Space and National Security

James A. Lewis, CSIS

NEC Space and Defense Forum

Tokyo, November 2007

Japan is facing major decisions regarding space and national security. The reason Japan needs to make this decision can be found in the larger context of global space and security activities. In this context, a decision to use satellites to improve national security would be logical. There are two reasons for this. First, the benefits to national security from space operations and services have increased greatly in the last few years. Second, Japan's neighbors are vigorously engaging in space activities, as are many other countries around the world. These changes mean that to think realistically about the Asian security environment, we must now look beyond sea and air and into space.

Effective use of space programs can improve national security. A number of factors have made space more important for national security. These factors arise from the changing international security environment, where there is greater risk and competition; the evolving nature of warfare, where informational advantage and asymmetric attacks are increasingly important; and with the rapid pace of technological change, that makes military or intelligence services from space much easier to acquire.

Countries are turning to space for national security for three principle reasons:

- The political prestige and international influence space activities bring;
- The technological capabilities that space programs create or reinforce;
- The informational advantage space assets ands services can bring to military and security operations and to strategic planning for security.

Using satellites and space services for national security provides several important benefits. First, space services are a force multiplier for conventional forces, as they improve capabilities and performance. Second, space services can significantly expand intelligence collection and analysis for assessing threats and providing warnings. Nations can, of course, conduct military operations, collect intelligence, and plan their security and strategic functions without access to space assets and services, but those that make use of space will have an advantage over their adversaries and competitors.[1] Finally, space programs are an element of national power – they increase prestige and provide technological prowess than can expand a nation's influence and leadership on the international stage.

[1] A space asset would be a satellite, for example. A space service would be the functions provided by the satellites – picture, or the ability to make long distance phone calls. GPS satellites are an asset; the signal they provide for navigation is a service.

The 1990 Persian Gulf War was the first conflict where satellites played a central role in shaping both strategy and operations. The satellite network designed for use against the Soviet Union in a global war gave the U.S. an advantage in a war against a heavily-armed regional competitor – in 1990, Iraq had the fourth largest army in the world. Remote sensing satellites provided data on the disposition and strength of Iraqi forces, provided targeting information, and allowed coalition forces to assess battle damage. The specialized Defense Support Program (DSP) satellites were able to provide warning, albeit very short warning, of Iraqi Scud missile launches. The use of military communications satellites and leased transponders on commercial communications satellites allowed unparalleled coordination between deployed U.S. forces and Washington. Although receivers were in short supply for the campaign, the signals from GPS satellites allowed coalition forces to navigate with precision in the desert and in the air. Iraqi forces found it difficult to compete with an opponent well-supplied with space services for navigation, communication, and remote sensing, and with a superior communications network.

One result of the first Persian Gulf War has been the emergence of post-cold war military competition in space. Many nations observed the benefits satellites provided for military operations and began to acquire or develop their own satellites. This competition is not the same as the competition between the U.S. and the Soviet Union during the Cold War, since it is asymmetric – no one tries to match the U.S. satellite for satellite. However, many nations are acquiring remote sensing, communications, and other security-related space services and, perhaps more importantly, a few nations are seeking ways in which they can disrupt other countries' use of space for national security.

At least six nations now are building and using satellites for security purposes. It remains to be seen how many nations will ultimately develop their own national security space programs. The trend, however, is for more countries to acquire satellites for security purposes. In addition, countries that are not acquiring satellites are buying satellite services from commercial operators – such as communications and remote sensing imagery – and using these services for national security.

In the seventeen years since this war, there have been major changes that make space even more valuable for security. The use of satellites in the Persian Gulf shaped the direction that future warfare would take and changed how nations think about national security. The integration of satellite services (communications, remote sensing, and navigation) with precision-guided munitions and with command structures helped to lay the groundwork for military transformation. More importantly, the amount of information provided by satellites transformed how some countries thought about strategic planning and warnings and indicators of threats to their security.

Space in the Information Age

This transformation did not occur in a vacuum. We are in the middle of a historic shift in how people work and produce. That shift is from an industrial economy to an information economy. One way to think about this shift is to consider that for thousands of years, the chief means for people to create value was in agriculture – by farming. About three hundred years ago, there was a transition, when the best way for a society to create value became manufacturing instead of

farming. In the last few decades, we have seen a similar transition, from manufacturing to the creation of ideas and services – to what we call an information economy. In this economy, creating intangible products and information gives companies and economies faster growth than do other activities.

In the same way, intangible products – information – can provide better security. Space information increases transparency among nations concerning their weapons programs and military forces, even if the target nation chooses not to cooperate. We also know that if two forces that are equal in equipment and size meet in combat, the force with greater access to information will have an advantage. Organizations that take advantage of information technology for communication, data processing, and sharing of information can act with greater speed and effectiveness than their opponents.

Changes in Warfare

The transition to an information age has also changed the nature of conflict. This change has deep implications for space and national security. These changes reflect the larger global transition to an information economy, where the importance of intangible assets – information and communications – has greatly increased. The core of a new approach to security lies in the enhanced use of information. Information – data, intellectual content, intangible technology – and its use and transmission are transforming societies and economic social activity. The expanded collection, sharing, and use of information will strengthen a country's ability to defend itself against threats to its security. Future conflicts will place intensive demands on space-based sensors and other sensor platforms to provide persistent surveillance, intelligence, and reconnaissance in real-time for extended periods over areas of interest.

The work of Air Force Colonel John Boyd in the 1980s, which emphasized the importance of speed in decision-making and the benefits of information superiority for military effectiveness, was influential in shaping the new approach. Boyd looked at the "decision cycle," the steps people and organizations go through to make a decision on which action to take. He argued that policymakers and commanders who could collect information and make decisions more quickly than their opponents would have an advantage. The intangible advantage of a faster and better-informed decision cycle could compensate for inferior force. Space and space systems offer the data collection and communications services that make faster decision cycles possible.

Intelligence activities have also changed as a result of space. The principle effect has been on the collection of information. The amount of information flowing to decision-makers in national security can be greatly increased at a much lower cost by the use of satellites. At one time, only the U.S. and the Soviet Union could afford to collect intelligence from space, but this is no longer the case. The diffusion of technology and the spread of space-faring capabilities to many countries mean that space-based intelligence collection is no longer something that only a super-power can afford. The great expansion in the number of satellite remote sensing programs contributes to this increase, as does the ability to take advantage of global information networks such as the Internet. The result of the connection between space assets and digital information networks is that "technical collection" of information is easier and cheaper.

The core of the new approach revolves around the issue of information superiority or information dominance. Information superiority can be best achieved by integrating space assets and services into planning and operations. The integration of space assets and the data and services they provide, combined with other kinds of intelligence, requires a re-conceptualization of organizations, strategy, and tactics. The question you may wish to ask is whether Japan, despite the excellence of its air and naval forces, is increasing its vulnerabilities by not making greater user of space to gain information superiority.

This question comes at a time when many nations have realized the value of space for national security and are willing to spend on space programs. Everyone knows that the U.S. and Russia have used satellites for military or national security purposes, but we now see many other countries – in Europe, China, India, Canada, Japan, Israel, and Korea –investing in national security space systems. Other countries, such as Taiwan, Spain, or the UAE are also considering security space programs. Competition in space has become a part of the Asian security landscape and has implications for both security and for regional influence.

China's Space Programs and the Asian Strategic Environment

There are five major space actors in Asia – the U.S., Russia, China, Japan, and India. Each of these nations has a range of space capabilities, including launch programs, satellite manufacturing and, in three cases, manned space programs. Each also has programs that can provide national security benefits, although these programs vary in their capabilities. The most rapid growth in capabilities is found in China and India, and these countries will be among the leading space powers in coming years. Tomifumi Godai, formerly of NASDA, summed this up when he recently said, "We could be overtaken by China and India. They are certainly riding on a wave of momentum."

Korea would like to join this club and is spending heavily on cooperative programs with the Russians to create a space capability. Korea's goal is to become one of the ten leading space powers by 2015. It closely watches both Chinese and Japanese space programs. Korea is spending a total of more than $4 billion in a partnership with Russia. The goals of the partnership are ambitious, and include the creation of a space launch center by late 2007; joint development of a new space launch vehicle (SLV); and the orbiting of a South Korean cosmonaut in 2008. Judging from the few public comments that have been made, Korea is also considering the military use of space. Whether or not this ambitious program succeeds, it is indicative of the importance space has taken on for Asian security.

In contrast to Korea, India's space program is well established and has already had many successes. India has also begun to assemble a range of military space capabilities. It has entered into partnership with Russia to develop and use the GLONASS satellite navigation system. The Indian military has requested a dedicated communications satellite for military purposes. India already has capable remote sensing satellites, and India's defense minister announced plans to deploy a military reconnaissance satellite by the end of this year.

Changes in the Indian space program are interesting and indicative. India's program is relatively small, with funding of less than a billion dollars a year, but it is very competent, with strong

programs in remote sensing and a growing communications capability. Until recently, India has focused primarily on civil and utilitarian satellite programs. Since China began to accelerate its space efforts, however, the direction of India's space program has changed, with the announcement of both lunar and manned programs. If there is a space race in Asia, it is between India and China.

China is the most active space power in Asia. It has been investing in space capabilities since the 1950s, and its space program was even partially shielded from interference during the Cultural Revolution, when other programs faced serious disruptions. This investment has paid off for China. The most visible return to China has been in prestige. China uses its space program to announce its great power status and to lay a claim to regional dominance. A White Paper on space put out by the State Council – the equivalent of the U.S. National Security Council - calls for "eye-catching achievements." China's President Hu Jintao described the success of Shenzhou 5 as "an historic step taken by the Chinese people in their endeavor to surmount the peak of the world's science and technology."

The motives that guide both China's civil and military space efforts fall into three categories. The first involves China bringing its space capabilities up to par with other developed nations. China has the money and expertise to do this. China also hopes to take advantage of new technologies, like microsatellites, to create new space capabilities that will allow it to surpass developed nations. China looks to these new technologies to provide asymmetric advantage against the United States and other potential opponents. This means that military space architecture for China will look very different from that used by the U.S. or Russia.

China also wants space to provide those "eye-catching" activities that will enhance China's prestige and influence. China's activities in space are undertaken primarily to affirm or enhance prestige and influence rather than build a continuous military presence. The long-term goal is to make space operations and services an integral part of China's national power.

China's manned orbital missions are only part of an ambitious program for space exploration. This includes both human and robotic efforts. The next phases of the manned program will be Shenzhou 7, planned for launch in 2007, with three astronauts. One of these astronauts will carry out a space walk. Between 2009 and 2012 there will be a docking maneuver with another spacecraft and the launch and operation of a space lab. The first Chinese space lab would be formed by docking two unmanned Shenzhou capsules together. Shenzhou 10 would carry the first crew for the lab. The Chinese say it would be followed by the construction of a permanent space station – some Chinese space officials say that a permanent space station is the major goal of the manned space program.

China is working on a separate unmanned lunar exploration program named Chang'e. The lunar program has three phases planned over the next twelve years. Chang'e 1 was just launched successfully and is now orbiting the moon. The second phase will land a craft on the moon by 2012. The third phase will return lunar samples to China by 2020. China hopes that success for Chang'e will help set the stage for a manned lunar mission. China does not yet have a launcher with sufficient payload for a manned lunar program, but it has begun an R&D program for the

next generation of launch vehicles. Michael Griffin, Head of NASA, said at a lunch last month that he personally believed that China would be back on the moon before the U.S.

China's space budget was a secret until 1994, and it has still not been made public in any detailed fashion. Estimates place it variously between $1 billion and $3 billion per year. This includes both military and civil space projects, but these figures do not include many space-related expenditures. China spends a little less than one-half of one percent of GDP for all space programs, but as GDP is growing rapidly, this gives it the opportunity to increase its space budget every year. Based on work done by USTR in the early 1990s on China's commercial space launchers, I would guess that these figures represent perhaps a third of the actual cost. China also seems to be more efficient in the use of its space funds, and it has the advantage of a young and well-trained space workforce, whose average age is about 40 years.

Remote sensing technologies are an essential element for building information superiority, and the Chinese military has identified them as a crucial area for building space capabilities. China has built and flown numerous remote sensing and reconnaissance satellites, albeit on a sporadic and experimental basis. The first models were primitive, having poor image resolution (resolution refers to the level of detail in the imagery collected by the satellite) and relied on film- recovery to provide data. Over time, Chinese remote sensing efforts have become more sophisticated and the Chinese space remote sensing program is marked by a continuous degree of incremental improvement.

The most visible example of China's military space program is its anti-satellite test. There are press reports that China is also developing other anti-satellite weapons. The Chinese miscalculated the reaction to their anti-satellite test. They did not expect global condemnation. This miscalculation reflects a degree of parochialism in Chinese security policy, a lack of experience in international politics, and a certain degree of hubris born of China's tremendous economic success. This makes it fair to ask if the Chinese could similarly miscalculate the balance of power in the region and overestimate the advantage they could get from information warfare or anti-satellite programs.

A review of what China builds and launches suggests that China's military space effort is intended primarily to demonstrate technological prowess and to test different kinds of satellites. China has built almost the full range of military space capabilities, and it could rapidly deploy satellites for signals intelligence, reconnaissance, geonavigation, and other services. That it has not yet done so does not mean that it will not do so in the future. The civil space program seems to have priority for now, but China is clearly focused on the military use of space as it explores other, asymmetric approaches to conflict.

Asymmetric Warfare

Asymmetric warfare is not a new idea. The advocates of air power in the 1920s believed that flying over enemy armies to attack factories, transportation nodes, and communications would bring victory faster than a conventional land assault that engaged enemy forces directly. They were wrong – countries and economies are more robust than they had estimated and air attacks, if anything, increased the will to resist among target populations – but many countries are

attracted to unconventional techniques and technologies – what Chinese strategists call "the assassin's mace" – as a way to overcome conventional military forces.

Asymmetric warfare is part of a set of interrelated changes in the nature of conflict. The first is the development of a high-tech, information-intensive style of combat pioneered by the United States in the first Persian Gulf War. The second is the reaction of the United States' potential opponents to the conventional military superiority this mode of combat has given it. The third is the development of new kinds of weapons and new modes of attack. The conventional strength that the United States derives from its high-tech, information-intensive style of combat means that potential opponents are seeking ways to obtain "asymmetric" advantage: they will avoid conflict where the United States is strong and attack where it is weak, and they will rely on unconventional weapons and tactics.

Irregular warfare or asymmetric attacks seek to remove some of the advantages that high tech weaponry provides for conventional warfare. This can take the form of insurgents who blend into civilian populations or it can take the form of attacks not on military forces but on the infrastructures that provide informational advantage to those forces. Surprise is more valuable to our opponents, as it eliminates the possibility of a damaging preemptive American counterstrike. The effect of more elusive opponents is to reinforce the need for information superiority.

Widespread awareness of U.S. capabilities in space has led to the adoption of countermeasures by a range of opponents. Countermeasures are not new – the Soviets knew almost immediately that U.S. satellites were spying on them. The Internet provides even poor and unsophisticated opponents knowledge of when U.S. satellites will be overhead. Informal networks of potential opponents share information on countermeasures.

In the Kosovo conflict of the 1990s, The Serbs successfully used a mixture of concealment, mobility, and deceit to confuse U.S. technical collection. Their success has encouraged others to explore ways to counter U.S. informational advantages. Jamming, spoofing, hacking, data disruption, and perhaps kinetic attack on satellites or their terrestrial infrastructure will be part of any future conflict. These attacks can involve, for example, carefully studying the signature of a target weapons system, and then duplicating that signature in a decoy. Or it could involve penetrating and disrupting the computer networks that operate satellites and process the data they provide. These techniques are routinely tested, albeit covertly, at the present time by several nations and will form an important element of military activities in space.

We should not discount the possibility of an attack on national space assets by potential opponents. China and Russia have sophisticated space capabilities. The Russians developed anti-satellite weapons and the Chinese are certainly attracted to them and are certainly researching anti-satellite capabilities. The possibility of the Russians, either with or without the consent of the government in Moscow, passing some anti-satellite technology to a potential opponent, cannot be discounted. Knowing how much the U.S. has integrated space services into its military operations makes disrupting those services, or the systems that provide them, a tempting target.

Technological Change

Technological developments have created new kinds of opportunities to provide a security advantage from space. A national security space system is no longer limited to building and operating large, expensive satellites. Countries can now take advantage of new technologies in sensors, pseudo-satellites, and information technologies to make future space systems more capable and robust, and more fully integrated into policy making and military operations. Smaller, lighter sensors, new kinds of platforms, and automated software tools will transform space operations. Some of these technologies offer the opportunity to leap ahead of competitors.

Constellations of small satellites, for example, using a mix of sensors, could offer increased coverage, redundancy and survivability. Networks using different kinds of satellites in different orbits, unmanned aerial vehicles and sensors on manned aircraft or other vehicles can provide persistent global awareness and new kinds of information advantage. The ability to place sensor packages on a range of vehicles other than satellites and to network the data flows they produce offers the potential for new operational capabilities.

Unmanned aerial vehicles also offer space-like benefits. As UAVs improve in reliability and in performance, they will be able to carry out some missions once reserved for satellites. High altitude UAVs carrying communications or sensor packages could provide a capability to reinforce or replace space assets at short notice for specific geographical areas.

The increased ability to manipulate and analyze data collected in space is another important technological change. Improvements in computing power and in analytical software have made space data more valuable and allow analysts to combine and integrate data from many different sources.

These developments and the pace and direction of technological change mean that more nations will have access to space, and access to improved security capabilities. The gap between "haves" and "have-nots" will shrink. While less than a dozen nations will have the ability to ability to launch a satellite into space, many more will now be able to acquire satellites or space services.

Commercial Space Services

The question of how to use space assets and how to gain informational superiority is complicated by the development of commercial space services. The United States and the Soviet Union spent billions of dollars to orbit fleets of satellites that provided intelligence, communication and navigation to their military forces. However, for far less cost, a potential opponent could assemble an "economy class" package to obtain some level of imagery, communications, weather, and navigation services. The distinction between military and commercial space is irrevocably blurred.

Commercial satellite services can provide military advantage. Nations do not need to depend on dedicated military platforms for space services. The emergence of a commercial space market in communications, remote imaging (and perhaps geo-navigation) created a situation where nations

could augment their military capabilities by buying space services. This also means that the satellites providing these services are logical targets for attack – albeit covert attack - by an opponent. The only national security space activities for which there are not commercial services available are in signal intelligence collection and in early warning of missile launches.

Some countries, such as India, Israel, and France, use the sale of commercial services to subsidize their national security space programs. These commercial services can involve the direct purchase of data or services from a commercial operator, or they can involve a "time-share" arrangement where a country has tasking authority of a space asset for some period of time. Even the United States makes heavy use of commercial services for communications and imagery. Some services are quite sophisticated – the new German TerraSar-X radar imagery satellite system offers imagery that a few years ago was only available from a few, expensive intelligence satellites.

Some countries combine commercial and security activities. This could be a communications satellite whose payload combines both commercial and military transponders, for example, or a reconnaissance satellite that sells some of its imagery on the commercial market, or a navigation satellite that provides both commercial and security services. The challenge that these "dual-use" programs face is that government usually over-estimate how much they can save by offering commercial services, and as a result, they underfund the program. Europe's Galileo navigation satellite program is a good example of this. Galileo offers useful services, but it is not commercially viable. For the program to succeed, the EU will have to pay more.

Organization and Doctrine

The arrival of these commercial services means that it is no longer necessary to build and operate your own satellite systems to gain an advantage from space. However, owning and operating a satellite is not enough for military advantage. To reap the full benefit of access to space requires extensive changes to doctrine and tactics, expanded staffs for analysis, and increased communications capabilities. Effective use of satellite services requires the development of a support infrastructure of analysts and operators and the integration of satellite data and services into military plans and operation. Countries seeking to use satellites for military purposes often overlook this terrestrial and expensive element of space power.

Expanded analytical capabilities are crucial. Imagery and data must be interpreted and shared to provide advantage. The U.S. decision to create the National Geospatial Agency was in part a recognition of the importance of reorganizing and creating supporting organizations for space. Satellites can generate floods of data. Most of it goes to waste unless it can be analyzed and communicated with others.

Doctrine is the principles by which a nation operates its military forces. Doctrines must be changed to gain the full benefit of activities in space. Most nations have not incorporated space into their military doctrine. The U.S. is the most advanced country in incorporating space into the way it conducts military operations. This doctrinal work is one reason for the U.S. military advantage in conventional warfare. The U.S. has also reorganized its military forces to incorporate space and space services more fully into their operations.

There are real benefits from combing space data with other information. The integration of space-based signals intelligence and imagery is a particularly complex task, since it requires extensive changes to doctrine, expanded staffs, and increased communications capabilities. One interesting development in this area, for imagery, is the growth of the commercial market in analytic services and software. Commercially available software provides growing capabilities to analyze space data and integrate with other data sources. This sort of analytics and integration can provide real intelligence benefits.

These terrestrial requirements are the hidden part of a national security space program. Many people look at the number of satellites and launchers as an indicator of space power, but it is these "back office" operations that provide the real benefit. Countries must also change their military doctrine, increase staff and communications resources, and modify existing organizations to gain the full national security benefit of space services. Building and launching satellites or buying access to satellite services is not sufficient in itself. A sophisticated use of satellite services requires the development of a support infrastructure of analysts and operators, and the integration of satellite services into security planning and operations. Countries seeking to use satellites for military purposes often overlook this terrestrial element of space power, but unless security functions are reorganized, the full advantage of investment in a space program will not be obtained.

Security space architecture is a final element for doctrine and organization of national security space systems. Architecture defines structure, equipment, and operations, and can be a roadmap for investment and development. Architecture is particularly important for space, given the physics of orbital operations, which dictate fixed patterns for movement and position. In this sense, space architecture is somewhat comparable to the concept of order of battle. Most countries, including the U.S., began by building their presence in space incrementally, adding a satellite or capability without a clear strategy of how these pieces would fit together. Developing a coherent architecture would provide advantages in performance and cost, but it requires treating space programs as an independent and separate function rather than as adjuncts to terrestrial activities.

U.S. Space Policy

The U.S. has worked for years to develop a coherent approach to space. Part of this effort involves a review of space policy by every administration and the release of a Presidential space policy. The current administration released its space policy in 2006.

In this new international context it is easy to misinterpret the U.S. space policy released in 2006. It is also in the interest of some opponents to intentionally misinterpret and exaggerate the alleged dangers of the new policy. In fact, the themes of the policy have been consistent for decades, appearing at least as early as the Carter administration of the 1970s. These policies are not based on the notion that space is peaceful. They reflect the assumption that opponents will seek to prevent the U.S. from using space for military advantage and at the same time, will attempt to exploit space for their own military purposes. U.S. policies affirm the right of the U.S. to defend itself in space and to deny space capabilities to opponents.

It is important to note that when the U.S. began its security activities in space in the 1950s, it did so only after a debate over the peaceful uses of outer space. President Eisenhower was deeply committed to the peaceful use of space. However, he decided that space operations that collected information and reduced uncertainty were not incompatible with peace. National security and peaceful use of space, in the U.S. view, are compatible.

The 2006 U.S. space policy says nothing particularly new. The policy reaffirms the U.S. belief that space should be free for all to use, and that the purpose of those uses should be peaceful, but that in any conflict the U.S. reserves the right to win any battle in space.

If there is a precedent for the new space policy, it is found in the long-standing U.S. approach to the freedom of navigation. Other nations may desire to regulate U.S. military forces in their actions to secure or defend the United States, but it is definitely not in the U.S. interest to accede to this desire. U.S. national vessels, armed or unarmed, have the right to navigate the open seas no matter which countries' borders they touch, and U.S. satellites – armed or unarmed – have the right to navigate open space no matter which countries they pass over. Note that the freedom the U.S. asks for itself it also extends to other nations, beginning of course with Sputnik, which passed over the U.S. every night without complaint from Washington.

It is not in the U.S. interest to try to make space a "sanctuary." Putting aside the question as to whether a potential opponent would respect any agreement that space is a sanctuary in the event of a conflict, there are many ways to attack satellites that do not involve space weapons, or kinetic weapons, or indeed anything that fits earlier concepts of weapons.

The space policy does not lay claim to outer space nor does it call for developing space weapons. There are budgetary and technical reasons why the U.S. might want to go slow on developing space weapons. They are expensive and the technologies needed for them are immature. Space weaponization is an area where the U.S. has a competitive advantage over its potential opponents. The fact that they cannot effectively compete with U.S. military space research is one reason why they publicly support a treaty banning space weaponization.

The chief problem with space weapons is that there is almost always a cheaper and better ground-based solution. This is a fundamental question for space activities and it is one that space advocates almost never ask. What is it that can only be done in space, or that can be done better in space than on the ground? There are military and intelligence activities where space operations have an advantage, but weaponization of space is not among these.

This problem complicates the development of a theory of space power by the U.S. Department of Defense. Space power is the capability to exploit space forces to support national security strategy and achieve national security objectives. To many outside observers, the concept of space power sounds ominous and threatening. Judging from U.S. comments, however, space power is an effort not to dominate space but to better integrate space operations and assets into U.S. military planning and activities. Space power points to the realization that satellites provide an advantage to the U.S., which no other nation can currently match.

The U.S. can reinforce its advantage in space by continuing to make its satellites more difficult to attack, by moving to a flexible military space architecture, by accelerating its Operationally Responsive Space programs, and by developing alternative technologies such as high-altitude Unmanned Aerial Vehicles and mini-satellites. These alternate technologies could provide "space-like" services that would render attacks on satellites useless. Since the U.S. is already pursuing many of these programs, and given the robustness of its satellite fleet, if the Chinese were to use anti-satellite weapons in a clash, they would gain little or no advantage. It is in the U.S. interest to ensure that this continues to be the case.

The Next Ten Years

The use of space by many nations for national security purposes has, in the years since the first Persian Gulf War, become routine. It is likely that this use will increase as nations take advantage of smaller, more capable satellites that do not cost as much as the giant collection systems of the past, and as they take advantages of commercial services. There is significant use of space for security purposes by a half dozen countries. Both the number of nations using space for security purposes and the scope of their programs will increase in the next ten years.

We also have multilateral competition in space now. This competition will increase in the next decade. For those countries that do not like the idea of a sole super-power, space programs – both civil and military – are a way to demonstrate independence and to challenge the U.S. Other countries see this effort as a challenge to their own influence and security and respond by developing their own programs.

China's ambitious space program is the best example of this. China's leaders wanted space programs in order to improve their security and to demonstrate to the world their return to great power status. It has been interesting to watch the reactions of India, Japan, Russia, and even the U.S., as each of these has accelerated their own efforts in space.

In Asia, the emphasis of these programs will be on using reconnaissance satellites monitoring neighboring countries (and for China, monitoring U.S. military forces). China may also seek to develop improved maritime surveillance capabilities. China will lead in developing military capabilities and doctrine as part of its larger military modernization effort, but these Chinese actions will provoke a response from India, Japan, and Russia. At the same time, the growing commercial space capabilities will offer smaller Asian countries an opportunity to mimic the military capabilities of nations with larger space fleets.

This is not a peaceful environment, and a treaty banning weapons from space will not change this. If the primary benefit of space operations for security is informational, space weapons are somewhat irreverent. As I said at the beginning of my remarks, nations can conduct military operations and perform intelligence, security, and planning functions without access to space assets and services, but they will be at a disadvantage when compared to those nations that do have space programs. National security space is expensive, and there is a fundamental political decision involved in deciding whether to acquire these space capabilities. The basis for that decision is how much threat a nation faces and how much risk it is willing to accept by not acting in space.