credibility of their declaratory policies, statements, and security commitments.

It should be noted that the United States has not conducted a test of a kinetic energy anti-satellite capability since 1985. The world in 1985 was very different than it is today, however. The United States and the Soviet Union were competing in space and other areas, and few countries had space systems. In 2007, however, many other countries are dependent on space systems for research, exploration, business, and national security. In 1985, international space cooperation was the exception, but in 2007 it is the norm. China's anti-satellite test runs directly counter to these trends.

Additionally, China is pursuing a broad-based, comprehensive transformation of its military forces to include space, counter space and information operations, including a modern intelligence surveillance and reconnaissance architecture with advanced space-enabled command and control

and targeting capabilities. China is also developing a wide range of anti-access and area denial capabilities including the direct ascent anti-satellite, radio frequency jammers, lasers, supporting space surveillance, and information warfare capabilities. The lack of transparency into China's defense expenditure, force structure, and overall intentions is most troubling as it could lead to miscalculation of intent and crisis instability.

The rapid maturation of counter space threats, including China's anti-satellite capabilities, will require a broad range of options, from diplomatic to military, to protect our interests in space. In 1985, only a handful of nations were operating in space and, fortunately, many were allies of the United States. Today, however, many nations are becoming space-faring nations. Each such nation by becoming a space faring nation should also adhere to the international outer space legal regime and ensure it is ready to conduct safe space flight operations. The United States has long urged the international community to focus on gaining universal adherence to the current treaty regime. A fielded direct ascent anti-satellite capability will pose a significant threat to low-earth orbiting satellites and could have strategic implications in a regional conflict.

Potential adversaries must understand that an attack on a U.S. satellite will be considered a hostile act. The National Space Policy conveys a clear message on the vital importance of space and our inherent right to protect our interests in space, and enables a broad range of options, from diplomatic to military, to counter these challenges. The response to threats to our space capabilities must

include: (1) encouragement for all nations to adhere to the principles outlined in current treaties and international agreements for the peaceful use of space; (2) continued modernization of our space situational awareness capabilities to ensure ample warning for the protection of space assets; (3) architectural solutions, including Operationally Responsive Space concepts, to ensure that space capabilities are available when needed; (4) capabilities to deny, if necessary, adversaries the use of space in order to protect our capabilities, ensure our terrestrial forces and keep the U.S. homeland safe.

In conclusion, the strategic significance of space activities to the security and defense of the nation, as well as its economic well being, will continue to increase for the foreseeable future. The United States will continue to lead the world in the peaceful pursuit of the advantages that outer space can bring to the international community. The U.S. Government and Department of Defense policies thus recognize that access to and use of space are central to preserving peace and protecting U.S. national security as well as civil and commercial interests for ourselves, our allies, and the international community at large. The National Space Policy is based on long standing principles and provides the framework for the United States to protect its interests in space through continued international cooperation, diplomacy, and space control capabilities to ensure continued U.S. freedom of action in space.

Mr. TIERNEY. Thank you, General. Thank you both for your testimony, both oral and what will be submitted on the record.

Let me just start the questions by asking this. Under Secretary John Bolton made a statement I mentioned in my opening remarks on September 2004. He said, "We are not prepared to negotiate on the so-called arms race in outer space. We just don't see that as a worthwhile enterprise." Ambassador, why isn't that a worthwhile enterprise?

Mr. MAHLEY. Mr. Chairman, I think I could answer that most succinctly by saying that no arms control is better than bad arms control. We have indicated in the Conference on Disarmament that we are prepared to discuss the topic and see if we can find some way in which one could frame it in a fashion which might be constructive. But, frankly, the kind of framework that has long been promoted as the prevention of arms race in outer space [PAROS], and the Conference on Disarmament documentation, including the most recent P–6 proposal, the A–5 proposals that were there for a long time, allow things that simply do not have either a verifiable or an enforceable means of trying to actually prevent an arms race that would be inimical to our national interest.

As I indicated in my opening statement, the particular proposal there, for example, would, indeed, make it illegal for the Chinese to exercise an anti-satellite weapon, but it would not in any way constrain them from developing it and deploying it. So we do not believe that is simply a means by which we are going to advance our national security in that kind of a negotiation.

Thank you.

Mr. TIERNEY. Do you think that would be some of the things that you would be negotiating?

Mr. MAHLEY. It is my experience in these, at least, that when we start out with a negotiation that already has that kind of a serious flaw in it, the exercise is one in which you are going to try to find out how many more flaws you end up with, as opposed to trying to get rid of some of those that are in there. It has simply been there for a long time that no one was prepared to take that out in terms of the opening proposal, despite the fact that we have frequently indicated that is one of the things which is unacceptable.

Thank you.

Mr. TIERNEY. Just on a personal note, you have testified before us, we discussed outside, on chemical, biological. Your consistent opinion is you can't verify any of these treaties, so we shouldn't do them, period, right?

Mr. MAHLEY. It is my view that when you have a treaty it is the responsibility of everybody that is a party of that treaty to comply with it, and that, unfortunately, in the course of the world there are probably going to be countries at one time or another which are not going to want to do that because they seek some advantage.

In that case, the inability to determine that they are, indeed, not complying with their obligations is a serious, if not fatal, drawback.

Thank you.

Mr. TIERNEY. So bottom line is no treaties ever, in your view?

Mr. MAHLEY. I would not wish to draw that conclusion, because I think we have done some in the past, and I think there is even the possibility of looking at things in the future that might be able

to meet those standards, but I do think that we shouldn't get into any that don't meet the standards.

Mr. TIERNEY. Give me a call some time, Ambassador, when you think of one that you think you might support, all right, because your numerous testimony, I think we haven't got there yet on that.

General, where we are talking about debris and things of that nature, wouldn't that be at least something that we would want to be concerned about, the amount of debris that any of these actions, like China's action, happen, and something we want to engage rather vigorously in trying to make sure that we mitigate or stop?

General ARMOR. Yes, sir, Mr. Chairman. And there are ongoing international discussions on debris mitigation. I think it is the Interagency Debris Coordination Committee, of which China was a signatory. This ASAT was not consistent with their signature on that.

I know that, consistent with the international discussions we have on those rules, we have Department directives that direct us to minimize debris on all of our space activities, and it is pretty rigorously enforced.

Mr. TIERNEY. When you talk about the United States establishing international space debris mitigation guidelines, essentially that is what they are, guidelines, and just——

General ARMOR. Yes, sir, voluntary guidelines, if I understand it correctly. I am not a lawyer.

Mr. TIERNEY. Has there been, to your knowledge, any negotiation trying to get some sort of regime that goes beyond the voluntary compliance aspect?

General ARMOR. Not to my knowledge.

Mr. TIERNEY. Do you think that would be useful?

General ARMOR. I am sorry, sir?

Mr. TIERNEY. Do you think that such a regime would be useful, given the amount of debris—this is one incident—and the potential that exists if others were to follow suit.

General ARMOR. These guidelines are very useful, sir.

Mr. TIERNEY. Are you saying that there would be no use for having something that could be enforced?

General ARMOR. I don't know what enforce means in that context, sir, but guidelines like this that help stimulate responsible behavior and good rules in space are, I think, beneficial to all responsible users, all space powers.

Mr. TIERNEY. It wasn't too beneficial to us with respect to China's actions, was it?

General ARMOR. Well, we are a little bit——

Mr. TIERNEY. Guidelines.

General ARMOR. We are a little bit mystified as to China's intent and behavior in this case, sir.

Mr. TIERNEY. But we weren't mystified to the fact that they did it, because we knew well in advance that they were gearing up to do it, right?

General ARMOR. There were intelligence indications. Yes, sir.

Mr. TIERNEY. Are you able to share with us why it is that we made the decision to not even make any public statement in advance that might have stopped them from doing that, or at least shined a light on them to make them think twice about doing it?

General ARMOR. I would defer to others on that, sir. I had no insight into that decision process.

Mr. TIERNEY. Who are the others that you would defer to?

General ARMOR. I would defer to the White House and the other departments.

Mr. TIERNEY. Thank you.

Mr. Platts.

Mr. PLATTS. Thank you, Mr. Chairman.

First, Mr. Ambassador, on the question of the current administration's not pursuing a space arms control agreement, and that would be an effective approach to take, am I correct in saying that is consistent with the previous several administrations, as well, that President Clinton, President Bush 41, President Carter, that they took this similar approach?

Mr. MAHLEY. Sir, I think what is most accurate to say is that the last time that we attempted to negotiate a legally binding outer space treaty was in the Carter administration with the then Soviet Union. We did that for a number of years and we came to a conclusion that we could not even define the terms of what we were trying to negotiate at that point, let alone the question of what actually constituted weaponization of outer space and what would constitute an effective means to try to prevent it in any fashion.

Since that time, I can say that there have been a number of internal deliberations in which we have tried to look at, in various U.S. administrations, things that might appear to be effective. And you are absolutely correct that it is a consistent view for at least the last four administrations that I am aware of that we have not been able to find anything that looked like it would be a productive means of trying to reach an international legally binding agreement. Yes, sir.

Mr. PLATTS. On the issue of China, I think both of you reference in your statements the inquiries, both through the military channels and diplomatic channels, as to seek to get an explanation, and nothing of substance has been forthcoming. In this setting are you able to share what answers we have been given thus far?

Mr. MAHLEY. Sir, the only thing that I can share with you diplomatically, because it happens to constitute the extent of my knowledge on the matter, not necessarily because it is all there is—and I will be happy to take the question to give you a more complete answer in terms of exactly what we have heard back from the Chinese. But the issue is that we demarged them about that and we have not as yet gotten from them anything which, in our general terminology, we consider satisfactory. By that I mean we have gotten nothing which attempted to indicate what their purpose was or to indicate what their intent was in doing it.

We have gotten a flat statement from them which, in diplomatic terms, is sort of a push off, which simply says that it was not directed at any specific country. That is fine. It wasn't. It was their own satellite. We knew that to begin with. And beyond that, we have gotten no constructive dialog from the Chinese in response to our query.

Thank you, sir.

Mr. PLATTS. Mr. Ambassador and General, would you, either one, want to conjecture, given that China has been one of the nations

pushing for arms control agreement, that since they are the only nation in the last 20 years that has actually pursued a weapon in space, as this test or this action in January exemplifies, their thought process? They are the only ones that have done it, yet they are seeking to limit that ability, from a diplomatic standpoint or a military standpoint.

Mr. MAHLEY. Sir, I will take a stab at that, even though getting inside Chinese minds is not one of the things which is useful in most cases, or possible.

I think the answer would, in some respects, be that the Chinese have generally been developing an overall military improvement operation, and so therefore that would make—and I would defer to my Defense colleague to contradict me if he thinks I am incorrect here—but therefore that kind of a test would not be inconsistent with their overall general military policy that they have been pursuing.

In terms of why they would do that when they are continuing to push the preventions arm race in outer space idea and Conference on Disarmament, again, I would refer you back to my opening statement when I indicated that certainly their proposal for an agreement would not have prevented their development and deployment of such a system. The fact is that it wasn't a choice in place, and so therefore it could well be something like a nuclear test. If you will recall back when we were doing the CTBT negotiations, the Chinese went through an entire series of nuclear tests when they thought they might want to try to get that done before the conclusion of the negotiations.

Whether that same kind of philosophy was engaged here, I really have no knowledge to say, but I would simply refer that to you historically.

Thank you, sir.

Mr. PLATTS. General, did you have something you would like to add?

General ARMOR. Congressman Platts, no, I really don't have that much to add. I mean, that test is consistent with the broad Chinese investment in space, and so if you are pursuing that technology, that is a logical technology thing to do, but it is not consistent with the other things they have said openly and/or in agreements at the President-to-President level, so I am still a little mystified.

Mr. PLATTS. Thank you, Mr. Chairman.

Mr. TIERNEY. In October 2005, I mentioned this also in the opening remarks, we had sort of an annual vote at the United Nations, and the vote generally talks about preventing an arms race in outer space, the need to do that, and in past years the United States has always voted present. This year it was a 160-to–1 vote. The United States was the one to vote no.

Ambassador, what was the change of heart there for that vote change? Just being obstinate, or was there something deeper in policy?

Mr. MAHLEY. Well, sir, I would not try to tell you that I, again, am perfectly familiar with all of the internal deliberations that went into making the determination on that vote, but I will tell you the following: this year the resolution did have changes in the wording, and what it did is, particularly in conjunction with the

other things that were going on in the Conference on Disarmament proposals at that same time, led us in language down a slippery slope into exactly the kinds of things that we had been protesting about in the Conference on Disarmament that we were not going to engage in, and so therefore it was the judgment of the administration that we ought, in this case, to simply make very clear that we were not going to let that language then be thrown back at us in the Conference on Disarmament context as having agreed to something which we were not prepared to agree to, and therefore the best way to do that was to vote no.

Mr. TIERNEY. General, in your written testimony you made the statement that China is pursuing a broad-based, comprehensive transformation of its military forces to include space, counter-space, and information operations, including a modern intelligence surveillance and reconnaissance architecture with advanced space-enabled command and control and targeting capabilities, also developing a wide range of anti-access and aerial denial capabilities, including the direct ascent anti-satellite radio frequency jammers, lasers supporting space surveillance and information, warfare capabilities. Then you go on to talk about the lack of transparency in their expenditure.

Are you able to say that the United States and other nations are not walking down the same path?

General ARMOR. Other nations not walking down——

Mr. TIERNEY. Not pursuing a broad-based, comprehensive transformation of forces, including space, not dealing with counter-space, not dealing with information, operations, not doing any of that?

General ARMOR. We can share intelligence assessments on all the space-faring nations with you, gentlemen, in another venue, and we have shared those intelligence——

Mr. TIERNEY. And I have seen them, so I am not asking you for specifics.

General ARMOR. I see.

Mr. TIERNEY. I am asking you for a broad statement. Are you able to state that no other country except China is taking that path or doing those things?

General ARMOR. As broadly as China is doing it, I believe they are the only ones, as well as us, that are that broad and deep from——

Mr. TIERNEY. So the United States and China?

General ARMOR. Yes, at the current time.

Mr. TIERNEY. OK. Now, there is some information out there that some people in the Chinese community didn't know that the test was happening. It was a relatively small group of people that were informed about that, and, in fact, the Chinese Foreign Ministry might have been largely cut out of the decisionmaking process on that. Is that something we should believe, Ambassador Mahley, or is that something they would like us to believe but is not real?

Mr. MAHLEY. Mr. Chairman, I do not have any specific information, so when I tell you that I don't know the answer to that question it is not that I can't share it with you, it is that I don't know the answer to that question. But I will tell you that it has been my experience, in dealing with the Chinese government over a number of years and over a number of topics, that they have internal com-

munications problems within their government at times, and so therefore it certainly would not surprise me to hear that the Ministry of Foreign Affairs was not fully briefed by their Ministry of Defense on that test and the impending nature of that test. Yes, sir.

Mr. TIERNEY. General, do you want to add anything to that? I think that is what you were signaling me?

General ARMOR. No, sir.

Mr. TIERNEY. Ms. Hitchens, who is going to testify on the second panel today, makes an important observation in her written testimony and states, "The more the United States seeks high-power means to both protect itself in space and ensure that others cannot use space against it, the more threatening U.S. intentions seem and the more others will seek to counter U.S. actions." Do you gentlemen agree with that observation? If not, why not? General?

General ARMOR. Let me start. No, I don't really agree with that. I think most countries are now recognizing that space is in their national interest, economically, and a wide variety of domains, and they are going to pursue it to the extent that their nation is able to. There are even some organizations, consortiums that see the economic benefits and will put resources in space. Space tourism, like you said, is another example of another organization. So I just see this as a general growth and mankind expanding into the space domain, and I don't see it as necessarily one versus the other.

Mr. TIERNEY. Let me proceed a little on that, because we just talked about the comment that at least the United States and China, with some depth, and others in less depth, are pursuing comprehensive transformation of military forces to include space, counter-space, information operations, intelligence, all those things, so yes, they are all doing it, but I think Ms. Hitchens point seems to be—we will hear more from her—that the more the United States seeks sort of hard power, or China or any of these others, to protect themselves in space and ensure that others can't use space against them, the more threatening this whole thing becomes, and it has a potential to spin a little bit out of control. You don't agree with that?

General ARMOR. No, Mr. Chairman, I don't. I mean, we are the world's super power. We sort of are on the leading edge in space. When you say space, people think of America. It has been that way for decades now. And so I think this is just part of the natural evolution of other nations expanding into the space domain.

We are No. 1 so you could say that we were the cause of all of their behavior, but I also think this is a natural progression of expanding into the space domain.

Mr. TIERNEY. And that includes all the military uses and things of that nature?

General ARMOR. Well, yes, sir, when mankind goes anywhere, it tends to take its defensive nature with it, as well.

Mr. TIERNEY. And both of you gentlemen are fine with the idea that we shouldn't do anything on the diplomatic end about trying to get some sort of a treaty or agreement to slow that down or stop it?

General ARMOR. Well, just like in the air and the sea, there are conventions and rules and guidelines that are very helpful to re-

sponsible behavior, navigation of the seas. Our militaries follow all of the air rules for traveling in air space, as does our Navy traveling in sea space, and so I believe that rules like that are genuinely signed up to an agreed-to conventions, rules—I am not a lawyer. I am not sure I know the right terminology, but those are generally helpful to prevent purposeful interference or to create situations where there is miscalculation of intent or just good, responsible behavior in the space domain.

Mr. TIERNEY. Mr. Platts.

Mr. PLATTS. Thank you, Mr. Chairman.

I want to make sure I understand both your positions on the issue of pursuing or the ability of a space arms treaty, that the position you have is based on the complexity of the issue and the ability to actually pursue one that would not compromise our national security and be verifiable and it is the issues around a space arms treaty that is why this administration and previous administrations have not pursued and actually engaged in one. It is not that you are not receptive, but it is just not a possibility that is going to not diminish our national security in today's environment.

Mr. MAHLEY. Mr. Platts, I think I would answer that in the following fashion. The United States has as a policy right now, the fact that we are prepared to pursue equitable, effectively verifiable treaties that are in the national security interest of the United States and its allies. Now, that is not new. That is a policy that has been generally the nature of U.S. negotiating practice for at least the last 15 years that I have been engaged in negotiations.

So, therefore, I think that it is safe to say that if we could find that kind of a treaty, that there is no inherent reason we would not be prepared to pursue it. But, as we have indicated, I think that we have had a number of false starts in the space area along that line which have been unsatisfactory. When I say false starts I go all the way back, as I say, to the ASAT negotiations that we engaged in with the Soviet Union some—I hate to look as old as I am, but some 30 years ago in that. And then the case that we have had, for example, the prevention of arms race in outer space proposal the Chinese have and the Conference on Disarmament. That has been around with only minor modifications for at least the last 12 years, and so therefore all of that is something which says those are not the ways to do that answer.

I would also point out, with just one side note, the Chinese have been pursuing an active anti-satellite program for at least the last decade, so again I don't think that is because of any wording that is in the current national space policy that caused them to do that.

Thank you.

Mr. PLATTS. General.

General ARMOR. I have been impressed with the Outer Space Treaty the last 40 years and the framework that it has laid out. Look at the way space has prospered now over the last 40 years. Again, I do feel that, now that there is more and more space-faring nations and entities in space, that we do need to help augment the rules or just coordinate guidelines on how to operate responsibly in space. In fact, we have made our space situational and space surveillance data available on an Internet site to all users in space; www.spacetrot.org goes right into the Cheyenne Mountain data

base so that people who are moving in space can sort of see that they don't bump into each other and otherwise know what is going on. That is the kind of responsible behavior that I think we would like to try and stimulate.

Mr. PLATTS. On the issue of a specific arms treaty, the actions of China in January kind of add additional concerns why that is not necessarily feasible if we take the answer of the Chinese Defense Ministry not well communicating with the Foreign Ministry in the sense of the military trumping diplomacy. An arms treaty, in essence, is a diplomatic agreement, and it kind of makes the point that, when dealing with China, we maybe all the more need to be careful because within their government some friction between their foreign ministry and diplomatic efforts and their military pursuit of expanded and more-developed capabilities. Is that a fair statement?

Mr. MAHLEY. Congressman, I think it is always a fair statement to say that when you have any kind of friction like that you tend to get policy which does not necessarily satisfy all the kinds of things that you would like to have done with it. And by that I mean that the Ministry of Foreign Affairs has certainly been among the people in the Chinese Government that have been pursuing the PAROS Agreement in Geneva.

I would not want to say that the Ministry of Defense was trying desperately to undercut their efforts in Geneva, but I will say that it is not clear that diplomatic effort by the Chinese in Geneva constitutes a consensus opinion of the Chinese government, in which case you may get actions which are not consistent with it. And certainly we think that the ASAT test was not consistent with any kind of an arms control agreement that they have been pursuing.

Mr. PLATTS. And certainly the actions in January, the launching of the satellite, didn't bolster the diplomatic efforts, and the refusal to give very much information in response to the launch doesn't bolster the diplomatic position of the Chinese.

Mr. MAHLEY. No. Neither that action nor their response to the action, not only to us but to a number of other countries that have made an inquiry, has done anything to promote their diplomatic efforts to try to get a negotiation going on outer space. That is a fair statement.

Mr. PLATTS. Thank you, Mr. Chairman.

I do have one more. One other one for both of you. If you had to highlight the most significant difference between the 1995 directive under President Clinton for a space policy and this one, what would you highlight as the most significant change? General?

General ARMOR. Why don't I start. I thought it was easy. I have been working in the framework of the 1996 policy for 10 years, and when I read the new one the two things that jumped out at me was, No. 1, more cooperation internationally, and especially with our allies. So I personally have been doing that. I have been out talking with our allies. I went to Geneva to the U.N. Institute of Disarmament Research a couple of months ago. I am planning another trip to Europe here soon, and working with the Australians. So there was an emphasis in the new policy about, hey, working with allies and cooperative countries works, why don't we do more of that.

The other one was creation of new organizations within the executive branch, the Director of National Intelligence, Homeland Defense Department also, to bring more unity of effort within the executive branch.

Those were the two things that jumped out at me, from my experience.

Mr. PLATTS. Thank you. Mr. Ambassador?

Mr. MAHLEY. Substantively I think I would first of all agree with General Armor. I would also say that I think the language is more explicit in identification of space as not only a top priority but as being vital to our national security. And I also think that there are some welcome changes in the new space policy in terms of the bureaucratics in the sense of organizing and assigning responsibility for the establishment of the resource base to pursue space policy that we need to pursue.

Those are the things that I would think are changes, sir.

Thank you.

Mr. PLATTS. Thank you both for your testimony and your answers.

Mr. TIERNEY. Thank you, Mr. Platts.

I think we are pretty much at the end of this particular panel.

I only make the note that the Foreign Ministry in China might be at odds with its Defense Department. That would never happen in this country. The Secretary of State's office would be at odds with the Department of Defense? We have not seen any of that in our recent history at all.

I do want to thank both of our witnesses for appearing here today and for your testimony, both oral and written.

At this point, with your assent, we will move on to the next panel, and we give you our gratitude for your time and effort here today.

Thank you.

Mr. MAHLEY. Mr. Chairman, I am going to impose on just one comment. If it were the case that the Defense Department and the Department of State were at odds with each other in this Government, we wouldn't tell the Congress about it, but we will tell the Congress that we think that is the case with the Chinese. Thank you.

Mr. TIERNEY. Thank you, Ambassador.

We are going to take about a 2-minute break here, if the witnesses of the second panel would like to come forward and take their places. We will change the name tags. Mr. Platts will be back, I think he said in a minute or two, and we will get started on the second panel. Thank you.

[Recess.]

Mr. TIERNEY. We are going to reconvene the meeting.

Mr. Platts is tied up for a couple of moments, and he has said he is fine if we start to proceed. He will join us when he can.

I want to introduce our second panel, which represents the scientific community, space and nonproliferation experts, as well as the commercial space industry. On this panel we have Dr. Laura Grego, staff scientist from the Union of Concerned Scientists based in Cambridge, MA; Ms. Theresa Hitchens, who is the Director for the Center for Defense Information; Mr. Jeff Kueter, who is the

president of the George C. Marshall Institute; and Mr. David Cavossa, who is the executive director of the Satellite Industry Association, originally from Lowell, MA, just outside my district in Massachusetts, and I may have some family members moving in.

Welcome to all of you.

Again, it is the policy of the subcommittee to swear in witnesses before they testify. I am going to ask you to stand and raise your right hands, and if there are any other persons who are going to be responding to questions, might they also rise.

[Witnesses sworn.]

Mr. TIERNEY. The record will please indicate that all witnesses have answered in the affirmative. In case you didn't hear me the first time, we would love you to give a summary of your comments. You can read, if you wish, but a summary of about 5 minutes. We won't hold you strictly to that, but in order that all of you get your statements in and we allow for some questioning and answering, that would be a terrific thing. Your full statement will be put in the record, in any event. Thank you.

Ms. Grego.

STATEMENTS OF LAURA GREGO, PH.D., STAFF SCIENTIST, GLOBAL SECURITY PROGRAM, UNION OF CONCERNED SCIENTISTS; THERESA HITCHENS, DIRECTOR, CENTER FOR DEFENSE INFORMATION; JEFF KUETER, PRESIDENT, THE GEORGE C. MARSHALL INSTITUTE; AND DAVID CAVOSSA, EXECUTIVE DIRECTOR, SATELLITE INDUSTRY ASSOCIATION

STATEMENT OF LAURA GREGO

Ms. GREGO. Mr. Chairman and distinguished representatives, thanks for allowing me the opportunity to testify before you today.

I would like to address the question of what approach the United States should take to develop an effective and sustainable policy toward space security. I am a physicist by training and currently apply my technical background to analysis of space security issues.

An important part of understanding security issues is understanding both the possibilities and the limits of technical approaches to security.

I have four main points that I made in my submitted statement, and I thank you for submitting that to the record. They are discussed in more detail in there, but I will summarize them quickly.

The first is that in recent years the United States has taken a largely unilateral approach to space security, based on pursuing technical measures and capabilities. The unclassified version of the national space policy released in 2006 formalized at the highest Administrative levels what was essentially already U.S. policy. Arms control and diplomatic approaches are considered largely irrelevant to solving outstanding space security issues.

Two, while there are useful technical measures the United States can and should take to improve security, because of the increasing technical capabilities of other countries and the dual use nature of micro satellites and other space technologies, the current unilateral technical approach is ultimately going to be neither effective nor sustainable. Defensive space weapons are not a solution to providing security to our critical satellite capabilities.

The third point is that, as a result, there is a need for diplomatic efforts to pursue rules of the road and operational constraints on space operations, as well as verifiable legal constraints on systems intended to damage and destroy satellites. In the future, limits on specific technologies will not be sufficient and operational constraints and other rules of conduct will be essential to maintain security.

And the last point was that, as a first step toward controlling anti-satellite systems, an international ban on debris-producing anti-satellite weapons similar to the weapon that China tested in January will be a way of starting an international process in taking an important step toward preserving the use of space for the future. If such a ban could be negotiated and respected, it would prevent the production of a large amount of space debris that would be generated in testing programs, and the single biggest threat to the future of the space environment could be mitigated. It would also reduce the military utility of extant or developing destructive ASAT weapons due to the decreased confidence in an untested or an incompletely tested system. Such a ban would be verifiable, perhaps with already existing surveillance assets.

A ban on destructive anti-satellite weapons will derive still greater relevance and usefulness as part of a comprehensive regime of technical measures to preserve satellite capability and arms control measures, rules of the road for space conduct, and confidence-building measures between space-faring nations.

In the remaining time I just wanted to spend a few minutes talking about in more depth a couple of points in my written testimony. The first is space debris. The Chinese ASAT test in January increased the amount of debris in low-earth orbits by about 20 percent. I would like to emphasize that the approximately 1,600 pieces of debris cataloged in the space catalog by the U.S. Air Force are only those that can be tracked by the U.S. Space Surveillance Network, specifically, pieces of debris bigger than about 10 centimeters or 4 inches in size. That does not include the pieces of debris that are too small to track reliably but which still can create significant damage to a satellite during a collision.

The destruction of the Fengyun 1C satellite released, according to our calculations, over 40,000 pieces of debris of that untrackable but still very dangerous type.

Fortunately, the absolute risk to satellites due to this debris is still low. However, the situation could become much worse if China or other countries continue testing these weapons, and it is critical to stop this now. We have been calculating the amounts of debris that would be produced by destructive ASAT weapons, and find that destroying a single large satellite such as a U.S. spy satellite would double the amount of dangerous debris in low-earth orbit. This is the same amount of debris that would be avoided during 70 to 80 years of space activity under the strict debris mitigation guidelines of the kind being considered at the United Nations and to which the United States is a consulting party.

At the Union of Concerned Scientists we continue to conduct research on the subject of the debris from ASAT attacks and would be happy to provide our expertise to Congress.

This brings me to my comments on the lead up to China's ASAT test. The Chinese research program on hit-to-kill technologies appears to have begun in the 1980's, probably sparked by observing the United States and Soviet Union developing and testing ASAT weapons during that time and the United States pursuing homing missile defense technologies. The research likely continued at a low level through the 1990's and may have been boosted in recent years in response to U.S. missile defense tests, as it would be in the Chinese self interest to understand this technology if it wanted to counter it for its own missile defense and to plans released by the United States for new military uses of space.

The Chinese ability to master the difficult technical challenge of maneuvering a high-speed interceptor to hit a high-speed satellite about the size of a golf cart indicates the advanced state of China's space technology. However, the complexity of this technology does also indicate that, without further testing, this nascent ASAT weapon could not be considered an operational military capability.

We are not privy to the internal decisionmaking process that led China to pursue this final destructive test, but we do know that the United States was not taken by surprise by the test, having observed the preparations for it, which reportedly China made no attempt to disguise, and the United States did see it take place.

We also know that the United States also observed at least two previous tests of the ASAT system reaching back at least 18 months in which the interceptor passed near to but did not collide with the satellite.

It has been reported again that, after seeing the earlier tests, that the United States decided not to contact China to protest or ask about them. Since China would have known that the United States could see this test with its early warning sensors and understand it for what it was, it may have interpreted the lack of reaction by the United States as a lack of concern, if not tacit approval. So one does wonder what might be characterized as unverifiable about that.

While the responsibility for this test rests fully with China, the United States may have missed an opportunity to avoid it if it used thoughtful diplomacy. Reports indicate that the U.S. officials assumed China was committed to this test and let the United States have little leverage to stop it. This assumption can't be evaluated since the United States didn't actually attempt to dissuade China. Moreover, we do have evidence that suggests this assumption may not be correct.

Based on information we have collected about the January test, there appears to be an ongoing debate within China about the wisdom of this test and about possible future tests. It appears that the Chinese leadership did not anticipate the strong international reaction to the test. The decision process may have included a narrow set of people, in particular the Foreign Ministry appears to have been largely cut out of the decision to conduct that test, which may have led to this surprise. And Chinese decisionmakers may not have been adequately advised on the degree of consequences and the harm it would do to other space-faring nations, a number of which China has strong partnerships with.

Had the United States raised this issue with China prior to the test, that would have almost certainly broadened the set of people who were involved in the decisionmaking process. This could have had a significant effect on the Chinese decision.

So what happens next or doesn't happen is important. Some in the United States argue that the ASAT program is central to China's military strategy of disrupting U.S. space assets, so it would not have stopped the test even if the United States had protested; that it would continue developing and testing the program, despite the strongly negative international reaction.

The system, itself, cannot yet be considered a proven capability. If China refrained from future tests, this would call into question just how central China sees this ASAT system is to its military posture, and that Chinese decisions may be influenced by international concerns.

I will leave you with the idea that technical solutions cannot get us all the way to a secure future in space. Diplomacy and arms control measures will be essential to building our future in space, a future where the enormous potential of space as an agent of prosperity and stability is realized.

I urge the distinguished members of this committee to ask the hard questions. Why isn't the United States using all the tools available to ensure security on space and on earth? Why are we not vigorously pursuing all the potential diplomatic avenues, when there are many? And while the United States has apparently abandoned the development of its own kinetic energy ASAT weapon back in the 1980's, it has taken a very welcome leadership role in developing international guidelines for debris mitigation and has the most to lose from space debris, owning over half the active satellites in orbit. Why doesn't it do more to make sure that no other country develops and tests this kind of weapons? Specifically, why did it apparently stand by and watch while China tested its massive kinetic energy ASAT system and did not vigorously try to dissuade the Chinese from the test in which they actually destroyed a satellite, especially with so much at stake?

Thank you.

[The prepared statement of Ms. Grego follows:]

Testimony by Dr. Laura Grego
Staff Scientist in the Global Security Program
of the Union of Concerned Scientists

before the Subcommittee on National Security and Foreign Affairs
of the Committee on Oversight and Government Reform

on

Weaponizing Space:
Is Current U.S. Policy Protecting Our Security?

May 23, 2007

Mr. Chairman, Distinguished Representatives:

Thank you for allowing me the opportunity to testify before you today. I would like to address the question of what approach the United States should take to develop an effective and sustainable policy toward space security that benefits both U.S. and international security.

I am a physicist by training, and currently apply my technical background to analysis of space security issues. An important part of understanding technical issues is understanding both the possibilities—and the limits—of technical approaches to security.

The main points I would like to make today are these:

- In recent years the United States has taken a largely unilateral approach to space security based on pursuing technical measures and capabilities.

- While there are useful technical measures the United States can and should take to improve security, because of the increasing technical capabilities of other countries, and the dual-use nature of microsatellites and other space technologies, the unilateral, technical approach is ultimately going to be neither effective nor sustainable.

- As a result, there is a need for diplomatic efforts to pursue "rules of the road" and operational constraints on space operations, as well as verifiable legal constraints on systems intended to damage or destroy satellites.

- As a first step toward controlling anti-satellite systems, an international ban on debris-producing anti-satellite weapons, similar to the weapon tested by China in January, would be a way of starting an international process and taking an important step toward preserving the use of space for the future.

So that we may start with a common understanding, I will be clear about what specific security issue I am addressing. The term "space weapons" encompasses space-based missile defense interceptors, ground attack weapons based in space, and anti-satellite weapons—both ground-based and space-based. While both space-based missile defense and ground-attack weapons have serious security implications, any sort of implementation of them is some years off. Instead, I will focus on what I believe is the major issue facing the United States in the near-term: the development of anti-satellite weapons.

Outer space has enormous potential as an agent of stability and prosperity. This potential is being realized, for example, via the unique capacity of satellites to observe and transmit to wide swaths of earth at once, permitting efficient communications to remote regions, simultaneous broadcast to large audiences, and comprehensive observation of the earth's atmosphere and surface. However, as satellites serve a number of important military missions and also have significant potential physical vulnerabilities, they have long been considered possible attractive military targets. And some argue that warfare in (and from) space follows naturally from war on earth.

How do we manage these strategic issues to preserve the beneficial agency of space into the future? How do we ensure that involving space does not escalate conflicts? How do we transition gracefully from the present to a future where many more states have interests and assets in space?

Currently, the state of affairs in space is as favorable to the United States as it is ever likely to be. The United States is the uncontested dominant user of space, owning over half of the nearly 850 satellites operating today.[1] Satellites have become integral to commercial endeavor, scientific inquiry, and military function. No state has deployed dedicated weapons stationed in space or weapons that could destroy satellites.

However, U.S. discussions of its military goals for space, along with futuristic visions of space-based ground strike weapons such as "rods from God" presented in semi-official U.S. military planning documents inflame apprehension domestically and abroad. These, coupled with the refusal of the United States to consider space security initiatives in international fora,[2] generate mistrust and strain strategic relationships that are necessary for progress on other crucial issues, such as nonproliferation and terrorism.

The choices made now about which space programs to pursue and how to formulate rules and engage in agreements about conduct in space will set the tone for space operations and strategic relationships for years to come. The United States, in particular, as the most influential user of space, has a great opportunity to shape the future. These issues have been visited before, most notably during the Cold War. But context is important, and a number of changes in political, strategic, and technical context have occurred in the last twenty years—changes that may lead to new policies regarding space weapons. This revisit finds the world with the United States as the single dominant space power, without the peer competitor relationship of previous years. At the

[1] Union of Concerned Scientists Satellite Database 4/09/07 version, http://www.ucsusa.org/satellite_database, accessed May 21, 2007

[2] The Russian Federation and China have submitted draft text for a treaty on space weapons to the United Nations Conference on Disarmament and have been trying to get it on the agenda for a number of years. The United Nations General Assembly has voted nearly unanimously for many years on resolutions on Preventing an Arms Race in Outer Space; only the United States and occasionally Israel or Micronesia has not voted positively. The United States has abstained every year until 2005, when it voted "no." Following the Chinese test, in the 2007 session of the Conference on Disarmament the United States agreed to take part in talks on space, if a plan of work is adopted.

same time, satellites and services from them, the use of which is not at all exclusive to space-faring nations, are much more deeply ingrained in the international economy than in the past. And the number of states with the ability to build and launch satellites,[3] or the aspirations to do so, has grown steadily.

In addition to the strategic roles they played in the past, satellites gained new roles over the last decade. Space systems playing tactical roles are now critical to the conduct of conventional military missions by the United States, and have been recognized as "an integral part of the deterrent posture of the U.S. armed forces."[4]

The new unclassified version of the National Space Policy[5] (NSP), released in 2006, recognized this ascendancy of military uses for space. In the 1996 NSP, the first space policy goal listed was civil ("Enhance knowledge of the Earth, the solar system and the universe through human and robotic exploration") and the second was military ("Strengthen and maintain the national security of the United States"). In the 2006 NSP, the top two goals listed are national security related: "Strengthen the nation's space leadership and ensure that space capabilities are available in time to further U.S. national security, homeland security, and foreign policy objectives" and "Enable unhindered U.S. operations in and through space to defend our interests there."

Of all nations, the United States has by far the largest investment in military space assets and best exploits the military advantages satellites can provide for missions such as reconnaissance, targeting, communications and surveillance. The military utility of satellites has naturally lead to a desire on the part of the U.S. military to preserve for itself these satellite-based capabilities and to deny them to potential adversaries.

However, satellites are intrinsically vulnerable, and defending them from a determined adversary is difficult. Satellites are readily observable and travel on predictable paths, so their future

[3] Over forty states own satellites as of June, 2006, not counting the states of the European Space Agency individually. Many more countries beyond this group buy satellite services.
[4] Department of Defense directive on Department of Defense Space Policy, July 9, 1999 http://www.dtic.mil/whs/directives/corres/pdf/d310010_070999/d310010p.pdf, accessed August 29, 2006.
[5] The new U.S. National Space Policy was released on October 6, 2006, four years after the Bush administration called for its review. The new directive replaces the Clinton National Space Policy of 1996, the previous operating document.

position can be readily calculated. Most satellites pass over much of the earth repeatedly, giving an adversary multiple opportunities to attack. By design, satellites are light and largely unarmored, as space launch is extremely expensive and mass at a premium.

As a result, these assets are not only valuable but vulnerable; this may provide other countries strong incentives to attack or disrupt them.

The 2006 National Space Policy emphasizes that space assets must be protected and afforded the unhindered ability to operate in space: "The United States … rejects any limitations on the fundamental right *of the United States to operate in* and acquire data from space" [emphasis added]. It also recognizes that in some situations, the United States may want to deny the use of these types of valuable space capabilities to its adversaries: "Maintain the capabilities to execute the space support, force enhancement, space control, and force application missions. …Develop capabilities, plans, and options to ensure freedom of action in space, and, if directed, deny such freedom of action to adversaries."

In addition, the new NSP dismisses arms control and diplomatic approaches as largely irrelevant.

In this regard, the 2006 NSP is strikingly different from the 1996 version. The 1996 NSP states that "Consistent with treaty obligations, the United States will develop, operate and maintain space control capabilities to ensure freedom of action in space and, if directed, deny such freedom of action to adversaries. These capabilities may also be enhanced by diplomatic, legal or military measures to preclude an adversary's hostile use of space systems and services." In addition, the Arms Control section of the 1996 NSP states that "The United States will consider and, as appropriate, formulate policy positions on arms control and related measures governing activities in space, and will conclude agreements on such measures only if they are equitable, effectively verifiable, and enhance the security of the United States and our allies."

In contrast, the 2006 NSP states that "The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States

to conduct research, development, testing, and operations or other activities in space for U.S. national interests…"

This shift is consistent with the U.S. diplomatic position in the United Nations, both in the First Committee and the Conference on Disarmament. As noted above, the United States has in recent years consistently opposed discussions of diplomatic approaches governing activities in space.

The approach instead has been to focus on developing a set of technologies, many of which have anti-satellite (ASAT) capability. While the United States has available for use nonpermanent means of interfering with the operation of satellites, such as "jamming" systems, more lethal options have been considered. In the 1980's, the Air Force performed a series of tests of the "Air-Launched Miniature Vehicle," a homing interceptor launched from an airplane, which could ascend directly to a satellite and destroy it with the force of impact; in a 1985 test, the system destroyed an orbiting satellite. About ten years later, the United States tested a system based on a high-powered laser that was coupled to a mirror that could track satellites. Research continues on technologies useful for laser ASAT systems. Additionally, systems such as the ground-based midcourse missile defense system and highly maneuverable microsatellites have intrinsic ASAT capability and create an implicit and unaddressed threat to satellites. And no clear directive has been issued taking destructive ASAT weapons off the table.

Because of the intrinsic vulnerability of satellites to various types of interference, one must assume that the United States will not have a monopoly on ASAT capabilities, and that other countries will be able to develop effective ASAT capabilities of some type if they have the incentive.

Defensive satellites, often called bodyguard satellites, are sometimes discussed as a means of protecting high-value satellites by acting as a weapon themselves to destroy or disable the attacking ASAT weapon. For various technical reasons, this is a very difficult task, and deploying such satellites would not provide confidence in the survivability of the satellite they were intended to protect. Additionally, defensive weapons of this type may be useful as ASAT weapons themselves, and because of their limited defensive use, may be viewed by others primarily as offensive.

With no legal restrictions on ASAT weapons, and with the evident strong interest in ASAT-capable technologies by the leading space power, other states may decide ASAT weapons are the answer to their perceived security needs. The Chinese rationale for developing and testing its ASAT weapon is unknown to us. However, its repeated calls along with the Russian Federation for diplomatic discussions about space security were rejected by the United States. Although it is impossible to say where such discussions could have led, that there *were* no discussions guaranteed that there was no law banning the Chinese destruction of an orbiting satellite. Additionally, although there were two tests of the ASAT system that were observed by the United States prior to the January test, there was reportedly no effort to dissuade China from testing it against a satellite.[6] It remains to be seen whether China sees this ASAT capability as important to its military posture. Performing another test of the system may indicate this is so; however, if China does not pursue additional tests, which would be required for the system to be considered operational, it may indicate that China is not committed to developing this capability and remains open to diplomacy.

The result of the series of tests of the Chinese ASAT weapon was the destruction of the Fengyun 1C satellite on January 11, 2007. FY-1C had a mass of just under one ton and was orbiting at roughly 850 km altitude when the collision occurred, and the energy of the collision completely fragmented the satellite into orbital debris. This test approximately doubled the density of debris larger than 1 cm in that region for at least five years, doubling the risk of a catastrophic collision at that altitude. By late May, the U.S. Space Surveillance Network had already cataloged some 1,600 pieces of debris (presumably larger than 5 to 10 cm) from the Chinese test. Because this breakup took place at a high altitude where the atmospheric density is very low, a large fraction of this debris will remain in orbit for decades, and the earth's gravity will spread the debris out into a shell around the earth.

Although it was a single destruction of a satellite, it demonstrated the very serious consequences of unrestrained ASAT weapon development. The breakup of satellites larger than FY-1C will

[6] M. Gordon and D. Cloud, "U.S. Knew of China's Missile Test, But Kept Silent," *New York Times*, 23 April 2007, p.1.

produce significantly more debris. Satellites that are considered likely targets of ASAT weapons, such as spy satellites, have masses ten times that of the FY-1C satellite. The breakup of a single large satellite with a mass of 10 tons would double the amount of debris with size larger than 1 cm in all low earth orbits, and could increase the density of debris, and therefore the risk of collision, in altitudes near the breakup altitude by several hundred percent. Satellites cannot be shielded effectively against collisions at orbital speeds with debris larger than about 1 cm. Moreover, debris smaller than about 10 cm cannot be reliably tracked from the ground to give warning of a possible collision. All satellites, not just the intended targets, would experience a resulting higher risk of collision.

Pursuing anti-satellite technologies in the absence of any restrictions on them will likely increase the threats that U.S. satellites face, both by ASAT weapons developed by other countries and the possible debris that testing and use of destructive ASAT weapons would cause. Clearly the approach in the NSP of using only a few of the tools in the toolbox—technical tools for space control, but not diplomatic tools—is misguided. The United States has available other approaches that are likely to garner more security.

Some of these approaches are technical. Fortunately, there are many things the United States can do to protect capabilities that rely on satellites, including designing satellites with redundancy, so that damage to one part of the satellite need not cause the satellite to be useless, and using a number of smaller satellites to perform the same function as a single or few big expensive ones. Moreover, ground and air-based components can provide a backup to satellites on a regional rather than global level. Keeping satellites from being an Achilles heel will also diminish their attractiveness as military targets.

The United States should implement these satellite safeguards, and should also take the lead on developing "rules of the road" for space operations, and increasing transparency on space security issues. Rules of the road could include rules that establish a keep-out zone around satellites, and a method for notifying the owner of a satellite should another satellite need to violate this zone. In a similar manner as the Law of the Sea, such rules can defuse unnecessary

tensions, and are especially useful during times of crisis. Diplomacy may not be perfect or solve all of the outstanding security requirements or tensions, but neither are military options perfect.

The United States emphasizes exploring a range of technologies, with the goal of seeing what works and may be useful. Similar effort ought to be devoted to exploring what is possible diplomatically. Exploring and understanding these possibilities does not imply the United States would necessarily see these efforts as successful and useful, and does not commit the United States to them. But neglecting this avenue altogether, as it does now, is irresponsible.

Space-faring countries have the most capability to mount effective ASAT attacks, and are the only ones who can place weapons in orbit. The technology required to build effective ground- and space-based ASAT weapons is within the capability of any space-faring nation, and they could deploy ASAT weapons relatively quickly in response to the deployment of ASAT weapons by another country. But these are also the countries with the most to gain by negotiating and observing limits on such weapons. This fact suggests that developing an effective international regime on controlling ASAT weapons should be possible.

There are some issues that military efforts cannot address, such as problems arising from dual-use technology, and that require diplomatic efforts to develop rules of the road that govern how systems are operated. A reasonable goal for diplomacy is to generate a mix of restrictions on the most dangerous technology and operational rules of behavior for dual-use technology.

A first step toward a comprehensive space security regime may be a multi-lateral ban on the testing and use of destructive anti-satellite weapons, particularly those intended to destroy satellites through impact, which therefore generate huge amounts of debris. If this agreement could be negotiated and respected, the single biggest threat to the sustainable space environment could be mitigated. This protection of the space environment would be the primary benefit, and a meaningful one.

Currently, missile defense tests consist of low-altitude intercepts of a ballistic missile warhead, which is sub-orbital. A ban on destructive ASAT weapon tests would prohibit the missile

defense interceptors from being tested explicitly against satellites, and the ban could set an upper altitude limit to missile defense tests.

Such a ban should be verifiable from the ground, perhaps with the already existing observational assets, perhaps with additional assets and coordination between observers. Countries that consider this idea may convene a panel of experts who could assess existing national technical means and their suitability for the purpose.

For example, U.S. early warning sensors could detect the launch of the booster carrying a ground-based hit-to-kill weapon; China's destructive anti-satellite test as well as the tests leading up to it (that did not destroy a satellite) were observed in this way by the United States. Additionally, preferably with—but perhaps initially without—launch detection, all possible satellite targets for tests of a destructive ASAT test could be monitored and verified that they have not been destroyed in an ASAT test. The US Space Surveillance Network (SSN) regularly tracks thousands of objects of size greater than around 10 cm; its tracking of active satellites and inactive satellites and large pieces of debris is considered to be complete.

Countries could verify the ban independently using a surveillance system that is much simpler than the U.S. Space Surveillance Network. Developing an independent capability to track all possible targets is a much simpler and focused task than trying to replicate the U.S. SSN catalog, as the number and type of targets and the mission is tightly circumscribed.

A test ban would prevent the production of the large amount of debris that would be generated in testing programs, and would reduce the military utility of the ASAT weapon due to the decreased confidence in an untested or incompletely tested system.

Limits on debris-creating ASAT weapons would be particularly powerful if it came in the context of other efforts to deter the use of destructive ASAT weapons in a conflict. These steps could include the measures discussed above to reduce the attractiveness of satellites as targets, and the declaration of a set of consequences that would follow the destruction of a satellite.

A destructive ASAT weapon ban will derive still greater relevance and usefulness as part of a comprehensive regime of arms control measures, rules of the road, and confidence-building measures. It is a logical place to start approaching a comprehensive space security regime, one that can not only preserve our ability to use space's benefits for many generations to come, but can help keep space from being a locus or catalyst for conflict here on earth.

Mr. TIERNEY. Thank you.
Ms. Hitchens.

STATEMENT OF THERESA HITCHENS

Ms. HITCHENS. Thank you, Mr. Chairman and members of the subcommittee, for inviting me today to discuss what I believe is one of the most important subjects for the 21st century, and that is the future security of space and, in particular, the impact of U.S. policy on that security.

Warfare in space would endanger all space operations, civil, commercial, and military. As the world's preeminent space power, the United States will have the most to lose if space becomes a battlefield. Unfortunately, U.S. policy is leading us in exactly that direction, toward embracing space weaponization and away from international diplomacy that could reduce future threats to our space assets.

As has been stated, the Bush administration on October 6, 2006, released international space policy superseding the previous Clinton policy. While there are similarities to previous policies in that new national space policy, the wording is strikingly different from its predecessors in its unilateralist tone and its focus on the exercise of military space power. In seeking to assert unhindered U.S. rights to act in space, the new policy, at best, ignores the rights of others under the Outer Space Treaty, which deems space a global commons.

The new policy not only repeats the 1996 language asserting a right to deny U.S. adversaries the use of space, but it goes further by stating U.S. intentions to deter others from even developing capabilities that can challenge U.S. freedom of action in space. That is a difficult thing to uphold, considering that most space technologies are dual use.

It stops short of overtly authorizing space weapons, but when read in concert with current military documents designed to implement it, which detail the missions of offensive space control and space force application, U.S. intentions to pursue such weaponry seem clear.

Reaction to the new policy, especially abroad, has been exceedingly negative. Dr. Joan Johnson-Freese of the U.S. Navy War College provided this assessment: "The blunt and even confrontational language of the new policy puts the United States at odds with the priorities of other space-faring nations. The language is so broad that it reads more like a blanket claim to hegemony in space." And the document, as the chairman has already noted, further distances the United States from international efforts to establish collective security in space.

Sadly, this aggressive U.S. declaratory policy and the Just Say No attitude to diplomacy is utterly failing to protect America's interest in space. To the contrary, it is backfiring, alienating allies and prompting our potential adversaries into seeking ways to counter any expansion of U.S. space power.

Certainly if the aim of U.S. policy is to dissuade and deter others from obtaining capabilities to threaten us, it has failed at doing so. As we heard, China has tested an ASAT weapon. India is threatening to develop similar capabilities which would no doubt spark an

Asian ASAT arms race involving Pakistan and possibly others. And we have already heard about the debris problem.

The time has come for the United States to rethink its failing strategy. A first step would be to engage other space-faring nations in efforts to define peacetime rules of the road, as mentioned by General Armor. A space code of conduct would bolster U.S. national security by serving to reduce tensions and making it easier to identify and constrain bad apples.

Second, the United States should renounce not only the development and deployment of debris-creating ASATs, but it should also urge an international ban on testing and use of these indiscriminate satellite killers. While such a ban may not prevent people from working on them, it certainly would discourage other nations from using them or testing them, which is where I mentioned would make it less likely that they would want to rely on them in warfare.

As they say, an ounce of prevention is worth a pound of cure, and in the case of space debris this is doubly true since there are currently no technologies available for cleaning it up. There is no such thing as a Space Hoover.

Finally, the United States needs to sit down with other space-faring nations to discuss how to avoid an arms race in the heavens, and I am glad to hear that Ambassador Mahley said that the United States is no longer refusing informal discussions in the CD. That is a change, and it is a welcome one. But I would hope that we would be willing to at least talk about crafting a treaty to ban space-based weapons, even though we know it would be fiendishly difficult to do. Certainly there can be no harm from an honest discussion.

My last point is that a new focus on diplomacy and collective security in space does not and should not mean that the United States should abandon necessary efforts to protect its satellites, for example, by improving space situational awareness, but the fact is that what any one operator does in space directly affects all others, and not any one nation, not even the United States, can guarantee safety and security in space on its own.

Thank you. I will be happy to take any questions.

[The prepared statement of Ms. Hitchens follows:]

STATEMENT BY

THERESA HITCHENS

DIRECTOR

THE WORLD SECURITY INSTITUTE'S
CENTER FOR DEFENSE INFORMATION

BEFORE THE NATIONAL SECURITY AND FOREIGN AFFAIRS SUBCOMMITTEE

HOUSE OVERSIGHT AND GOVERNNMENT REFORM COMMITTEE

ON

WEAPONIZING SPACE:
IS CURRENT U.S. POLICY PROTECTION OUR SECURITY?

MAY 23, 2007

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

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

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

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

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

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

2006 NSP vs. 1996 NSP

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

[2] Satellite Industries Association press release, "Commercial Satellite Industry Continues to Grow," June 14, 2006, http://www.sia.org/PDF/06142006PRStateofSatelliteIndustryReport.pdf.
[3] These are: Intelsat, headquartered in Bermuda; SES Global, Luxembourg; Eutelsat, France; Loral Skynet, U.S.; Inmarsat, London.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Military Space Strategy & Doctrine

A National Space Policy, as with any presidential policy, must be read as a capstone guidance document, and thus cannot be judged in a vacuum. In the case of U.S. national security and military space, numerous other documents underpin the NSP by articulating how the presidential policy should be implemented, and the military mission and capabilities requirements that flow from presidential decisions. Interestingly, under the Bush administration, a number of these "subordinate" military documents were actually issued in advance of the new NSP – even though it was known throughout the national security space community that a new policy was being formulated. The most pertinent, and of the most concern regarding the future of U.S. military space operations, are the "Joint Doctrine for Space Operations", published by the Office of the Joint Chiefs of Staff in August 2002,[6] and the U.S. Air Force "Counterspace Operations" doctrine published in August 2004.[7] Both of these documents are as of May 2007 still operable.

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

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[5] Joan Johnson-Freese, "The New U.S. Space Policy: A Turn Toward Militancy?" *Issues in Science and Technology*, Winter 2006, 33-36.
[6] Joint Publication (JP) 3-14, *Joint Doctrine for Space Operations*, 9 August 2002, http://www.dtic.mil/doctrine/jel/new_pubs/jp3_14.pdf
[7] Air Force Doctrine Document (AFDD) 2-2.1, *Counterspace Operations*, 2 August 2004, http://www.dtic.mil/doctrine/jel/service_pubs/afdd2_2_1.pdf

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

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

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

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

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

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

[8] Robert S. Dudney and Peter Grier, "New Orbit for American Space Power," Air Force Magazine, Vol. 87, No. 2, February 2004, http://www.afa.org/magazine/Feb2004/0204orbit.asp
[9] *Strategic Master Plan FY 06 and Beyond*, Air Force Space Command, Oct. 1, 2003, http://www.wslfweb.org/docs/Final%2006%20SMP--Signed!v1.pdf

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

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

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

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

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[10] Ibid.
[11] Ibid.
[12] *Counterspace Operations, Foreward*

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

Regarding "third party assets," the document explains:

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

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

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[13] Ibid, p. 31.
[14] Ibid, pp. 32-33.
[15] Ibid, p. 33.
[16] Ibid, p. 34.

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

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

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

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

[17] *Space Operations*, Air Force Doctrine Document 2-2, 27 November 2006, U.S Air Force, http://www.fas.org/irp/doddir/usaf/afdd2_2.pdf
[18] Ibid, p. 32.

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

Posture

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

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

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

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

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

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

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

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

Security Dilemmas and Risks

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

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

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

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

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

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

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

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

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

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

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

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

Diplomatic Isolation

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

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

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

Sadly, the Chinese anti-satellite test – rapidly followed by statements by Indian officials that New Delhi too would pursue anti-satellite capabilities[28] -- threatens to contradict that statement.

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

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

[28] Vivek Raghuvanshi, "China's ASAT Galvanizes Indian Efforts," *Defense News*, April 9, 2007, 20.

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

Reversing a Failed Approach

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

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

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

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

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

[29] Marco Cacéres, "Market Impact Brief: China's ASAT Weapons Test," Teal Group Corp., Arlington, Va., Jan. 22, 2007.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Mr. TIERNEY. Thank you, Ms. Hitchens.
Mr. Kueter.

STATEMENT OF JEFF KUETER

Mr. KUETER. Mr. Chairman, members of the subcommittee, thank you for the opportunity to be here today to discuss this very important issue. I agree completely with Theresa that it is, I believe, the national security question of the 21st century.

Our use of space has clearly changed, and what it means for the strategic environment has clearly changed. As has been mentioned, the missions provided by space are integral to the American way of warfare. This way of warfare brings us enormous advantages. It requires less manpower, puts fewer U.S. forces in harm's way, and integrates all space-based missions into real time boots-on-the-ground and stand-off precision strike operations.

By fulfilling these real-time war fighting needs, as well as the broader strategic reconnaissance and intelligence missions, space assets no longer just tell us where people are and what they are doing, they are integrated with and improve the effectiveness of weapons systems that are used to target and destroy. That is not a convenience to the war fighter; they are now part of the weapons systems that we use every day, and not an insignificant part of that.

These capabilities are uniquely American strength and provide clear incentive for attacking American spacecraft. Other nations have clearly taken notice. China's demonstration of its direct-ascent anti-satellite system in January 2007 shows those emerging capabilities. Last September, reports surfaced that China had successfully conducted laser blinding tests against U.S. reconnaissance satellites, and further investigation reveals that these blinding tests had been ongoing for several years. China has made no secret of its efforts to develop techniques to jam navigation satellites, as have many other nations.

China's perceptions of its security environment and the nature of the future conflicts explain their investment in military space capabilities. They understand that the control of space is essential to success in future warfare. Without control of space, Chinese military leaders believe neither they nor an adversary can expect to assert air or naval dominance or win a ground war.

In light of this changed environment, what are we to make of the national space policy? Released after many years in the making, the policy charts a reasonable course, upholding established beliefs about safeguarding the security of the United States in space while preserving the flexibility needed to respond to the uncertain security environments of the future.

The policy is not without its failings, but it does reiterate the commitment to preserving and protecting U.S. assets in space, as has been directed by Democratic and Republican Presidents, alike, over the years. But as the first space policy written for the age of the space-enabled reconnaissance strike complex, the policy rightly asserts that the national security establishment should "develop capabilities, plans, and options to ensure freedom of action in space and, if directed, deny such freedom of actions to adversaries."

This goal draws its origins from the earliest days of the U.S. space program, nor is there really anything unique about directing the security establishment to develop plans and options to deny freedom of action to adversaries. Even President Carter ordered the Defense Department to "vigorously pursue development of an anti-satellite capability" and allowed for the production of such systems.

Nevertheless, this mandate is widely interpreted as presaging the deployment of new U.S. space weapons rather than for what it actually is, a reaffirmation of the continuing strategic approach.

The declaration that the United States will "oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space" also is offered as evidence that the new policy is part of some nefarious framework to expand U.S. hegemony in space. Instead of just simply a statement that the United States will not support international agreements that it considers contrary to its interests, it is not the blanket prohibition on arms control, as is often asserted.

Past space policies include similar qualifying language. For example, President Clinton's 1996 policy stated that the United States should "conclude agreements on such measures only if they are equitable, effectively verifiable, and enhance the security of the United States or our allies." The new policy sends the same message as the old policy: the United States will not become a party to an agreement that it feels is contrary to its interests. Nevertheless, the new policy does not eschew internationally. For example, it strongly calls on the United States to assume leadership on overall debris mitigation.

So the question now facing America's leaders is, how does the United States best deter, deny, and dissuade the Chinese and other emerging space powers from hostile actions in space?

The first step I suggest is moving beyond the tired lexical dispute over what is militarizing or weaponizing space. That is too late. Space is already both of those. A positive step would be to build on recognition of the new reality in space to enable public and political support necessary to begin the work to protect critical space programs. A new emphasis on policies and programs likely to improve our capabilities to respond and react to incidents in space is needed. The United States should not foreclose the option of developing active defenses, if necessary. And, finally, diplomatic efforts can play important roles in preserving U.S. security, but only in combination with other measures.

There are a number of topics that I suggest we consider there, most importantly involving more actively our NATO allies.

Thank you for the opportunity to be here today.

[The prepared statement of Mr. Kueter follows:]

TESTIMONY OF JEFF KUETER

PRESIDENT, GEORGE C. MARSHALL INSTITUTE

WASHINGTON, D.C.

BEFORE THE SUBCOMMITTEE ON NATIONAL SECURITY AND FOREIGN AFFAIRS

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

U.S. HOUSE OF REPRESENTATIVES

MAY 23, 2007

Mr. Chairman, Mr. Ranking Member, and Members of the Subcommittee, I appreciate the opportunity to appear before you today. I am Jeff Kueter, President of the George C. Marshall Institute. The George Marshall Institute is a 501(c)(3) non-profit organization founded in 1984, focused on how science is used in making public policy. The Institute's analyses are designed to improve the comprehension of the public, the media, and policy makers of important scientific and technical issues and help them distinguish between opinion and scientific fact so that decisions on public policy issues can be based on solid, factual information, rather than opinion or unproven hypotheses. We publish reports and host roundtables and workshops. Our activities focus on the environment and national security topics, with a particular emphasis on ballistic missile defense and space security.

The Marshall Institute's National Security Space Project (http://www.marshall.org/category.php?id=8) examines the implications of the U.S. reliance on space assets.

The Changed Security Environment in Space

Just how reliant the United States is on its satellites is neither well understood nor appreciated fully. "Space capabilities are inextricably woven into the fabric of American security, scientific, and economic activities," Lieutenant General C. Robert Kehler, the deputy commander of U.S. Strategic Command, told a congressional subcommittee in 2006. Gen. Kehler's summation confirms what we have all seen with our own eyes – the U.S. has fused its land-based conventional power projection capabilities with its space-based communications, navigation and reconnaissance capabilities.

What is not completely appreciated by the American public, but clearly is by the Chinese and others, is how different this use of space is and what it means for the strategic environment. Today's space systems fill (1) environmental monitoring; (2) communications; (3) position, navigation, and timing; (4) integrated tactical warning and

attack assessment; and (5) intelligence, surveillance, and reconnaissance missions. These missions are integral to a new American way of warfare. This "way of warfare" requires less manpower, puts fewer U.S. forces in harm's way, and integrates all of these space-based missions into real-time boots on the ground and stand-off precision strike operations. By fulfilling real-time warfighting needs as well as the broader strategic reconnaissance and intelligence missions, space assets no longer just tell us where people are and what they are doing; they are integrated with and improve the effectiveness of the weapon systems used to target and destroy. They are part of the weapon system, and not an insignificant part at that.

Any serious discussion of policy options must begin by moving beyond a tired lexical dispute. Discussions about space security are cluttered with commentators and advocates fretting about the potential implications of "militarizing" and "weaponizing" space. But it is too late: space is already militarized and weaponized. These terms assumed precise meanings during the Cold War and subsequent debates, but discussion of the lexicon never fully grappled with the underlying security dilemma. The militarization of space, or the use of space for military purpose, occurred as an outgrowth of the integration of space-enabled capabilities into terrestrial weapons systems. The aforementioned space-enabled reconnaissance strike complex which emerged during the first Gulf War effectively militarized space. The weaponization of space is more nuanced. The most common understanding of the phrase "weaponizing space" involves the placement of weapon systems into orbit or development of weapons which fire into space. Weapon systems are already in orbit. They are not anti-satellite or missile defense systems, development of both was effectively blocked by the arms control community for years, but instead, they are the existing suite of space assets. The integration of space capabilities into terrestrial warfighting assets is essential and indispensable to the functioning of those weapons. Without GPS, stand-off precision strike, the backbone of American warfighting, fails to function. Put another way, the reconnaissance strike complex does not work unless it is space-enabled. Chinese strategic thinking provides additional support for the view that defines space systems as weapons in information-age warfare.

From a more traditional perspective, China's direct ascent anti-satellite (ASAT) test on January 11, 2007, weaponized space and potentially so does every long-range ballistic missile in the world. There is no doubt that space is now weaponized. China's test prompted arguments over whether an earth-launched ASAT is really "a space weapon." The contention that a ground-based system is not a space weapon because it is not launched "from" space ignores the practical reality that an ASAT launched from either the ground or from space brings war to space. Understanding how China weaponized space is simple, the missile it launched destroyed an asset on orbit. Ballistic missiles, which are principally designed to strike terrestrial targets, are space weapons under the traditional definition because they can be fired into space and they transit through space to their targets. More broadly, electronic attacks on data transmissions and destruction of ground stations are attacks against space systems. But are they space weapons? Not in the traditional sense, but their effects are just the same. In the end, the silicon revolution overtook the tired debates about the militarization and weaponization

of space that produced so much angst during the Cold War. Debate over the nuances of the lexicon may continue, but the threat to the United States remains the same.

This integration of space assets with terrestrial power projection capabilities remains a uniquely American strength and provides a clear incentive for attacking American spacecraft. U.S dependence on space for national and tactical intelligence, military operations, and civil and commercial benefits far exceeds that of any other country. In this new environment, a "scorched space" attack or a space "Pearl Harbor" would hurt the U.S. most of all.

The numerous vulnerabilities of space systems make such a strategy possible. The physical destruction or disabling of a space asset is the most direct means of attack. Physical destruction can be accomplished by intentional strikes against ground stations, launch systems, or orbiting satellites. Ground stations are essential to the function of a space system. Without the ability to receive information sent from space, the utility of satellite systems is severely constrained.

There are ways to directly target space systems in orbit although it is expensive and technically challenging. Unlike an attack on a ground station, where the transmitting data can be rerouted to another receiving station eventually, once the satellite is destroyed or damaged, it can not be replaced quickly, easily or cheaply. Given the length of time needed to launch a replacement satellite and the high probability that a replacement would not be available, an adversary that can disable a sufficient number of U.S. satellites could expect to reap advantages in the short-term.

The Chinese demonstrated a direct ascent anti-satellite capability, wherein an object is launched from Earth at a target flying overhead in space. The destruction of the orbiting satellite is achieved using kinetic energy, i.e., the object launched from Earth slams into the targeted satellite and the energy created by the collision of two fast moving objects destroys both. Kinetic kill interceptions are well understood and were demonstrated by both the U.S. and Soviet Union during the Cold War.

Other techniques to destroy satellites include co-orbital ASATs, which are placed into orbit where they wait for a period of time before they are sent to destroy their target. The emergence and proliferation of microsatellite technologies has given rise to fears of their use as parasitic co-orbital ASATs satellites. Many nations, including China, have active microsatellite programs, but there is little public evidence to reveal China's intentions beyond the acknowledged peaceful and commercial purposes. The Soviet Union built and tested co-orbital ASATs in the 1970s and early 1980s. The Soviet system is said to have reached full operational capability in 1972. While microsatellites imply some capabilities in this area and Chinese military writings recognize the utility of the parasitic concept, the technical challenges of maneuvering in space should not be overlooked. Lasers, particle beams, and radio frequency weapons constitute another category of ASATs capable of inflicting physical damage. They all have stand-off ASAT capabilities when deployed on platforms in space. The United States demonstrated the

vulnerability of satellites to these directed energy techniques in a 1987 test of the MIRACL ground-based laser.

Another type of physical threat to space assets is high-altitude nuclear detonation. In this scenario, an attacking nation would launch a ballistic missile armed with a nuclear warhead into space and explode it there. All satellites within the line of sight of the explosion would be killed promptly, with the effects dissipating with distance from the explosion. The radiation released in the explosion provides a gradually fatal dose to non-hardened satellites over weeks to months. Most U.S. satellites, particularly those commercial assets used extensively for defense communications, are not hardened to withstand this kind of attack and lack the maneuvering capabilities needed to "get out of the way" of the attacking missile in-flight, the explosion or out of the radioactive effects. An attack using multiple launches could have devastating impacts on military and commercial satellites. China certainly has the missile and nuclear capabilities to bring about a high-altitude nuclear explosion, as do several other countries. This most extreme action would likely occur only in times of acute international crisis.

Space systems also are vulnerable to disruption, which could preclude or deny their use when desired. Satellites use electromagnetic energy to send data and information from the satellite to ground. Disruptive attacks use electronic means to disturb these transmissions by jamming the transmission or "spoofing" it. Jamming impedes the communication between the satellite and user by blocking or drowning out the transmission. Simple jammers are cheap and easy to obtain, but the U.S. military and commercial users have ways to prevent some of these attacks. Spoofing occurs when fake signals are sent. These faked signals have all the appearances of legitimate data coming to or from the satellite. Spoofing is more difficult to achieve because the faked signals must appear genuine. Encryption is one of the means used to protect against spoofing.

These are not hypothetical concerns. Last year, prior to the revelations about China's robust capabilities, Gen. Kehler told a House subcommittee that "GPS jamming has occurred as has jamming of commercial telecommunications satellites ... Open source reporting has cited examples of incidents, both intentional and unintentional, that have impacted space capabilities ..." Well publicized instances include the jamming of a Chinese satellite by Falun Gong in 2002; Iran's jamming of Telstar-12, a commercial communications satellite, from Cuba in 2003; Libya's jamming of Loral-Skynet and Telstar satellites in 2005; and Iran's jamming of a French satellite also in 2005.

General Kehler summarized the state of affairs clearly when he said that "while none of these incidents proved catastrophic, our enemies clearly understand the reliance we place on space capabilities and we should expect the level and sophistication of efforts to deny us the advantages of space to increase in future conflicts."

The Chinese Challenge

On January 11, 2007, China tested a direct ascent ASAT system. The target, a Chinese weather satellite, was destroyed, reportedly producing some 900 trackable pieces of space debris in orbits from 125 miles to about 2,300 miles and resulting in an increase of 10 percent in the total amount of manmade debris in orbit. This demonstration was just the latest in a series of tests of China's space weapons program and is a warning sign to the United States.

Nor is this system the only space weapons program under development in China. Last September reports surfaced that China successfully conducted a laser blinding test against a U.S. reconnaissance satellite. Further investigation revealed that these blinding tests had been ongoing for several years. The intention of these blinding tests is to demonstrate the capability to find, track, and illuminate U.S. spy satellites. Blinding an overflying spy-satellite's optical and infra-red imaging systems could result in either temporary or permanent damage, depending upon the delivered power of the beam and the sensitivity and protections built into the satellite's sensors.

China has made no secret of its efforts to develop techniques to jam navigation satellites. Technical journals published by the People's Liberation Army (PLA) discuss the use of broad-spectrum or narrow-frequency jamming. Some PLA journals contain many articles focused on how to jam synthetic aperture radars in space, which are the same kind of radars used by the U.S. for intelligence collection and missile launch warning.

Reports about China's programs to design parasitic microsatellites satellites and the ability to collide satellites with other satellites appeared in 2001. It is feared that these small, maneuverable satellites could approach U.S. satellites to either physically destroy them as a result of a collision or attach themselves to the U.S. satellite to somehow disable or jam it. Chinese technical journals contain articles discussing the theoretical algorithms needed to achieve maneuverability in space for the purpose of shifting orbits in order to rendezvous with other objects. While this capability is more speculative than the demonstrable direct kill, blinding, or jamming options already at their disposal, the microsatellite program combined with the interest in maneuverability and on-orbit collisions are strongly suggestive of serious investigation in such capabilities.

China's perceptions of its security environment and the nature of future conflicts explain their investment in military space capabilities. According to China's strategists, future wars will occur across multiple battle spaces, expanding from operation on the land, at sea and in the air to the electromagnetic spectra and into outer space. Future wars require widely spread forces, operating over large geographic areas, demonstrating precise operational coordination and timing, utilizing precision strike weaponry and operate at high operational tempo. U.S. strategists reached similar conclusions and these same characteristics are written into the Quadrennial Defense Review, embodied in the annual defense budget, and are reflected in the doctrines of the military services.

In modern warfare, information collection, transmission, management and analysis all occurs in or from space. The Chinese see American operations in Kuwait, the Balkans, Afghanistan and Iraq as exemplary models of these future war concepts. Analyses of China's strategic thinking by the Center for Naval Analyses, the U.S.-China Economic and Security Commission, and others show their recognition of the reliance of U.S. forces on space-based assets and, and more importantly, China's identification of U.S. space capabilities as a vital element of U.S. military power.

Based on these analyses of Chinese writings, which are drawn from military textbooks, course materials and journals, scholars note China's aspiration to establish space dominance. They contend that achieving space dominance would allow China to protect its space systems and deny access to space to an opponent. The integration of space-enabled information into land, air, and naval warfare make control of space essential to success in future warfare. Chinese military leaders clearly understand that without control of space neither the PLA not an adversary could expect to assert air or naval dominance or win a ground war.

In a word, China is now unquestionably a rising space power. Not only does China have the capacity to exploit space for its own purposes, but the ASAT test demonstrated a Chinese capability to deny other nations that same ability. Future military success requires the ability to use space and deny its use to an opponent. The Chinese recognize space as an essential strategic high ground. Consequently, the same information technologies and improved sensor systems that make modern weapons much more destructive effectively make outer space a key battleground.

The National Space Policy

In light of this changed environment, how should we evaluate the National Space Policy? Released last October after many years in the making, the policy reiterates many long-standing principles of U.S. space policy and makes long-overdue changes in defining U.S. vital national interests in space. The policy charts a reasonable course, upholding established beliefs about safeguarding the security of the United States in space while preserving the flexibility needed to respond to the uncertain security environments of the future. The policy is not without its failings. It conspicuously lacks the decisive voice needed to safeguard America and her allies from rapidly emerging challenges in space and the manner in which it was released allowed others to interpret its meanings and implications, often improperly.

The new National Space Policy rightly balances the need for the U.S. to defend its interests in outer space with the desire for all to use space for peaceful purposes. The principles offered to guide U.S. actions are:

- The United States is committed to the exploration and use of outer space by all nations for peaceful purposes, and for the benefit of all humanity. Consistent with this principle, "peaceful purposes" allow U.S. defense and intelligence-related activities in pursuit of national interests;

- The United States rejects any claims to sovereignty by any nation over outer space or celestial bodies, or any portion thereof, and rejects any limitations on the fundamental right of the United States to operate in and acquire data from space;
- The United States will seek to cooperate with other nations in the peaceful use of outer space to extend the benefits of space, enhance space exploration, and to protect and promote freedom around the world;
- The United States considers space systems to have the rights of passage through and operations in space without interference. Consistent with this principle, the United States will view purposeful interference with its space systems as an infringement on its rights;
- The United States considers space capabilities -- including the ground and space segments and supporting links -- vital to its national interests. Consistent with this policy, the United States will: preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny, if necessary, adversaries the use of space capabilities hostile to U.S. national interests;
- The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests; and
- The United States is committed to encouraging and facilitating a growing and entrepreneurial U.S. commercial space sector. Toward that end, the United States Government will use U.S. commercial space capabilities to the maximum practical extent, consistent with national security.

At one level, the new national space policy makes some necessary and welcome improvements over the policy signed by President William J. Clinton in September 1996. These include the statement that the United States "considers space capabilities...vital to its national interests." The new policy also recognizes the importance of space in support of homeland security and the increasing criticality of the commercial space sector and enhanced space situational awareness. It also reaffirms the Administration's previous decision on civil space exploration.

At a more legalistic level, the policy performs the function of reiterating a number of long-standing principles of U.S. space policy, including the statement of a sovereign right to free use of outer space to support defense and intelligence-related activities. These stipulations help support the fundamental premise of the new National Space Policy:

> "In this new century, those who effectively utilize space will enjoy added prosperity and security and will hold a substantial advantage over those

> who do not. Freedom of action in space is as important to the United States as air power and sea power. In order to increase knowledge, discovery, economic prosperity, and to enhance the national security, the United States must have robust, effective, and efficient space capabilities."

In highlighting the principle of "freedom of action," the new policy reflects the experience of the past decade –when space-based navigation, communications and reconnaissance systems became key enablers for global power projection. History shows that any position at a pinnacle of power will soon be contested by other nations. This suggests that other nations will seek to counter America's asymmetric advantage in space, including the development and deployment of ground- and space-based anti-satellite weapons. In some cases, these activities may be accompanied by hypocritical hand-wringing over the "specter of an arms race in and the weaponization of outer space haunting the international community."[1]

Concerns about how to protect the satellites providing vital information about the closed Soviet and Chinese governments and territories have been a major element of presidential decision-making about space from the dawn of the space age. The sheer importance of space assets demanded their protection, as has been directed by Democratic and Republican presidents alike:[2]

- "... the President has reassessed U.S. policy regarding acquisition of an anti-satellite capability and has decided that the Soviets should not be allowed an exclusive sanctuary in space for critical military supporting satellites." (Ford, NSDM 345, 18 Jan 1977)
- "The United States will pursue activities in space in support of its right of self-defense." (Carter, PD/NSC 37, 11 May 1978)
- "The DOD will develop, operate, and maintain enduring space systems to ensure its freedom of action in space. This requires an integrated combination of anti-satellite, survivability, and surveillance capabilities." (Bush, NSD 30 (NSPD1), 2 Nov 1989)
- "Consistent with treaty obligations, the United States will develop, operate and maintain space control capabilities to ensure freedom of action in space and, if directed, deny such freedom of action to adversaries. These capabilities may also be enhanced by diplomatic, legal or military measures to preclude an adversary's hostile use of space systems and services. The U.S. will maintain and modernize space surveillance and associated battle management command, control, communications, computers, and intelligence to effectively detect, track, categorize, monitor, and characterize

[1] Cheng, Jinye, "Statement on Outer Space," Thematic Debate, First Committee, United Nations General Assembly, 61st Session, Oct. 11, 2006, http://www.reachingcriticalwill.org/political/1com/1com06/statements/chinaoct11.doc (accessed Nov. 2, 2006).

[2] All quotations are drawn from *National Security Space Project's Presidential Decisions: NSC Documents* (Washington, D.C.: George Marshall Institute, 2006).

threats to U.S. and friendly space systems and contribute to the protection of U.S. military activities." (Clinton PDD/NSC 49 (PDD/NSTC 8), 19 Sep 1996)

The new space policy reiterates this commitment to preserving and protecting U.S. assets in space, but, as it is the first space policy written for the age of the space-enabled reconnaissance strike complex, the policy rightly directs the national security establishment to "develop capabilities, plans, and options to ensure freedom of action in space, and, if directed, deny such freedom of action to adversaries." There is nothing new or unique about expressions of support for preservation of freedom of action in space. That goal draws its origins from the earliest days of the U.S. space program. Nor is there really anything unique about the direction to develop plans and options to deny freedom of action to adversaries. Even President Carter, who supported initially an international treaty banning anti-satellite capabilities, directed the Defense Department to "vigorously pursue development of an anti-satellite capability" and allowed for production of such systems, provided they were not excluded by a treaty.[3]

Nevertheless, this mandate in the new policy is widely interpreted as presaging the deployment of new U.S. space weapons, rather than for what it actually is, a reaffirmation of a continuing strategic approach.

The declaration that the U.S. "will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space" also is offered as evidence that the new policy is part of a nefarious framework to expand U.S. hegemony in space. Instead, it is simply a statement that the U.S. will not support international agreements that it considers contrary to its interests. It is not the blanket prohibition on arms control as is often asserted. Past space policies include similar qualifying language. For example, President Clinton's 1996 policy states: "The United States will consider, and, as appropriate, formulate policy positions on arms control and related measures governing activities in space, and will conclude agreements on such measures only if they are equitable, effectively verifiable, and enhance the security of the United States and our allies."[4] While more economical in the words used to express its views on international negotiations, the new space policy sends the same message as the old space policy – the United States will not become a party to an agreement that it feels is contrary to its interests.

The language on international agreements also reflects lessons drawn from the 1972 ABM Treaty as well as skepticism towards multilateral space disarmament efforts that provide cover for self-serving attempts by China and Russia to constrain the U.S., while doing nothing to restrict their own clandestine ASAT programs. Unfortunately, the policy was not accompanied by fuller discussion on how the U.S. would work with its allies to protect critical space infrastructures. The absence of such public discussions has

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[3] *National Security Space Project's Presidential Decisions: NSC Documents, Newly Declassified Excerpts* (George Marshall Institute: Washington, D.C., 2006), 6.
[4] *National Security Space Project's Presidential Decisions: NSC Documents* (Washington, D.C.: George Marshall Institute, 2006), 361-2.

produced confusion about our intentions in those countries that otherwise stand most closely with us.

Could the National Space Policy be improved? Undoubtedly, yes. The policy's tortuous phrasing and its release late in the president's second term suggest it is a compromise between political appointees and the bureaucracy. The unclassified guidelines provide little specific direction. In cases where guidance is more specific, it occurs in areas where presidential exhortation is largely irrelevant. The publicly-released document largely avoids explicit calls for action and fails to define clear outcomes for assuring freedom of navigation in space. Those textual ambiguities coupled with the botched marketing efforts largely explain the confusion, misinterpretation, and unfortunately, concern and distrust over U.S. intentions in space.

Responding to New Challenges

So the question now facing America's leaders is how does the U.S. best deter, deny, and dissuade the Chinese, and other emerging space powers, from hostile actions in space? The first step is wider recognition of the new reality in space to enable the public and political support necessary to begin serious work to protect critical space assets from both direct and indirect threats.

A new emphasis on policies and programs likely to improve our capabilities to respond and react to incidents in space is needed. In addition to improving our awareness of movements in and through space, the United States government would do well to invest in small satellite development and rapid launch capabilities, explore policy changes to allow greater exploitation of commercial systems, and encourage the development of allied space capabilities. This combination of actions, once achieved, would change the strategic calculations of prospective adversaries.

The United States must not foreclose the option of developing active defenses. For example, the Chinese ASAT test should "boost" the prospects for space-based missile defense. If the international community is truly worried about the debris-generating effects of ground-based ASAT weapons, then it ought to embrace, indeed demand, development and deployment of boost-phase missile defenses capable of intercepting ASAT missiles long before they reach their satellite targets. Combined with a new emphasis on satellite protection, ground-based replenishment capabilities and space-based missile defenses could frustrate any attempts to block the peaceful use of space by America and her allies.

Finally, diplomatic efforts can play important roles in preserving U.S. security. The growing interdependence between economic and security interests will necessitate improved cooperation between the U.S. government and commercial satellite operators. The United States also will need to coordinate its space protection activities with military and civil space authorities in allied and friendly nations. As information sharing advances, new norms for shared space situational awareness, debris mitigation and orbital traffic management may emerge among America and other responsible spacefaring

nations. However, the success of any norm requires parties to exhibit maturity, trustworthiness and a willingness to act responsibly – three preconditions which China has shown it is unable to support. Absent the ability to enforce compliance or punish offenders, a code of conduct rule regime will be weak and, more likely than not, ineffectual. A rules system for space that relies on voluntary compliance and lacks viable punitive measures will be a hollow one.

Further, diplomacy alone can not restore U.S. security. The significance of the broader diplomatic and economic relationship with China suggests that space incidents will be downplayed so as not to upset those concerns. Students of the Soviet ASAT program should not be surprised that the Chinese military's provocative ASAT development program was accompanied by hypocritical protestations over the specter of an arms race in and the weaponization of outer space. Russia and China are leaders of an international effort to construct a framework to govern space. The Chinese, of course, are leaders of the "Prevention of an Arms Race in Outer Space" (PAROS) treaty process at the United Nations. At the same time that their diplomatic corps raged against the supposed weaponization of space by the U.S., the Chinese government successfully executed their anti-satellite tests.

Still, some have constructed an interpretation of the recent events that shifts the focus from discussing China's culpability to one that blames the U.S. for forcing China's hand by interpreting U.S. policies as being intent on deploying weapons, characterizing U.S. actions as dangerous and provocative, condemning the U.S. refusal to enter into international negotiations, and concluding that only a treaty can restrain the U.S.'s aggressive tendencies. Fortunately, all those claims are wrong. These demands that the U.S. preemptively and unilaterally disarm itself in space are reminiscent of old Cold War debates over nuclear weapons recycled for a contemporary issue. Efforts to ban weapons in space are unenforceable and compliance to its strictures virtually unverifiable. The ignominious record of enforcing and verifying treaties prohibiting activities on Earth is proof enough to give pause to any conversation about a treaty governing activities in space. The difficult experiences of the United States and the Soviets in negotiating space control offer useful lessons for those advocating a return to that course today. Those negotiations collapsed, despite the participation of interested parties, because of the inability to reach agreement on basic definitional elements. The prospects for successful negotiations today, with substantially more nations involved and a much more complicated strategic environment in space, have to be considered remote.

Finally, these agreements fail to address the chief reason an adversary would seek access to space in the first place – namely, the potential for inflicting a crippling blow against U.S. military and economic might by decapitating its surveillance and communications abilities. Why would China abandon capabilities that hold the "soft underbelly" of American military power at risk? Their own words clearly show a concerted desire to develop such capabilities and provide the strategic rationale for them having done so. There is little reason to believe they would negotiate away that advantage. Instead, such agreement would likely weaken U.S. security by precluding the necessary development of space systems and doctrine.

Conclusion

Outer space can be preserved and balanced with the protection of the parochial interests of states to ensure free passage and access for all. The unique position of the United States today affords it the opportunity to take steps to ensure the defense of its interests. Such actions are not incompatible with the preservation of peace and stability. Indeed, history shows those goals to be the first order preferences of U.S. policy. Unfortunately, history also shows that others do not share that view. The inevitability of increased access to space creates new challenges for U.S. policy, challenges that must be confronted in a manner consistent with and supportive of U.S. national interests.

Thank you for the opportunity to appear here today and to present these views for your consideration.

Mr. TIERNEY. Thank you, Mr. Kueter.
Mr. Cavossa.

STATEMENT OF DAVID CAVOSSA

Mr. CAVOSSA. Mr. Chairman, Representative McCollum, Representative Platts, on behalf of the Satellite Industry Association it is my goal today to provide you with an overview of the critical role satellites play in our global economy, the role they play in support of our military and first responders, and then finally speak for a few moments on the importance of space situational awareness and being a responsible actor in space.

Whether broadcasting television programming to viewers throughout the world, enabling the U.S. military to conduct large and small scale operations across large distances, or providing communications to first responders during disasters, satellites are there.

Today satellites permeate our every-day lives and contribute over $106 billion to our global economy. Today commercial satellites support daily activities such as truck fleet management, credit card validations, pay-at-the-pump services, ATM withdrawals, high-speed Internet access, traffic and weather reports, and almost all television and radio distribution. In rural areas where terrestrial communications do not reach all residents, satellite broadband, satellite television, and satellite radio provide consumers services they otherwise would not have access to through terrestrial means.

As we all know, satellite communications have also played a critical role during the response to each of the natural and man-made disasters in recent memory. In 2005, satellite communications provided a lifeline for aid workers and victims in the remote islands of the Indian Ocean following the Asian tsunami, and in the earthquake-desolated towns and villages of Pakistan. In response to Hurricanes Katrina and Rita and the recent tornadoes in Kansas, satellite communication's once again proved their essential value when all other forms of terrestrial communications were wiped out. In many of these affected areas, satellite communications provide the only means of communication.

Military forces are also perhaps the most dependent upon satellite communication systems today. Telemedicine via satellite puts the resources of the world-class specialists and surgeons at the disposal of medical teams in the field. Unmanned aerial vehicles such as the Predator and Global Hawk are heavy users of satellite bandwidth today. Other bandwidth-intensive activities such as secure video teleconferencing and encrypted command and control are also supported by satellite communications. The DOD estimates that satellite systems provided over 60 percent of all communications during Operation Iraqi Freedom.

Given this reliance on satellite communications, during the last 5 years the satellite industry has spent thousands of hours and millions of dollars working with the government, both domestic and allied, to improve the performance, security, and reliability of our satellite infrastructure. These activities are being coordinated, again, both domestically and with our allied partners through what is called the Commercial Satellite Mission Assurance Working Group [MAWG].

Through the MAWG we meet on a regular basis with representatives of the combatant commands, the military services, and Defense agencies, as well as the U.S. State Department, the intelligence community, and representatives of allied governments. The issues we discuss are space situational awareness, information sharing, jamming and intentional interference to commercial communication satellites, and how to handle close approaches in space between commercial satellites and government satellites.

For the past few years our companies have worked closely with the U.S. Government to develop a series of best practices to reduce the chances of orbital collisions and close approaches between commercial satellites and government satellites. As part of that effort, for the past 3 years our companies have used space surveillance data provided by Air Force Space Command. Their commercial and foreign entities pilot program is very essential to avoid collisions with other natural or man-made objects in space.

A key piece of this coordination effort, as General Armor mentioned during the question and answer session, is in jeopardy, however. The CFE program, or the Commercial and Foreign Entity program, is currently on a list of unfunded priorities in the DOD budget, and therefore we urge Congress to fully fund the CFE program to ensure we are all able to continue safe operations and responsible operations in space. We need that data from the Department of Defense.

We believe that the U.S. Air Force should fully implement the congressional mandated CFE program and that the program should include launch support, conjunction assessment, end-of-life and re-entry support, anomaly resolution, and emergency services during close approach times. This will all help us operate safely.

In closing, satellite systems, as I have mentioned, represent a critical infrastructure for the United States, its allies and our trading partners. As such, Congress must ensure that space commerce is as protected as maritime commerce is today, and therefore we need to invest to raise the robustness of the space infrastructure to mute the effect an attack would have on any one object.

The commercial satellite industry is fully focused on reducing potential vulnerabilities in our systems and, further, we are working proactively with the U.S. Government and with allied governments to establish these best practices that I have referred to to promote safe and responsible operations.

Mr. Chairman and committee members, thank you for having me today. I look forward to answering any questions.

[The prepared statement of Mr. Cavossa follows:]

Written Statement of

David A. Cavossa, Executive Director
Satellite Industry Association (SIA)

Hearing on
Weaponizing Space:
Is Current U.S. Policy Protecting Our National Security

Before the
Committee on Oversight and Government Reform
Subcommittee on National Security and Foreign Affairs
United States House of Representatives

Wednesday, May 23, 2007
2:00pm

Opening

Chairman Tierney, Ranking Member Shays, members of the Committee, on behalf of the Satellite Industry Association (SIA)[1], I would like to thank you for holding this hearing today on space and national security issues. It is my goal today to provide you with an overview of the critical role of satellites in our global economy, discuss briefly the role they play in support of our military and first responders, and lastly focus on the importance of space situational awareness and being a responsible actor in space.

The SIA is a U.S.-based trade association which represents the commercial satellite industry including satellite operators, service providers, manufacturers, and ground equipment suppliers throughout the world. SIA represents the consensus and unified voice of the U.S. satellite industry on policy, regulatory, and legislative issues affecting the satellite business. As such, SIA plays a very active role in the ongoing dialogue between industry and the Defense Department on satellite protection and reliability issues.

Whether broadcasting television programming to viewers throughout the world; enabling the US military to conduct large and small-scale operations across large distances, or providing communications to first responders during the 2005 Hurricane Season or in response to the recent tornadoes in Greensburg, Kansas, satellites are there.

Today, the commercial satellite industry offers a wide variety of services and applications to its customers, which among others include: broadcast and cable telecommunications companies, television networks, financial institutions, major retailers, utilities, emergency personnel, first responders, schools, hospitals, Internet service providers (ISPs), consumers, and Federal, state, and local government agencies.

Critical to Economy

Today, satellites permeate our every day lives and contribute over $106 billion to the global economy. Satellites provide direct to home television and digital audio radio services to over 30 million direct-to-home television subscribers throughout the United States and over 89 million worldwide.

Today, commercial satellites support daily activities such as truck fleet management, credit card validations, pay-at-the-pump services, ATM withdrawals, high-speed Internet, traffic and weather reports, and almost all television and radio distribution.

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[1] SIA Executive Members include: Arrowhead Global Solutions Inc.; Artel Inc.; The Boeing Company; Datapath, Inc., The DIRECTV Group; Globalstar, Inc; Hughes Network Systems LLC; ICO Global Communications; Integral Systems, Inc.; Intelsat, Ltd.; Iridium Satellite LLC; Lockheed Martin Corp.; Loral Space & Communications Inc.; Mobile Satellite Ventures LP; Northrop Grumman Corporation; SES Americom, Inc.; and TerreStar Networks Inc.; and Associate Members include: ATK Inc.; EchoStar Satellite LLC; EMC Inc.; Eutelsat Inc.; Inmarsat Inc.; IOT Systems; Marshall Communications Corp.; SES New Skies; Spacecom Corp.; Stratos Global Corp; SWE-DISH Space Corp; and WildBlue Communications, Inc.

In addition, satellites systems are often utilized for their unique ability to easily access remote locations.

In rural areas where terrestrial based communications solutions do not reach all residents -- satellite broadband, satellite television, satellite radio, and a host of other satellite services provide consumers and businesses with a wealth of voice, video, and data services and applications they otherwise would not have access to from terrestrial providers.

Furthermore, in areas where terrestrial services are available, satellite services give consumers all the benefits of competition, including greater diversity of service offerings, incentives for improving service quality, and downward pressure on pricing.

Satellites can also interconnect terrestrial networks in the event that those networks become unavailable or congested, allowing traffic to be re-routed and thereby increasing overall end-to-end communication availability. Satellite systems are flexible and they can quickly and cost-effectively provide surge capacity on demand to businesses and consumers.

Critical to Homeland Security

The national and homeland security communities also rely on satellites for critical activities, such as direct or backup communications, emergency response services, continuity of operations (COOP) and continuity of government, military support, and intelligence gathering.

Incorporating satellite technology into overall network architectures for primary or backup communications provides for transmission media diversity, system redundancy, and increased communications resiliency.

Here are a few examples of US Government agencies using commercial satellite communications for their primary or backup communications solution;

- *Federal Emergency Management Agency (FEMA)* relies heavily on Fixed Satellite Services (FSS) and Mobile Satellite Services (MSS) for daily use and during emergencies.
- *The Department of State (DOS)* relies heavily on commercial satellites to transmit voice, data, and video communications.
- *White House Communications Agency (WHCA)* uses commercial satellite communications systems extensively to support the President and Vice President.
- *Transportation Security Administration (TSA)* and their Federal Air Marshals use satellite communications while in-flight to communicate with staff on the ground.[2]

[2] NSTAC Satellite Task Force Report, March 2004

- *United States Coast Guard (USCG)* uses commercial SATCOM for ship-to-ship and ship-to-shore communications and for container security and tracking.
- *Nuclear Regulatory Commission (NRC)* uses SATCOM for monitoring of the status of the nuclear assets and voice communications for field personnel.
- *The Department of Health and Human Service (HHS)* is a heavy user of fixed and mobile satellite services. Specifically, the HHS command center uses satellites to back up its data networks.
- *The Federal Bureau of Investigation (FBI)* maintains satellite phones in every field office;

And there are many, many more examples.

As we all know, satellite communications have also played a critical role during the response to each of the natural and man-made disasters we have experienced in recent years.

Following the terrorist attacks of September 11th when New York City's terrestrial communications networks were damaged and overloaded, satellite communications easily maintained connectivity and satellite equipment was quickly deployed to meet urgent needs.

In 2005, satellite communications provided a lifeline for aid workers and victims in the remote islands of the Indian Ocean following the Asian Tsunami and in the earthquake-desolated towns and villages of Pakistan. In response to Hurricanes Katrina and Rita and the recent tornadoes in Kansas, satellite communications once again proved their essential value when all other forms of communication were wiped out.

In many of these affected areas, satellites provided the ONLY source of communications in the hours, days, and weeks following these natural and man-made disasters.

Organizations using satellite communications ranged from first responders at the federal, state and local government agencies to individuals, schools, churches and local relief groups. Small businesses such as retail gas stations and convenience stores, and larger businesses such as insurance companies, financial institutions, and news teams also used satellites to communicate when all other means of communications failed.

Critical to National Security

Military forces are perhaps the most dependent upon satellite communications systems to access essential information services to support land, sea, air, and space operations. The DoD currently uses military satellite communications (MILSATCOM) and commercial satellite communications to meet its global deployed telecommunications requirements.

Unmanned Aerial Vehicles (UAVs), such as the Predator and Global Hawk, are heavy users of commercial satellite bandwidth. Other bandwidth-intensive activities, such as

secure video teleconferencing and encrypted command and control operations, are also supported by satellite communications.

The Army's Blue Force Tracking program uses low-cost satellite links to provide battlefield situational awareness directly to soldiers and commanders, improving the effectiveness of distributed teams and greatly reducing the potential for friendly-fire incidents.

The Armed Forces Radio and Television Service provides news and morale programming to our troops around the globe via satellite. Telemedicine via satellite puts the resources of world-class trauma specialists and surgeons at the disposal of medical teams battling minutes to save lives in the field.

As a result of these services, the DoD has steadily increased its use of commercial satellites and services to support a multitude of military operations. DoD estimates that commercial satellite systems provided over 80 percent of the satellite bandwidth supporting Operation Iraqi Freedom and accounts for over 55 percent of all allied communications in Iraq today.

Industry-Government Cooperation

Given this reliance on commercial satellite communications, during the last 5 years the satellite industry has spent thousands of hours and millions of dollars working with the government to improve the security and reliability of our satellite infrastructure.

These activities are being coordinated both domestically and with allied governments through what is called the Commercial Satellite Mission Assurance Working Group (MAWG). Through the MAWG we meet on a regular basis with representatives of the Combatant Commands, Military Services, and Defense Agencies as well as the US State Department, Federal Communications Commission, Department of Commerce, NASA, the Intelligence Community, and representatives of allied governments.

The Mission Assurance Working Group focuses on the following issues for cooperation:

- Information Sharing between DoD and Industry
- The Development of Protocols for Responding to Jamming or Purposeful Interference
- Integration of the Commercial Satellite Industry into Government Training Exercises and War-Games, and perhaps most importantly;
- Space Situational Awareness

With the expansion of commercial satellite operations in space, the industry has had to develop new tools to avoid physical or electronic interference in space. The satellite operations centers at our companies routinely cooperate with each other, with the US Government and with allied governments, to reduce the impact that routine maneuvers and unplanned anomalies might have on other responsible space operators.

A key piece of this coordination effort is currently in jeopardy however.

Today, and for the past 3 years, our companies have used space surveillance data provided by Air Force Space Command's Commercial and Foreign Entities (CFE) pilot program to avoid collisions with other natural or man-made space objects.

Our satellite operators are unable to replicate the space tracking capabilities that the US Air Force enlists, and therefore we are unable to collect this vital information on our own. This CFE program is currently on a list of unfunded priorities in the DoD budget. We urge the Congress to fully fund the CFE program at the requested $2 million level and ensure we are all able to continue safe operations in space.

In addition, as a result of the experience satellite operators have gained working together and with the Air Force, through the CFE program, we feel that it is time to propose an expanded level of cooperation and mutual assistance regarding the conduct of activities in space.

Just as the United States and Allied Navies provide naval cooperation and guidance for merchant shipping on the high seas, we believe that US Strategic Command (STRATCOM) is the logical organization to take the lead to enhance the safety of commercial satellites and to support U.S. and coalition military operations.

Over the last 18 months, our companies have worked closely with the US Govt. on a series of "best practices" for orbital conjunctions and close approaches between commercial satellites and US government satellites.

Our recommendations for best practices are as follows;

- All space faring governments should continue to make investments in the capabilities and technologies necessary to provide adequate space situational awareness to increase the safety of all space operations.

- Countries should share space surveillance data to the maximum extent possible, after due consideration to national security and economics.

- With respect to the US, we believe that the US Air Force should fully implement the congressionally mandated CFE program. The program should include:
    - Launch support
    - Conjunction Assessment
    - End-of-life/Reentry Support
    - Anomaly Resolution
    - Emergency Services

- Responsible operators should follow the IADC guidelines on debris mitigation.

- Operators should provide timely notice of launch and related orbital insertion activities.

- A requirement for consultation if an operator has reason to believe that a spacecraft operating under their supervision might interfere with another operator's space activities.

- A requirement for consultation when debris and other uncontrolled objects result from an operator's activities or experiments in outer space

Closing

In closing, commercial satellites systems play a critical role in the economy, national security, and disaster response capabilities – in short satellites represent a critical infrastructure for America, its allies and its trading partners.

The commercial satellite industry is fully focused on eliminating potential vulnerabilities to our systems and we are working pro-actively with the US and Allied Governments to ensure safe operations.

Improving the sharing of information, coupled with the inclusion of commercial satellite communications into the DoD's Communications Architecture, will guarantee better service, increase security, and ensure availability. Such a partnership is in the long-term interests of our military, our first responders, and our citizens.

Mr. Chairman, thank you again for the opportunity to testify today on behalf of the Satellite Industry Association. I look forward to answering any questions.

Mr. TIERNEY. Thank you very much. Thanks to all the witnesses on the panel.

If you are good enough to key up a small video that I would like to play just for a minute and a half on this, this is a video by sellerstrack.com, which uses debris data from the Air Force. As we watch it, I think we can remember the model-sized piece of debris in low-earth orbit would hit a satellite with the same force as a one ton safe dropped from a five-story building on earth. But after this I want to ask a question of Mr. Cavossa.

[Video presentation.]

Mr. TIERNEY. The red that you see there is obviously a depiction of the debris from the Chinese satellite being shot down.

[End of video presentation.]

Mr. TIERNEY. Mr. Cavossa, can you talk to us a little bit about the challenges of space debris to your commercial satellite sector?

Mr. CAVOSSA. Our commercial satellite operators are located both in low-earth orbit, in relative proximity to what you saw there in that illustration, but a great number, a majority of our satellites are located in geostationary orbit, which is 23,000 miles away, quite a bit further away. But our satellite operators today, both in low-earth orbit and geostationary orbit, work very closely with each other. They make sure that when a satellite from one company is going to perhaps maneuver to a different orbital slot, it coordinates with all the satellites around it to make sure that everyone knows, hey, I am about to move, and give that data on where you are going to move your satellites so everyone is aware. We call it Nation Watch of Space Situational Awareness.

Mr. TIERNEY. But debris doesn't give you much of an opportunity to plan with anything, does it?

Mr. CAVOSSA. No. If it is, of course, debris that we don't know about, that is a problem, and that is why this CFE program that I mentioned that the Air Force Space Command runs is so critical to commercial satellite operators. We don't have the ability to track objects in space, the same ability that the U.S. Government has.

Mr. TIERNEY. So you think tracking would be enough if a number of nations decided they were going to test as China did and all that debris got in there? Do you think the ability to track that would give comfort to your commercial sector?

Mr. CAVOSSA. Well, sir, tracking alone would be important, of course, but if there was quite a bit more debris up there, yes, that would cause a problem for our satellites.

Mr. TIERNEY. Ms. Hitchens, would you respond a little bit to Mr. Kueter's testimony and to the first two witnesses of this concept that we can't really verify any treaty on that, we can't define the terms, I think the first panel said what's weaponization, they can't determine what's a violation, can't be verified and can't be enforced. Do you have a reaction to that?

Ms. HITCHENS. I think everyone who works on this issue recognizes that it would be very difficult to craft a sort of generic space weapons ban treaty, and Laura referred to it with the idea of the difficulty of banning technology, and in particular the difficulty of discerning between dual use technology on what is a weapon and what is not a weapon.

On the other hand, that doesn't necessarily mean that it is not doable. The United States has signed treaties that don't have verification provisions. Correct me if I am wrong, but I believe the Biological Weapons Convention does not have verification protocol, because the United States insisted that it did not.

Certainly there are other approaches like the ASAT testing and use ban, which we have rejected, and I don't know why because you can verify testing and use of a debris-creating ASAT.

So there are a lot of different approaches that need to be explored. The problem here has largely been a lack of will and not a lack of way.

Mr. TIERNEY. Mr. Kueter, on that other point, I heard you say pretty clearly that U.S. warfare and intelligence relies on satellites. I don't think anybody disputes that, or that it is a useful thing to have, but can't we differentiate between not interfering with a nation's ability to use satellites for those purposes and the prospect of people attacking those satellites and then creating debris from it or other difficulties on that, and then go back to Ms. Hitchens' point of wouldn't it be useful to at least make a differentiation and then talk about having some agreement that would not allow people to do that.

Mr. KUETER. The satellites that we use for real-time war fighting capabilities, the communication satellites, the GPS signals that enable precision navigation and timing, are integrated into terrestrial power projection capabilities today. That is the point that I am trying to make in terms of why those assets are now very attractive strategic targets for a real or potential adversary of the United States to go after. If they were to successfully eliminate our access to those capabilities or deny our use of those capabilities when we desire to use them, they would gain an enormous asymmetric advantage over us at a particular point in time.

Mr. TIERNEY. I guess that is the point. So isn't that what we want to negotiate with them so that they wouldn't be able to do that without some sort of agreement prohibiting that?

Mr. KUETER. Well, sir, there are two specific responses to that. The first is I don't see where it would be in the interest of any other nation to negotiate their right away to exploit that asymmetric advantage at some future point in time; and, second, I don't believe that it is possible to verify all of the numerous ways that one might hold those assets at risk, both electronic, which we have not talked about very much, or through direct threats, such as the direct-ascent ASAT that we have talked about.

Mr. TIERNEY. On the first point, isn't that a little bit like saying people won't want to negotiate away their right to have nuclear weapons, so we shouldn't have any weapons nonproliferation agreements in that respect, and biological, chemical, the whole idea that somebody might want an advantage that they think they can get some day means that they will never negotiate in good faith and preclude that?

Mr. KUETER. Well, the first point I guess I would make against that statement is that we are talking about a set of capabilities today that China clearly possesses and that other nations have nascent capabilities to possess. In the sense of being able to launch a ballistic missile from the surface of the earth carrying a nuclear

warhead into space, exploding it, and destroying any number of satellites in its path, those capabilities exist in the hands of numerous nations today. So you would be talking about an arms control effort that would require rolling back capabilities.

I would suggest that we have very few arms treaties that we can point to that suggest a rolling back of capabilities on a multilateral level.

Mr. TIERNEY. I can name a few.

Ms. Hitchens and Ms. Grego, why don't we ask you for a comment on that?

Ms. GREGO. Well, I think really the question is are we better off in a world where we have unrestrained ASATs or not. You can argue that you can't define every threat, that you can't verify every threat, and that may be true. I don't think that we have gone far enough to really determine that. But the question is: would we be better by moving ahead with diplomatic efforts to restrain the most dangerous technologies; for example, direct-ascent ASATs. I think the answer really is yes. And I think that is the type of ban that is actually verifiable, that is doable with our capabilities right now.

Whether or not countries have the technology to approach or to develop those weapons, well, I think soon enough anyone who is interested or finds it in their interest to have an ASAT weapon would be able to develop some technology that can do that. That is the reality we have to face, and I think we will best face that if we have some kind of comprehensive arms control agreement to manage that transition to the future.

Mr. TIERNEY. Mr. Platts.

Mr. PLATTS. Thank you, Mr. Chairman.

First, Mr. Cavossa, as to the specific national space policy for your industry, do you think it adequately addresses the role of commercial space travel and involvement as it is written currently?

Mr. CAVOSSA. Sure. Representative Platts, as an industry association, we are a consensus-based trade association, so all 30 members of our group have to agree before we go forward with any position, so on that issue the industry doesn't have a position of supporting or opposing.

I can highlight, though, that there was some interest in the things we did see in the space policy we hadn't seen in the past, which was the focus on interference becoming a problem. Jamming up commercial communication satellites is a problem, and it was mentioned in the national space policy as an issue that the U.S. Government was looking at and viewed as a serious threat. So we were happy to see that.

Mr. PLATTS. OK. And certainly you mentioned the funding on the CFE issue, not part of the space policy but just the importance of that to your industry?

Mr. CAVOSSA. Yes, sir.

Mr. PLATTS. OK. Ms. Hitchens, you talk about in your testimony that the space policy, we are, in essence, giving China an excuse or a basis to pursue the weaponization of space. Given the timing of this launch in January, I think it is fair to say it was really under the language of the last policy of 1996, because the new policy had just come out in the fall of 2006. So how do you reconcile that if this new policy is so dramatically different and more mili-

tary focused, China went ahead with their launch, anti-satellite launch, under the Clinton policy, so why would this one be more encouraging given that it happened already under the Clinton policy?

Ms. HITCHENS. I think there are two parts to that question, sir, so I am going to try to answer maybe the last one first.

It is obvious that China has been interested in what we call counter-space technologies, things we have been pursuing for more than a decade, for a long time due to their recognition that United States and other's space power is something that might be vulnerable. OK? So there is no denying that.

Second, it is probably not true that China's test was a direct response to the new national space policy. I think what I was trying to say in my testimony is that such a national space policy that can be read as very aggressive, especially when you read it along with Air Force doctrine that talks about counter-space operations, offensive counter-space operations, attacking satellites, you can see that it could give political cover to the Chinese to say we are doing this because the United States is a threat.

And the Chinese, indeed, have said that we are a threat, the United States is a threat, both with its efforts to create hegemony in space and contain the Chinese and, second, with the U.S. missile defense effort, which the Chinese have long been concerned will nullify their very small nuclear deterrent.

So U.S. space power has been an issue for China for more than a decade, and it has numerous factors.

Mr. PLATTS. So is it your contention, then, that if we had just continued under the Clinton space policy, China would not be pursuing its endeavors as it is?

Ms. HITCHENS. Actually, no. I think obviously the Clinton administration didn't pursue space arms control, either. Although they did not, they ruled out space weapons and anti-satellite weapons. They canceled programs. Despite the language in the policy, their implementation of it was very, very different. They did not approve of the weaponization of space.

That said, I don't necessarily think the Chinese might not have gone down this path if we would have continued the Clinton policy, because we have failed. This administration has taken a harsher line, but we have failed for more than a decade to properly pursue diplomacy as one end of our space policy.

Mr. PLATTS. I guess when I read the sections of the 1996 policy that you quoted and the 2006, I would look at it similarly to Mr. Kueter that I don't see a whole lot of difference. There are some slight words, but I think the key is, when they talk about an arms control agreement, only if they are equitable, effectively verifiable, and enhances the security of the United States and our allies.

Maybe they put that at the end of the sentence as opposed to lead with that, but the focus is still we are not going to pursue and enter into arms agreements that are not in the national security interest of our country.

Ms. GREGO. No country would enter into an arms control agreement that wouldn't be in their interest. That would be silly. And I don't believe that is what I or others who are advocating for certain kinds of agreements and diplomacy are trying to advocate. In-

deed, in my humble opinion it is in the U.S. national security to try to use diplomatic tools to counter some of these problems, because I don't believe that we can do that using hard power.

Mr. PLATTS. One real quick.

Mr. TIERNEY. We have four votes coming up, so that everybody gets a chance to ask questions.

Mr. PLATTS. OK. Final one is just, 1996, the last policy, is a very different world coming out of the end of the cold war to 2007 and the global war on terror and the threat that exists today. Would you acknowledge that you can't compare 1996 and the decisions then directly to 2006, given the changes in the threats to American security?

Ms. HITCHENS. I actually think that is a very good point, sir. One of the things that I believe that we need to look at currently with regard to space is the fact that there are more and more space actors and that the technology has spread, and we have to really think about how we handle space in a globalized world as opposed to in a bipolar world, and that makes it a lot more difficult but it makes it a lot more crucial that we figure out things like rules of the road for space actors. I think that is what you and General Armor were talking about, the expansion of space technology and the need to——

Mr. PLATTS. I would like to explore further, because the issue that has not been mentioned is the difference in terrorism today versus 1996 in a global sense, but I am out of time.

I thank all of you for your testimony.

Mr. TIERNEY. There may be more time for you after Ms. McCollum, but I want to make sure Ms. McCollum has an opportunity.

Ms. McCollum.

Ms. MCCOLLUM. Thank you, Mr. Chair.

To the difference in language—and I might add that the Bush administration, when it is working on language like this product doesn't hold discussions, hearing from the best and brightest in a public venue, talk to Members of Congress about things. Usually it gets released on a Friday after Congress has adjourned to go home to work for the weekend in our Districts. But I found it interesting in your testimony, Ms. Hitchens, I think words do have meaning, and I think the meaning is very, very different.

The Clinton policy: "Consistent with treaty obligations, the United States will develop, operate, and maintain space control capabilities to ensure the freedoms of action in space, and if directed denies such freedom of access to adversaries. These capabilities may also be enhanced by diplomatic, legal, or military measures to preclude an adversary's hostile use of space systems and services." Clearly, going to defend the country but clearly wants to work with the international community for a solution.

This is our new doctrine: "The United States considers space capabilities, including ground segments, as supporting links and vital to its national interest. Consistent with the policy, the United States will preserve its rights and capabilities of freedoms and actions in space." But here's where the language, I think, in my opinion, really changes: "Dissuade or deter others from either impeding those rights or developing capabilities to do so, to take actions necessary to protect space capabilities, to respond to interference and

deny, if necessary, adversaries the use of space capabilities hostile to the United States' interest."

One is inclusive, kind of to what you were saying about your industry doesn't have a position on it but let's get people together and talk about what is in the common good, making sure that the U.S. security interests are taken care of, and the other one is saying I don't have to worry about the common good, I just have to worry about my good. And when I just worry about myself, or if we just worry about the United States, other countries quite often perceive that as hostile, that they are not being included in it.

So if you could comment, internationally what have you heard from even some of our allies internationally on this different tone that is being taken, and perhaps you, as well, sir, from the industry perspective internationally.

Ms. HITCHENS. Well, as I said, the reaction, particularly internationally, to the new space policy was exceedingly negative. I want to point out that this didn't just come from places that would be likely to bash the Bush administration or the United States. I mean, Aviation Week, the industry journal, called the new policy judalistic and fretted that it would harm NASA's ability to find partners for the Moon and Mars. The Times of London called the policy comically proprietary about the United States' wish to control everyone's access to space. And you heard my quote from Joan Johnson-Freese, who is a tenured professor at the Naval War College. So we are not exactly talking about the flaming liberal left commentators here.

Language is important. Language is important, and the language in this policy talks about U.S. rights, U.S. rights, protecting U.S. freedom of action; whereas, if you look at the Clinton policy and you look at the words, it talks about sovereign rights of any nation. Those are differences. In fact, the Reagan policy talked about sovereign rights of any nation. So this is a change in tonality.

While we may think that is no big deal in the substance, on the international stage that is what diplomacy is about. It is not only about what you say, but it is about how you say it.

Mr. CAVOSSA. Congresswoman, all I can say is, as an industry we tend to be a global industry. The satellite industry is very much the telecommunications industry, so the companies that are represented by the Satellite Industry Association across the board are U.S. and non-U.S. companies. What we have seen, I mentioned in my testimony the Mission Assurance Working Group, that we have been working with the Department of Defense and allied governments. In those meetings, allied governments are in the room, representatives of the government or of the ministries of defense are there, and they are trying to work with us. To the DOD's credit, they are inviting them to be involved in these discussions.

That is all I can speak to.

Mr. TIERNEY. Thank you very much.

We are going to have to go to vote, but if anybody has a final comment that they want to make in 30 seconds, I will give you each an opportunity to do that, and then apologize for the fact, but I don't want to make you wait around for another hour before we come back.

Does anybody care to say anything? Mr. Kueter.

Mr. KUETER. I would just like to comment on your question. I think the reactions that we saw in the immediate aftermath of the release of the policy reflect the greatest failure that the administration pursued in releasing this policy, which was the failure to come out publicly and articulate what they meant when they used the language in this particular document. I think the language that you quoted compared to the Bush administration or the new space policy is consistent in terms of an interpretation that one could put on it.

And I would say that, in terms of the real rubber meets the road part of international cooperation, I would refer you to General Armor's comments on the first panel, where he said that, in fact, from his perspective the new policy encouraged greater international cooperation on a military-to-military side, something that he didn't see in the earlier program.

Mr. TIERNEY. Thank you.

Mr. Cavossa, anything to close?

Mr. CAVOSSA. No, sir.

Mr. TIERNEY. Ms. Grego.

Ms. GREGO. No, thank you.

Mr. TIERNEY. Ms. Hitchens.

Ms. HITCHENS. I just want to mention that I do want to thank you, Mr. Chairman, and the panel for undertaking this, because I believe this has been the first hearing on space policy, the first public debate, and we really do need to have more of these.

And the second thing I wanted to say is the one thing I think you will hear agreement on across the board here if you listen hard is the question of rules of the road and the idea of establishing new rules for people to operate together particularly in peacetime. That is an issue that I think there is more and more consensus about, and I would really urge the committee and the subcommittee to look into that in more depth.

Thank you.

Mr. TIERNEY. Thank you. Thank you all very, very much for your time, patience, and your contributions.

I would invite you to write the committee with any suggestions you have on what a further hearing would focus upon. If it could be helpful to the debate, we will then discuss it as a committee and decide if we are going to do that. We do want to make sure that this issue gets covered. We think it is important also or we wouldn't have had the hearing.

Thank all of you, thank my colleagues.

[Whereupon, at 3:50 p.m., the subcommittee was adjourned.]

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