

**CARNEGIE INTERNATIONAL NON-
PROLIFERATION CONFERENCE**

**RONALD REAGAN BUILDING
AND INTERNATIONAL TRADE CENTER
WASHINGTON, D.C.**

NOVEMBER 7, 2005

**4:00 PM – 5:30 PM
“OUTER SPACE SECURITY”**

CHAIR:

THERESA HITCHENS, CENTER FOR DEFENSE INFORMATION

PANELISTS:

**RICHARD GARWIN, IBM
AMBASSADOR PAUL MEYER, CANADIAN DEPARTMENT OF
FOREIGN AFFAIRS AND INTERNATIONAL TRADE
YE RU’AN,
CHINA ARMS CONTROL AND DISARMAMENT ASSOCIATION
BRIGADIER GENERAL SIMON WORDEN,
UNIVERSITY OF ARIZONA**

*Transcript by:
Federal News Service
Washington, D.C.*

THERESA HITCHENS: (In progress) – this presentation, and then we will open the floor for Q&A. There is a microphone here in the middle and I do ask that you identify yourselves before you ask your questions. Our agenda is kind of packed so in order to save time I am going to give very brief introductions. You can find biographies of all of our speakers in the Carnegie booklet. I am going to mix up the order a little bit. They are not sitting in actual presentation order – (laughs) – so I hope you don't get confused on the introductions.

I am going to start with Ambassador Paul Meyer, who is currently Canada's ambassador and permanent representative to the United Nations for disarmament, and also the ambassador to the office of the U.N. in Geneva, where he is responsible for representing Canada at the Conference on Disarmament. He has held a variety of positions with the Canadian government since 1975 including stints in the Canadian Embassies in Washington and Tokyo. He has been intimately involved with the debate – or perhaps I should say lack of debate in the Conference on Disarmament and the U.N. on the prevention of an arms race in outer space. Ambassador Meyer will speak first.

Following Ambassador Meyer will be Brigadier General Simon Peter Worden, who is a familiar face to those of us who are working on space issues here in the United States. He retired in May 2004 as director of development and transformation at the Space and Missiles Systems Center of Air Force Space Command. He holds a doctorate in astronomy from the University of Arizona and has advised both presidents and members of Congress alike on both civil and military space issues, which is an interesting point being able to work on both things. And he has many awards and decorations to his name including the NASA outstanding leadership medal. He is currently very involved with advising U.S. government efforts on developing responsive space capabilities to improve access to space.

We are also honored to have Ye Ru'an, president of China's Arms Control and Disarmament Associate and a senior fellow at the Chinese Institute for International Studies. From 1994 to 2001, he served as the counselor and the minister counselor at the Embassy of the People's Republic of China here in Washington. He has been a visiting scholar at the Stanford University Center for International Security and Cooperation and at the International Institute for Strategic Studies in London, and has long been interested in U.S.-Sino relations where space is actually a major issue for the future.

Last and by no means least, sitting next to me is Dr. Richard Garwin who is an IBM fellow emeritus and a member of all three elements of the National Academies of Science. Dr. Garwin is the official dean of American military scientists, having built a long career advising a number of presidents on technology and security issues, serving two terms on the President's Science Advisory Committee and one on the Defense Sciences Board. The National Reconnaissance Office named him as one of the 10

founders of National Reconnaissance and he has also been recognized for his technical contributions to the first electronic intelligence satellite, the POPPY, which was recently unclassified.

With that, I will turn the floor over to Ambassador Meyer.

AMBASSADOR PAUL MEYER: Thank you, Theresa. And let me say first how pleased I am to have the opportunity to speak on this very important subject at the Carnegie Conference. As a practitioner, I will be addressing this panel's topic – and I remind you, it's Outer Space Security: Past Perspectives, Future Prospects – from the position of focus on the diplomacy of outer space security, especially in so far as it relates to the Conference of Disarmament in Geneva, a 65-member body that has as its mandate the negotiation of multilateral arms control and disarmament agreements.

That conference has had on its agenda for many years now the issue of the prevention of an arms race in outer space, or PAROS as its acronym. And, indeed, for a period from the mid-1980s to 1994, it actually had an ad-hoc committee dedicated to this subject. Unfortunately a lack of agreement in this consensus-based forum has prevented the reestablishment of such a committee for over a decade. The lack of an ad hoc committee has, however, not prevented some worthwhile discussion and proposals being generated both in formal plenary sessions and in informal meetings. I will pick up on a few highlights of this discussion a little later, but first want to provide a brief account of Canada's approach to the PAROS issue.

Canadian policy has centered around the desire to preserve outer space as a weapons-free environment, a global commons, if you will, open to peaceful use by all. For years Canada has advocated a legally binding ban on all space-based weapons.

Canadian Prime Minister Paul Martin, in his address to the U.N. General Assembly in 2004, stated, and I quote, "What a tragedy it would be if space became a big weapons arsenal and a scene of a new arms race. In 1967 the United Nations agreed that weapons of mass destruction must not be based in space. The time has come to extend this ban to all weapons," end of citation. This statement concisely sets out what is at stake and suggests building on the existing limitation of the outer space treaty by negotiating a comprehensive ban on all weapons.

In addition to the space weapons ban, Canada has also encouraged the development of a broader concept of space security and tries to engage a wider group of stakeholders in developing this concept, which integrates a number of factors that impinge on the security of outer space. It has contributed to the establishment of the spacesecurity.org consortium, which is a group of governmental, non-governmental, and academic organizations interested in the subject, and has supported the production by spacesecurity.org of the annual Space Security Index, a publication that gives expression to this broader concept of space security by assessing on the basis of eight broad indicators the current state of space security.

Besides the negotiation of international legal instruments, Canada also encourages complementary action involving political commitments relating to space security. Useful ideas for confidence-building measures have included, for example, proposals for a no first deployment of space weapons pledge, codes of conduct for space activity, and expanded commitments of non-interference with space base national technical means or other space assets building upon provisions of previous bilateral agreements but also existing multilateral commitments such as those contained in the CFE Treaty.

Proposals of this kind might also serve to foster a political diplomatic environment that would be conducive to the negotiation of a multilateral agreement on PAROS, which to be effective would require the support of the major space-faring nations, especially those with a space-launch capability.

Despite the protracted impasse at the Conference of Disarmament over adopting its program of work, the body has served as a significant forum for policy dialogue on PAROS. This dialogue has intensified in recent months as more countries become aware of their growing dependency on space assets for a wide array of tasks, and would be jeopardized, frankly, if outer space became a combat zone.

In terms of official plenary discussion – for which, I remind you, statements are on the public record; they are recorded and available – I would flag in particular the June 30th, 2005 CD plenary devoted to the subject of PAROS, during which 23 states outlined their national thinking on this issue. Special note should be named as well of the Russian-Chinese working paper, CD document 1679 of June 2002, which outlined draft elements of a PAROS agreement, and the three subsequent papers prepared by these delegations on the themes of existing legal regime definitions and verification.

On August 16th of this year, an informal meeting to discuss these three thematic papers and the initial working paper drew representatives from 54 member states and observer states. The United Nations Institute for Disarmament Research, or UNIDR, based in Geneva, has also been the organizer of three major international symposia on space security, with the most recent being held in March of this year. And I would commend you to look at the report from that very comprehensive discussion that is available on the UNIDR site and probably others.

This quickening of space and expanding involvement in the consideration of space security issues at the CD is promising. But we still need to find a manner to channel it in the most productive fashion. The ideal would be of course to unblock the impasse at the CD by agreeing on a balanced program of work that would include at least three elements: one, the negotiation of a Fissile Material Cut-off Treaty – and you will recall Dr. ElBaradei this morning referred to it as absolutely ridiculous that after 10 years we have not been able to commence negotiation of that treaty – second, nuclear disarmament; and third, PAROS, the first with negotiating mandate and the other two initially with discussion mandates.

That is the ideal and I hope we can continue to work towards states making the necessary compromises that would enable such a program to be agreed again by consensus. The fallback option would be to arrange a structured discussion of these issues that would be sustained throughout the year, and the incoming six presidencies of the CD – they have six countries that have responsibility in rotation to preside over the conference – are currently looking at this issue to devise a plan for a schedule of activities for 2006. And it's significant because the president is the only one who is able to initiate certain activities without receiving the endorsement of the conference or a general agreement of the conference, which has been a limiting factor for our work in the past.

A third option would be to establish a PAROS experts group that would enable, again, at least some of the complex legal, scientific, and technical issues to be addressed. Finally, if these options do not materialize, we should actively explore other means of unblocking the CD in order to take its work forward. I do not believe it is in anyone's real interest to prolong the impasse in the CD. Frustration with the current stalemate surfaced clearly at the U.N. General Assembly's first committee last month. And I hope this serves as a wakeup call to us all to move now to take the appropriate corrective action.

It is sometimes sad that the international community should not bother with PAROS as no arms race is in the offering. We see this situation in a different light as an exercise in preventive diplomacy, to take advantage of the present non-weaponized status of outer space to ensure that this condition will be preserved forever. There are several examples from the annals of multilateral arms control whereby states ruled out of bounds searching the activity before it was actually being undertaken. The Outer Space Treaty, the Seabed Treaty, the ENMOD, Environmental Modification Convention are all examples that come to mind.

We believe that the international community's collective interest in preserving secure and sustainable access to and use of space free of space-based threats requires similar preventive diplomatic action. I thank you for your attention.

(Applause.)

MS. HITCHENS: And next up we will have Brigadier General Pete Worden.

BRIGADIER GENERAL SIMON WORDEN: Thank you, Theresa, for the – I guess I am supposed to give the military perspective. I am not sure my colleagues in the Defense Department would agree that my perspective is the military perspective but I will give it a try.

Before I begin, though, I would like to really ask a rhetorical question – is why we are having a discussion that more or less focuses on space weapons now. I took a look at the chart on proliferation threats at this conference's website and I didn't see any space weapons tokens kind of spreading throughout the world. And if I read the prognosis of various groups in the arms control community, it seems the space weapons threat is

combined or is confined to this nation. Now, as a former U.S. military man and space officer, this concerns me. I don't like to see my country pegged as the bad guy, and it is to this problem I would like to address my introductory remarks.

A few months ago there were a number of articles, most notably in The New York Times about a massive and secret space weapons development program in the United States. These articles could only be described as breathless. They posit a soon-to-be-released national space policy that allegedly would authorize a massive investment in space weapons.

Now, these reports were taken as gospel truth by many. Particularly gullible, or perhaps complicit, were certain foreign states, most notably China and Russia. Both nations trumpeted the so-called rush to militarize space by the United States as a huge threat to mankind's future and both invigorated their long standing, but in my opinion rather silly, space weapons ban treaty in the U.N. Conference on Disarmament, and both held widely publicized conferences on the space weapons threat, inviting many at this conference, I might add, no doubt at those governments' expense.

Most disturbingly, however, was that both nations threatened their own space weapons developed as a response to America's supposed space weapons rush. Now, this situation is in my opinion a perfect tempest in a teapot. To the best of my knowledge there is not a massive U.S. space weapons program. Most of what arguably would be called space weapons development has long since been terminated. There is to be sure a modest cottage industry in the U.S. policy community attempting to focus attention on this issue, both pro and con.

But my message to you is to relax. In the close to some \$50 billion, U.S., space program, anything that could be remotely called space weapons development is in the few tens of millions of dollars per year in technology and hedge programs – a quite reasonable precaution, I might add, for reasons I'll discuss later.

Allow me to elaborate for a moment. A few years ago, the national political leadership here in the United States became concerned over national security space policy. This culminated in the Rumsfeld commission named after someone who I think now has some mid-level position in the Defense Department. Now, among other results was the concern over a so-called Pearl Harbor in space resulting in the U.S. losing its vital space capability in a foreign sneak attack.

This concern resulted in what appeared to be a more coherent national security space management structure and would also appear to be the beginning of a U.S. space force. As a result, numerous official-looking documents emerged from the incipient Space Force Headquarters in Colorado Springs with impressive and I might add slightly scary advocacy of space dominance.

So what has happened? Well, in my opinion, not only has there not been a space weapons push, but the overall U.S. military use of space and focus on the medium is in

sharp decline. Virtually all of the Rumsfeld commission management changes have been reversed in the last few months, the Air Force, supposedly about to become a space force, is now opting for so-called near space in preference to real-space capabilities. Near space is an impressive-sounding and quite incorrect euphemism for a balloon core. So unless the arms control community is worried about the spread of balloon-born weapons, I don't think there is much to fear.

The concern with space dominance has morphed into a quite legitimate focus on the part of the DOD on what is called space-situation awareness, knowing what is actually happening in space. A lesser focus is on what is called defensive counter-space, guarding against loss of space assets.

Lest you think this is a subtle way to deploy offensive arms as defensive arms, one of the most potent and actually well received directions for defensive space is what is called responsive space, and I thank Theresa for mentioning my name in concert with that. That probably doesn't help the thing go forward – (scattered laughter) – but this basically means the ability to replace damaged or inoperable space systems on short notice and affordably with small satellites and no-cost launchers.

Most of what might be called true offensive space weapons such as space lasers have long since been cancelled, and salt has actually been sown into the ground from which these ideas arose. What remains are quite legitimate capabilities that are extensions of electronic and information operations.

These programs have as their objective denying adversary use of a growing fleet of commercial space assets. Since we too rely on these assets, the intent, indeed the demand, is that any electronic measure we deploy be temporary and reversible. The oft-cited programs of the Missile Defense Agency for space-base missile defenses – never large in recent years – have been marginalized by Congress and DOD leadership.

Now, why has this retrenchment occurred? First, and perhaps most obviously, the security threats we now face come from a much different direction: in short, virulent Islamic terrorism. Space weapons have little application to this threat. Second, there does not appear to be a rapid rise of technological adversaries, although this possibly does remain real. In the final analysis, however, the most compelling case against space weapons is that the U.S. space industry and associated military space leadership is frankly incapable of delivering any space capability, let alone a space weapon.

Now, in the ever-tightening budget situation with DOD a community incapable of even maintaining existing capabilities such as missile attack warning is unlikely to be allowed a foray into new regimes. Indeed, this is what has happened. The space weapons advocates – and there are some in the military – have little chance when every space penny goes to funding overruns on such programs as the space-based infrared system, or SBIRS, and the future imagery architecture of FIA, new spy satellites, each of which support cost overruns of factors of five over initial estimates.

Far from taking comfort in this situation, those of you who are concerned with space security should be rightfully alarmed. We are confronted with increasingly interconnected worlds served by global utilities, many based on or relying on space systems. Our war on terrorism is actually a multi-decade war of ideas. Space is a key element of the information distribution and collection systems that will enable us to win that war, yet our security space leadership and industry seems incompetent to address any security problem. I believe their reluctance to discuss space weapons stems from a very real inability to discuss any space issue from a technically sophisticated standpoint. This is a serious threat to not only our own security but global security as well and I hope we can discuss that issue here.

Let me return for a moment to space weapons issues as that is what is advertised – the reason for being here. Some say that the current lack of space weapons desire on our part is an ideal opportunity to hold an arms race before it starts, as Ambassador Meyer did. These folks decry the U.S. government's refusal to engage with the Russian and Chinese overtures in this area. Now, this is a legitimate question, but it's also one I believe has a good answer.

Now, I don't want to get into a big historical dispute, but many believe, and I among them, that the threat of space weapons, particularly space-based missile defense was one factor in ending the Cold War. If the very threat of space weapons had the possibility of such leverage against a pure competitor, what could someone now offer the United States that is worth giving up that potentially powerful position for all time? Now, I hope we can discuss this issue as we proceed today, but in my opinion it has served U.S. security well to never say never in many areas.

There is another reason to keep our space weapons powder dry, and that is the spread of so-called dual-use technology. For example, the German government in response – in concert with the Russian government have a program called TXES (ph) designed to rendezvous with an uncooperative satellite to repair it, but it is a simple task to unrepair such target satellites as well. Even more widespread is access to micro-satellites, systems weighing a few tens to a few hundreds of kilograms and having the ability to perform 80 percent of the mission of a large satellite at 10 percent the cost.

Now, the United States lags far behind on these technologies. My concern is that we may face a future where the United States has lost space superiority not from enemy space weapon, but simply from not having deployed the necessary basic space capabilities that others have.

In summary, it's my opinion that space security is a very serious issue, but the issue is not over space weapons. I believe a U.S. push to develop space weapons is highly unlikely in the foreseeable future, but conversely I have a strong concern about global space security and the role the United States will play in it. Our increasingly incapable security space infrastructure is a far worse threat to global security than any purported space weapons program in the United States or elsewhere. Thank you.

(Applause.)

MS. HITCHENS: Peter is always good for stirring up the audience. (Laughs.) And next we will have Ye Ru'an to give a perspective from China.

YE RU'AN: Thank you, Theresa. It is my honor to join this distinguished panel and a good opportunity for me to continue my learning process of space issues as I am not a specialist on space issues and not involved in space programs in China at all.

Four weeks ago, China's successful launch of a second space orbiter, Shenzhou VI, with two astronauts on board, won universal acclaim. Like all Chinese around the world, including my compatriots in Taiwan province, I feel proud of my country, which is still a developing country, for such an outstanding accomplishment by our scientists and engineers through more than 30 decades of hard work. This event indicates that it is an inalienable right for all states to explore outer space for peaceful uses and that space is not and should not be the exclusive domain of one or two space superpowers.

As we all know, outer space is the commons of all mankind. It is of growing importance to our daily life on earth. Today, numerous undertakings by states, including telecommunication navigations, weather forecasting, remote testing, mineral exploration, crop breeding, disaster relief, and a lot more are inseparable and benefit from peaceful uses of space.

Statistics show that until today, states have launched thousands of flying objects into space. We can well imagine that space will be more and more important for our planet in the future. However, with rapid advancement of science technology over the past decades, and especially space technology, military uses and strategic value of space have also markedly increased. Efforts for the research and development of space weapons such as ASTS (sp), airborne and space-borne lasers, kinetic and direct energy weapons have never ceased.

New military theories and concepts as space controls, space power projection, space countering have emerged, and the simulations of space-war exercises have carried out. At present, development of space weapons is not simply something on paper or mere talk show; tens of millions of dollars have already been invested. Various plans, programs, visions, are being implemented. If more and more advanced space technologies are used for military purposes both on earth and in space, it will seriously jeopardize space security, peaceful uses of space and the well being of all mankind.

If the international community fails to act now to check this dangerous trend, it would not be too far away before space weapons are deployed in space. Everyone would be living under the shadow of double Damocles swords: nuclear and space weapons. In view of this looming danger, what is more worrisome is the existing international legal instruments governing space activities with drawbacks and loopholes have been overtaken by changes in international relations and technological advances. They are

becoming less and less effective in preventing an arms race in space and prohibiting development and deployment of space weapons.

The 1967 Outer Space Treaty only bans the deployment of nuclear and other weapons of mass destruction in space, but does not ban sophisticated conventional weapons or new concept weapons now under development. The 1979 Moon Agreement, which has only 10 state bodies is less relevant to space activities on the earth orbit. Moreover, the barrier of the ABM Treaty that served to maintain world strategic stability has opened a green light not only for developing long-range BMD systems, but for developing space weapons. None of these legal instruments contains provisions that prohibits the use or threat of force from the earth against objects in space.

Over the past decades, preventing an arms race in outer space and the now weaponization of outer space has been a priority agenda in international arms control disarmament progress. The international community has made tremendous efforts for this endeavor as Ambassador Meyer said just now. As early as the '50s of the last century, the U.N. General Assembly listed the PAROS as one of its important agendas.

It became an agenda item in the Conference of Disarmament in Geneva in 1982. The CD had established ad-hoc committees for 10 consecutive years deliberating on the definition of space weapon, formulation of proper norms, improvement or amending of the existing treaties, space-related CBMs and other relevant issues. For years, the U.N. General Assembly has adopted about 20 or so resolutions on PAROS with an overwhelming majority of votes in favor.

Governments of many countries including Russia, China, Canada, and other countries have put forth a number of significant proposals for improving the existing legal regimes, or concluding a new treaty governing outer space activities. Some non-government organizations and experts have produced valuable ideas and suggestions such as an international code of conduct on preventing accidents and dangerous military activities in space, specific CBMs to protect space assets, enhance management of space debris and agreement on no first deployment of space weapons, et cetera.

China has strongly and consistently supported peaceful uses of outer space and opposed an arms race in and weaponization of outer space. China is one of the co-sponsoring states of all U.N. G-8 resolutions on prevention of arms race in outer space. The Chinese delegation has submitted to the CD a number of working documents about space issues. However, it is disappointing to note that in the past 10 years, CD in Geneva has remained in stalemate on this important agenda without being able to begin negotiations and not even discussions on the agenda.

Unfortunately, all of these international efforts, governmental or non-governmental, have not been able to persuade the decisionmakers in Washington to give up space weapon programs and join the rest of the world in keeping outer space weapons-free. Outer space should not become a new frontier for war. Otherwise, when space weapons are actually deployed, we and our sons and grandsons will pay far more cost for

non-proliferation control and dismantlement of such weapons if the United States begins to deploy space weapons.

The only country that has the capabilities to respond in kind is Russia. Whether or not it can afford or is willing to is another question – or other space-faring countries, including China, will not join the race. But I assume that they would do whatever they can to protect their space assets and legitimate right for peaceful usage of space and ensure for their national security. We all should learn a hard lesson from the prolonged, hectic nuclear arms race between the United States and the former Soviet Union and prevent the weaponization of outer space before it's too late when another genie comes out of the bottle. Thank you.

(Applause.)

MS. HITCHENS: And finally, Dr. Richard Garwin.

RICHARD GARWIN: Well, when I was in college I was a motion picture projectionist and the blank screen is the bane of a motion picture projection experience. So I am going to fill this screen simply because it is here. (Scattered laughter.) Also, the aspect ratio of this room is pretty good, and there is a chance that when the people in front can see it, the people in back can see it too.

Now, what I want you to take home really is two things. One is this website, fas.org/rlg, where you will find a lot of current papers by me posted, and the other is the judgment, already evinced by Pete Warden, that weapons in space are not effective, the counter to weapons in space is not more weapons in space, but a government that can't make decisions, that can't make space systems is likely to make the wrong decision, and so will other governments, and so one could have an expensive arms race and the beginning of hostilities where it was totally unnecessary. This is what you will find on my website in the 2000s papers – go back to the 1940s.

So I was asked to look at this from a scientific perspective, and you heard some of my involvement. But also I was for many years a member of the Land panel, Edwin Land – the Polaroid person on overhead reconnaissance. I served on the space studies board of the National Academies, and for instance, also on the first Hubble Telescope repair emission advisory committee. And in 1958, I was a member of the U.S. government delegation to the 10-nation conference on surprise attack and worked also at that same time on the conference of experts to ban all nuclear explosions tests.

But as part of the 10-nation conference on surprise attack, I proposed geosynchronous satellites that would relay telegraph speed communication from the silo watchers in the Soviet Union and in the United States to control centers. And then I tried through NASA to move such satellites forward. They would have solar heat engines rather than solar cells and thermal stores to carry them through the eclipse period. So that was good, clean fun. (Scattered laughter.)

But it was clear that in these early days these satellites would soon be important in national security and in commerce, and so I worked also after its deployment on the CORONA system, of which there were more than 100 missions at a cost of about \$7 million per mission, but the mean life of these photographic film satellites was only a week or two, by which gave rise to fairly prompt return of the images on the film delivered to the ground. Truly real-time intelligence or near-real-time intelligence came from electronic satellites, one of which was declassified just two months ago.

It was perfectly clear that the characteristics of space make satellites exquisitely vulnerable since any object, no matter how light, can travel in a similar orbit. Now, that means there is a special vulnerability, not often commented because people are much more interested in making much more exciting kinds of space weapons rather than the space mines that I will talk about.

In 1953, I had already proposed to governmental organizations that we use those balloons that Pete Worden mentioned, weather balloons that go typically to 30 millimeters, 100 kilofeet, where there is only 2 percent of the atmosphere above them. So instead of having atmospheric drag on launching light things, atmospheric drag is no longer a consideration.

And so you can put up on those light balloons a little thing that weighs a couple of kilograms, is automatically pointed by magnets in the direction you want it go, and you can then fire off two- and three-stage model rockets that would inflate radar reflective balloons that would test and confuse radars on the other side. So access to space of this type has always been available at very low cost for those who could make use of very small payloads.

Now, this had become more and more feasible because the utility of the very small payloads has increased greatly because of the integrated circuit revolution still in full gallop, and the advent of the global positioning system that allows a full-functioned GPS receiver that will tell you whether you are there or here in a tenth of a second at a cost of 100 grams and \$200.

The simplest role for the small payloads – small payload doesn't do much good in reentering the atmosphere, but is evidently the anti-satellite mission to destroy a satellite either immediately or on command, and which satellite needs to be large and costly – hundreds of millions of dollars, billions of dollars for some very capable satellites.

So our U.S. reconnaissance satellites in low-earth orbit, in LEO, have always been vulnerable – initially to Soviet ASAT, which was not a very sensible way to threaten satellites, but in fact to small interceptors or space mines. So to avoid such vulnerabilities, in 1983, I presented a draft treaty to a subcommittee of the Senate Foreign Relations Committee, and many others are concerned with preserving our satellite capability, both our national intelligence capability and our military capability.

So the current director of the National Reconnaissance Office, Donald Kerr, in 1983 on a panel discussion at Los Alamos said the most important stabilizing thing in my view is the question of eyes and ears. We have to take every step we can to preserve those assets, including possibly negotiating ASAT treaties, other treaties that might occur to us that will maintain – he means the opportunity for both the U.S. government and the Soviet government to be as well-informed as possible in order to terminate any possible conflict as soon as they could.

Well, opinions differ on how to protect this enormously valuable capability, national reconnaissance, because they serve many functions including those of national security beyond the ability to support military operations. But over the years we have greatly increased the military role of space systems. Instead of preserving them for the strictly national, non-military role of information the national security decision-makers. And I have played my part in that, and I have tried to draw this distinction between military roles and weapons in space.

Now, it's been very difficult because when I chaired for seven years the advisory board to the secretary of State, the arms control and disarmament – arms control and –

MS. HITCHENS: (Off mike.)

MR. GARWIN: – and non-proliferation advisory board to ACDA. ACDA was getting \$40 million a year, which, if you do the math, is one ten-thousandth of the funding for the Department of Defense. So it is very difficult to send people to conferences, let alone to have an impact in a government where influence is equated to votes in the populace, and the votes are determined by money spent in their district, not national security or international security.

So I wanted to have a legal basis to protect satellite systems other than space weapons by negotiating a universal treaty banning space weapons and ASAT tests. Well, you have heard from General Worden that the U.S. government, that it cannot make decisions in space or build systems in space or in the Defense Department as a whole.

And as you have seen, a lot of the government is broken on the civil side. And the conference side in disarmament is broken. In my opinion it is ill-structured and ineffective simply because it has too many states, and because it relies on consensus. So you can't rely on treaties alone.

Now, both China and Russia have apparently accepted the views that there is a distinction between satellites involved in the military activities such as GPS weather satellites and communication relay satellites even if they support military operations, that a bomb fall there and not here, and if it is made of concrete, it will do a good job of destroying what is there and leave me untouched, unless they are targeted on me – as distinguished from those that themselves protect damaging force in the guise of laser beams or that shoot or collide with other satellites or objects on the ground.

Why such a treaty? Because that would imply the authorized use of force against the satellites of a state that no longer abided by its obligations, and more importantly would provide a political and moral basis for retaliation against military and other ground targets not limiting the use of force to the satellites which might not even be possessed by that state.

Now, the official U.S. position that there is no urgency or necessity to negotiate limits on space weapons simply because there are no space weapons in existence is wrong-headed on its face. It's like refusing to face up to the potential avian flu pandemic until it's upon us.

So that is the background for my negative views to U.S. programs to develop space weapons and to practice anti-satellite intercept. That opposition arises from my assessment of the exquisite vulnerability of such satellites, whether for power projection or missile defense. And you can read these at length on my website in a paper co-authored with three other people available with the other materials at the website that I mentioned to you.

(Audio break, tape change) – A, are not going to be very effective as you see in that paper, “Crossing the Rubicon,” because laser beams projected against fixed targets are easily countered by water shields or other means, but other states such as China might fear that a fully deployed space weapons system could be self-protecting, and therefore despite the fact that their assessment of vulnerability and lack of utility might agree with mine, they could not tolerate the initial deployments that might lead to such a system. This is a prescription for a war on earth that begins in space in contrast to a war limited to space.

So I recommend a U.S. declaration – I wouldn't start with a treaty – that we not be the first to deploy space weapons or to test destructive anti-satellite systems. I think this would be in accord with what Pete Worden proposes. One could have such things at a low rate available, but we would be committed not to deploy space weapons first. And we would issue that in parallel with an urgent challenge to negotiate an international treaty to this effect.

From such a position – that is, calling for an international treaty – we could credibly declare that deploying space weapons would be regarded as a threat to U.S. security and that destruction of a U.S. satellite would be regarded as an attack on U.S. territory.

So I close with that. And like the other speakers, I would be delighted to answer questions or to hear comments, even those that don't agree with me. Thank you.

(Applause.)

MS. HITCHENS: Well, as you heard, we have a lot of different perspectives from a lot of different experts here who have had a lot of involvement in this issue. And

not only did they provide great presentations, they actually stayed on time, which is great. So I am going to open the floor to questions. I want you to please identify yourself and please ask short questions and not take up the audience's time with lengthy comments. I would appreciate that, as would our panel. Go ahead.

Q: Ron Clemenson (sp) from Ottawa. I would like to ask a question of Professor Garwin, but I don't have the mental capability to do that. But as an ex-Air-Force officer, I can ask General Worden this. (Laughter.) It seems to me that it is very un-American.

MR. GARWIN: I don't know if that is a positive or negative. (Laughter.)

Q: Believe me, it's positive. It seems to me that it is very un-American for the United States to hide behind not permitting a discussion on this. Let me ask you the other thing: Why should the United States not actually take the lead, insist that the CD discuss this and take the leadership that it showed in the 1980s when it was discussing bilaterally the space issue and it was discussing multilaterally the space issue and they had two ambassadors there to do that?

Why should the United States not use its leadership potential, which its allies and its friends – and I think even if you have enemies, which I suppose you do – your enemies would appreciate if you led the discussion along the line of what Professor Garwin put here, surely it would be in the U.S. national interests and the interest of national security? Thank you.

BRIG. GEN. WORDEN: That is a very good question. And I would maybe preface my answer by – you know, I don't speak for the U.S. government. I mean, I suppose at best I can speak for the governor of Arizona as an employee of that state. But I can give you some of my perceptions on this and maybe an admonition here. If the world community would like the United States to not block things over space weapons, the best thing to do is not make a big deal out of it.

And my experience in the government and in these issues – when somebody that might be a competitor is pushing you very hard to do something, then that says why should we do what they want? That provides us leverage by not doing that. What I have seen – and this was really throughout the Cold War – is that – it was sort of like for the Missile Defense Program.

And Professor Garwin had a lot of back and forth on the Missile Defense Program a decade or two ago that one of the most compelling arguments against the – or within the U.S. government to not give up anything – they said, well, if this was so stupid and didn't work and wasn't a good idea, then why did the Soviets want us to give it up so much.

So I think that argument – and this is the one that I have seen from my colleagues or former colleagues, particularly after my implication of their confidence – I'm sure they're really former colleague – (scattered laughter) – I don't think that – in the back of

the minds of a major power like the U.S., indeed a superpower, is that why is it in our interest to do this when it looks like it provides future leverage.

In a general sense, the U.S. government – although it is certainly a lot more on the Republican side than Democratic side, but maybe not as much as you might think – is that signing new agreements to say you are not going to do something doesn't seem to have the payoff that you want. Now, I understand the argument that it does in good will and cooperation with the rest of the world, but I think probably our experience recently has been that hasn't been a strong impetus on the U.S. government, at least recently.

So I think it is to understand the problem here rather than – I mean, I don't want to defend them but I think that is a very understandable rationale.

Q: I am Michael Katz-Hyman from the Henry L. Stinson Center. Pete Worden mentioned TXES, which is a satellite that is able to inspect or even dock and deorbit an uncooperative satellite. I am sure the panel is aware of a similar satellite called XSS-11, developed by the U.S. Air Force research lab that is designed to inspect other satellites in orbit. And the Air Force says the XSS-11 is just for inspection, not attacking, and I would guess that the designers of TXES would say the same thing about their satellite. And unlike other sort of grand-space warfare plans, XSS-11 is in space right now inspecting other satellites, so it's something that we are dealing with now. How would the panel think is the best way to avoid these misunderstandings on the purpose and actions of satellites?

MS. HITCHENS: That is a really good question. I am going to let Ambassador Meyer go first on that. I'm going to make him go first. (Laughs.)

AMB. MEYER: Okay. Well, I don't know the details on that system, but I guess – I mean, there are ways to – I mean, one way would be a transparency, a confidence-building measure presumably of inviting states to observe a launch or two, get a briefing on the nature of the system, and if indeed it is so benign that that would be a way of allaying concerns. There was the old – also, I suppose functional – observe the difference and the extent to which it carry capacities that might be less benign. Maybe that would be evident.

But, I mean, something like that would be a useful step to show a commitment not to change status in space, which arguably the United States benefits most significantly from, both in terms of non-aggressive military use of space assets as with civilian use.

MS. HITCHENS: Any other panelists want to address that? Do you want to address that, Pete?

BRIG. GEN: Really, that is a very good question because I think that this kind of gets to the point. I think there can be agreements on the – the focus really on space-situation awareness, and it's where – that is where the U.S. focus is now. And I suspect that there is considerable opportunity here. I can't resist poking at my Canadian

colleagues because the key technology on TXES and on XSS-11 and also on another one that the U.S. government is doing called Orbital Express happens to be the Canadian technology for our proximity ops and the manipulator arm. So in some sense we'll put the monkey on your back – is that it's your technology that is the dangerous one.

AMB. MEYER: Happy to do joint research.

MS. HITCHENS: Did you want to address that, Dr. Garwin and –

MR. GARWIN: Well, it's a difficult problem and I propose that the main threat is space mines and those are satellites that would sit next to other satellites for a long time ready to destroy them. So there was some satellite that visited another satellite for a short time. It might be announced in advance. I haven't thought that out, but a ban on space mines, a ban on space weapons would go a long way. A country would then be violating its undertaking if it actually deployed space mines.

MS. HITCHENS: Okay.

Q: Hi. Paul Carroll with the Ploughshares Fund. I have two questions; one is very simple, the other is a little broader – the first for General Worden. I guess I am curious. I don't necessarily see advocating or even leading an international treaty as never saying never because as this administration has clearly demonstrated, things like the ABM Treaty and the Kyoto Protocol have not locked us into anything. So I guess I – maybe it's reiteration of some of the other points, but having a treaty or a binding international agreement isn't forever. I think it is a positive leadership opportunity. So I guess I'm just curious about – to hear your response of that.

The second piece goes to this issue, this argument of the government incompetence and even the technological challenges or obstacles to actually deploying an effective system of any kind as a space weapon.

And I want to tie it back into the earlier panel we heard on secrecy and taboos because there are two concepts in play here and I think Dr. Garwin could answer this. But it seems to me it is really difficult in human nature to forego something of a scientific challenge. If we think we can do it or we have a vision we can do it, how can we just say, well, we are not going to try. So I'm curious about that.

The second thing is most of the taboos we have against nuclear weapons or torture or slavery seem to have come about after those things already happened. And in this case we are trying to create a taboo before we have this in existence. So I am curious to get your sense of our ability to both forego a technically sweet challenge and develop a taboo as I think we are talking about before we have actually gotten there.

MR. GARWIN: Can I answer that?

MS. HITCHENS: Yes, go ahead.

MR. GARWIN: Well, if you look at my paper, "Crossing the Rubicon," and other papers, you will see that it is not technically sweet. It provides a lot of employment for the people who would be doing the work and they may have a lot of fun. And they maintain as a result that it would be useful simply because if you put all of the arguments in favor on one side and all of the arguments against on another and you keep just the arguments in favor, anything, no matter how harmful or wasteful looks useful.

And what Pete Worden said is that the government doesn't have interest; it has emotions. This is a childish response. This is an argument that Henry Kissinger used to use in support of SDI or other things – that is, why is the other side so upset if we are doing it? But I have been involved with the other side too, and they are upset because they have the feeling that the United States has a government that understands the reality and that we wouldn't be spending on such things unless there was some merit in it. So it is a drive toward the irrational, that is the result – that results from such emotions on both sides.

BRIG. GEN. WORDEN: Yeah, if I might answer, I think the – and I don't want to make this my position, but my understanding of a lot of folks in the security community in the United States – and it is not just on one party – is that they would just as soon not have new restrictions that they have to get rid of if the situation changes. So there is a – if one were to propose a particular restriction, the first reaction is going to be what does that get us and why put a new one on we just would get rid of at some point in the future.

So those that got rid of the AMB Treaty never wanted it to start with so they are certainly not going to be going off to negotiate new treaties. That is a – I think that is quite a logical argument from people with that perspective. So it's quite understandable. One could argue is it right or wrong, but it is certainly one that exists very strong and I think it is unlikely to get around it in any foreseeable future in the U.S. power structure.

(END ONE HOUR)