

Between the US and China: the Dynamics of Military Space

By James A. Lewis

That space is again seen as an area of tension and military competition should surprise no one. The first space programs were military and the military use continues to be a central element of human activity in space. This military aspect has become somewhat obscured, as civil and commercial programs receive greater public attention. The end of competition in space between superpowers also contributed to the illusion that space was something of a sanctuary.

Space weapons have been contemplated from the start – in 1945, Army Air Force Commander Hap Arnold recommends to the Secretary of War that the United States (US) pursue the development of long range missiles and “space ships” capable of launching missiles against terrestrial targets. In the 1950s, the Soviet Union threatened to launch nuclear weapons from satellites, leading both superpowers to begin to develop anti-satellite weapons and, in the case of the Soviets, armed orbital vehicles. While the UN Outer Space Treaty calls for the peaceful use of space and forbids the use of weapons of mass destruction, it does not forbid military use of space nor does it restrict the use of other kinds of weapons in space.

But focusing on space weapons is unhelpful to understand the context for military conflict in space. If space weapons were banned, there would still be military conflict in space. More importantly, a

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simple ban along the lines of the 1967 UN Outer Space Treaty would not improve US security. Two trends help explain this. The first is the change in the larger strategic environment. The second is the changes in the nature of warfare. In combination, these two trends guarantee that conflict and attack will continue to form part of the fabric of space activities.

The Cold War, for all its danger, had provided a considerable degree of stability to international relations. Competition was primarily between two blocs of nations, each led by one preponderant power. Intra-bloc competition was constrained. In space, a peer competitor facing a strategic nuclear exchange would want to avoid misunderstanding. New competitors, less experienced and perhaps perceiving less risk, do not face the same constraints.

The collapse of the Soviet Union did not signal the end of competition or conflict in space.

Before 1991, the US had led an alliance of Western democracies in a global defense against a superpower foe; it finds itself now in a world where alliances are less cohesive. A number of nations see themselves as challenging the US now or in the future for power, international influence and regional or global leadership. While there are some similarities to earlier periods when great powers competed, the terms of competition now are different – they are more subtle. Nations compete for influence rather than for land, and the tools of the competition are often economic and technological rather than fleets, armies and empires. This is not the imperialism brought to the world by Europe in the centuries before 1945.

For some, a corollary to these predictions of the end of historic conflict was a belief that the US had become a global hegemon – the one indispensable nation, as a former Secretary of State would have it. This too, was wrong. Efforts to cast the goals of US foreign and military policy in hegemonic terms have a faint whiff of ancient Soviet propaganda. A discussion of the intentions and interests of the US should be reserved for another time, but in considering US military activities in space it is useful to bear in mind that these interests and intentions include neither empire nor hegemony. While it remains the most powerful country and perhaps the only nation with global security interests, it is not the “leader of the free world,” nor the “one indispensable nation” – many nations would be happy to dispense with US leadership. This new competition with other nations for influence is a source of risk for US national security.

One key development of the new environment was the emergence of post-Cold War military competition in space. The competition, unlike the contest with the Soviets, was asymmetric – no one tried to match the US satellite for satellite. However, many nations saw the military advantage that space provided to the US and sought to duplicate it or to disrupt it. This was the result of the first Gulf War where the US discovered, almost by accident, that a military space architecture assembled for a strategic conflict gave it immense

advantage over a formidable regional opponent. Satellites, precision guided munitions and an emphasis on information superiority provide the elements of a new style of warfare that is still in the process of being defined.

The Persian Gulf War and the conflicts that have followed demonstrated the value of space assets for military action and the dependence of the US on its satellite fleet. Most potential opponents realized that relatively cheap attacks against US satellites could have a much greater payoff in reducing US military effectiveness, particularly if the opponent did not have its own fleet and did not rely on space for its military capabilities – the lack of strategic parity meant that there was no mutual exchange of hostages in space and this, as will be discussed later, has serious implications for arms control.

Three related developments shape the environment for armed 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 our potential opponents to the conventional military superiority this high-tech, information-intensive mode of combat has given the US. The third is the development of new kinds of weapons and new modes of attack. In combination the conventional strength provided by the high-tech, information-intensive style of combat adopted by the US means that potential opponents would seek asymmetric advantage – avoiding conflict where the US is strong and attacking where the US is weak, and they will use unconventional weapons and tactics in doing this.

Other changes in the nature of warfare affect this competition. International norms on an acceptable use of force (or even the threat of the use of force) have changed significantly since 1945, constraining the use of military power. The use of force is also constrained by US military strength. No nation is rash enough to undertake direct military action against the United States. Competitors and opponents instead look for asymmetric advantage – to exploit vulnerabilities and attack where the US is weak or unprepared, using new modes of attack.

To understand the implications of the new strategic competition for space we must look at asymmetric warfare. This is not a new idea. The advocates of air power in the 1920s believed that flying over an enemy army to destroy factories, transportation nodes, and communications would bring victory faster than a conventional land assault that engaged the enemy 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 potential opponents are attracted to unconventional techniques – what Chinese strategists call “the assassin’s mace” – as a way to overcome US conventional military superiority.

The widespread awareness of US capabilities in space has led to the adoption of countermeasures by a range of opponents. The

open discussion in the US of satellite assets and, at time, the discussion of the classified data produced by those assets encouraged these countermeasures. Countermeasures are not new – the Soviets knew almost immediately that US satellites were spying on them. The Internet provided even poor and unsophisticated opponents knowledge of when US satellites would be overhead. Informal networks of potential opponents have shared information on countermeasures. The Serbs successfully used a mixture of concealment, mobility and deceit to confuse US technical collection. Their success has encouraged others to explore ways to counter US informational advantages. Jamming, spoofing, hacking, data disruption, and perhaps kinetic attack will be part of any future conflict. These techniques are routinely tested, albeit covertly, at the present time by several nations and will form an important (if at times ignored) element of military activities in space.

Anti-satellite weapons might not even pose the greatest problem for the military space services used by the US military. We should also assume that potential opponents are putting considerable emphasis on deception and denial efforts, including jamming of satellites signals, interference with networks, and spoofing of targets. This can involve, for example, carefully studying the signature of a target weapons system that the US sensor collects, 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. Denial and deception efforts may actually be of greater concern, and are more likely to become an element of conflict in space, since we know from the experience in Kosovo that a skilful combination of concealment, mobility and deception can confuse US technical collection.

Additionally, the line between military and civil is also irrevocably blurred. Commercial satellites provide military advantage. Nations do not need to depend on dedicated military platforms. 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.

These trends combine to create a new military environment. It is an environment where intangible services can be as important as hardware. It is an integrated battlespace, reaching from ground to orbit and beyond. It is an environment where commercial and military assets are intertwined. It is a battlespace where informational advantage may be the key to success. Since space is integrated into the battlefield and is crucial for information advantage, control of space is as critical as control of the air or the sea.

The New US Space Policy

In this new military context it is easy to misinterpret the US 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 an untroubled Eden of Peace. They reflect the assumption that opponents will seek to prevent the US from using space for military advantage and at the same time, will attempt to exploit space for their own military purposes. US policies affirm the right of the US to defend itself in space and to deny space capabilities to opponents. The policy itself says nothing particularly new, although it provides a usefully blank screen onto which foreigners and arms controllers can project their own fears and longings.

It might at first, therefore, seem to be in the US interest to make space a “sanctuary,” where its many satellites could operate peacefully and free from attack. Putting aside the question as to whether a potential opponent would respect this sanctuary in the event of a conflict (and a 21st century sanctuary in space is likely to provide as much protection as Belgian neutrality did in the 20th century), 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.

But doesn't the space policy open the door to the weaponization of space when that door should be closed? Isn't it in the US interest to ban space weapons, since the US with its large fleet of military satellites (larger than all other nations put together) faces the greatest risk from these weapons? Since it seems clear that some potential opponents will continue to pursue anti-satellite weapons in secret, UN treaty or not, a US decision to renounce such weapons does little to reduce the risk to the satellite fleet. Additionally, the size of the US satellite fleet suggests that in a conflict using anti-satellite weapons, US capabilities would be damaged and degraded, but those of any opponent would be destroyed and eliminated. The policy reaffirms the US 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 US reserves the right to win any battle in space.

If there is a precedent for the space policy, it is found in the long-standing US approach to freedom of navigation. At times, various countries have attempted to assert jurisdiction over the open sea, announcing that warships could not pass without their permission. The US practice in these cases has been to send warships through the body of water in question, to make it clear that the tradition of sovereign rights to use international waters remains clear. Other nations may desire to regulate US military forces in their

actions to secure or defend the United States, but it is definitely not in the US interest to accede to this desire. US national vessels, armed or unarmed, have the right to navigate the open seas no matter which countries' borders they touch, and US satellites – armed or unarmed – have the right to navigate open space no matter which countries they pass over. Note that the freedom the US asks for itself also extends to other nations.

There are constraints on the US that will slow the development of space weapons. Space weapons are not the first priority for the Air Force, and there has always been a degree of Congressional skepticism. Space weapons are expensive and the technologies needed for them are immature (meaning the likely outcome of any program now is spending a lot of money on something that will not work). However, spending lots of money on something that will not work has not been an obstacle to past military programs, and it is certain that if the US does not invest in research the technology is unlikely to improve at anything other than a very slow pace. The principle obstacle to deploying space weapons is that there are usually alternative approaches that are more effective and less costly, whether it is for long-range precision strike or anti-satellite attack. That said, space weaponization is an area where the US has a competitive advantage over its potential opponents. The fact that they cannot effectively compete with US military space research is one reason why they publicly support a treaty banning space weaponization. It is also a reason why the US should not foreclose further research.

China and Other Potential Opponents

China's military is not a peer to the US, but it is a challenger. The challenge comes from a combination of increased conventional capabilities and from the pursuit of asymmetric advantage – using new weapons and tactics to attack an opponent in areas where it is weak or vulnerable. People's Liberation Army (PLA) writings call this "overcoming the superior with the inferior." Seeking asymmetric advantage is not new, nor is China the only country to seek it. What is new is the means that US opponents like China and others plan to use to gain asymmetric advantage. One part of the modernization effort looks for ways to counter the US military advantage by attacking information and communications assets, including satellites and networks.

China has identified space activities as an area where the US military advantage could be challenged. China's military is developing weapons and tactics to mount this challenge. The most dangerous of these programs are those aimed against US carriers. China has acquired many of the technologies developed by the Soviet Union to attack US carriers and it is refining these technologies and the tactics

needed to use them. Another set of programs is developing anti-satellite capabilities and a third involves information operations. While China has expended considerable effort on anti-satellite weapons and information operations, neither activity poses much risk to US military superiority.

Unlike the Soviet Union at its peak, the Chinese are not acting like mirror-image competitors. This may change as China's gross domestic product (GDP) increases and if relations between the two countries do not improve, but for now, China seems to want to avoid what some perceive as the Soviets' error of spending themselves into bankruptcy in an arms race with the US. China's military space programs seem, at the moment, to have taken second place after the manned space program. China has not assembled nor does it maintain the full range of capabilities needed in space for intelligence and military benefit and a manned program provides little direct benefit to military operations. In some cases, China appears to have built a satellite in order to show what it can do rather than to meet an operational military or intelligence need.

The key to understanding China's military space capabilities (in contrast to its anti-satellite capabilities) is on-orbit presence. China does not have a continuous military space presence equal to what the Soviets or the US had in the 1960s. China's launch rate is slow and episodic. In the last decade, the number of Chinese government satellite launches has totaled only about 12 % of US launches. In any given period, the Chinese orbit no more than six to ten satellites and most of these are for communications or navigation. While China's announced goal is to build and operate a multi-satellite military space system for continuous operation, they have not yet committed the resources to achieve this.

China has said that its space program will concentrate its resources on "a limited number of projects that are of "vital significance" to the nation. At first glance China's space effort would appear to be spread too thin to be effective. However, a review of what China builds and launches suggests that the goal of China's space efforts is a demonstration of technological prowess and national power. A desire to demonstrate self-reliance often seems to drive space activities. A White Paper on space put out by the State Council – the equivalent of the US National Security Council – calls for "eye-catching achievements." China's goal is to show the world that it has reclaimed its place among the leading nations.

A Misstep in Space

China's recent anti-satellite test was certainly an eye-catching achievement, although perhaps not in the way the State Council had envisioned. The test rudely trampled the illusion of peace in space. Perhaps the only real surprise was to arms control advocates and

critics of the US military space program. Using an old ballistic missile to put a kinetic weapon (i.e. one that destroys its target by colliding with it at high speed) into space is the cheapest and easiest approach to developing anti-satellite weapons (ASAT). China has reportedly also been experimenting with directed energy weapons (such as lasers) to attack satellites, but these are complex and expensive. Both programs reflect years of work and the investment of hundreds of millions of dollars into space weapons by China.

China joined Russia and the US as a space power when it orbited a person around the earth, something the other two nations had done decades ago. In launching a kinetic ASAT, it is again copying the activities of the two original military space powers. Both had kinetic ASAT programs in the 1970s and 1980s. The US weapon, which was launched from an F-15, was tested in 1985. But both the US and the Russians stopped kinetic tests in the 1980s because of the damage to the world's ability to operate in space. A kinetic weapon leaves a cloud of debris, travelling at high speed around the earth, that poses considerable risk to any satellite or spacecraft that enters its path. The fragments of the Chinese satellite and weapon will orbit the earth for at least a decade, increasing the risk of space operations.

China is not the only nation with potential anti-satellite capabilities. The Russians have the inheritance of the many Soviet programs, and their current erratic policies (on relations with the West or on arms transfers) do not inspire confidence. However, to assess fully the anti-satellite risk, we need to distinguish potentially hostile states with well-developed space and nuclear capabilities (Russia and China) and states with primitive capabilities (Iran or North Korea).

Iran or North Korea could seek to disable US satellites by detonating a nuclear weapon in orbit if their current programs succeed in producing both weapons and missiles. This could be done by detonating over their own countries in an effort to blind US satellite reconnaissance and communications. The advantage of this approach is that both Iran and North Korea could use their existing nuclear weapons and missile programs, which the international community has been unable to stop, to create an anti-satellite capability that would fall outside any of the space arms controls efforts currently being contemplated.

The damage done in space by the debris left by the test, although extensive, is minor compared to the damage China did to itself in the politics of space. What is left of the credibility of a nation that for years has said that its only intentions in space were peaceful and which then tried to deny that the test had taken place – although when the Foreign Ministry said it knew nothing of the test, it may have been the truth. It is next to impossible to hide a ballistic missile launch – the US and the Russians orbit satellites that detect the flash of launch and its general location. It is also difficult, given how many

nations track activity in space, to hide when a satellite suddenly turns into a cloud of debris. Denying the test was inane, but indicative.

The effect on the US is much less important than the effect on China's neighbors and on the debate over weapons in space. Some reports say that the ballistic missile was launched over Russian territory without advance notice – and if true, this is a dangerous and unprecedented step. The Russians are rightly concerned. Japan and India may also see themselves and their smaller (and hence more vulnerable) national security space programs at some risk. China has used space to assert its regional supremacy, and launching the ASAT helps confirm this, but it will likely also harden attitudes and perhaps create incentives to develop counterbalancing forces. If nothing else, China's test has confirmed the benefits of a regional missile defense system for Japan.

There is also a perceptible shift, albeit painful for some, in the debate about weapons in space. Until the test, many nations were loud in their condemnation of US military activities in space. When the Bush administration released its space policy, it was condemned as a US effort to dominate and militarize space, even though the policy was mainly a rehash of US statements going back to the Carter administration. With the test, China has joined the US as a villain in space. The Chinese orbited a weapon in a messy and imprudent fashion, and did so after years of denying that they had any military intent. This undercut many of the assumptions put forward by advocates of space arms control – the most important being that it is possible to negotiate with a nation whose public statements are at such variance with its actions. The US has always been open about its military programs and there has been a vigorous public debate over their benefit. Even the Russians (in their incarnation as the Soviet Union), were more forthcoming about their intentions. While individual programs remained secret, neither nation pretended that they were not engaged in military space activities.

The implications of the test for the US are relatively small, and the test does not signal an “arms race” in space. Since US military planning always assumed that the Chinese were developing ASAT weapons, little adjustment is required as a result – at most the US may need to accelerate some developmental programs. This would not have been the case if the US had unilaterally renounced military programs. The US would benefit from accelerating efforts to create a cohesive space architecture that provides robustness and redundancy, and work on operationally responsive space initiatives should increase in priority.

Nor does the ASAT test affect the military balance between China and the US. The Chinese have not suddenly gained a new advantage. The weapon was tested against a remote sensing satellite in low earth orbit, about 500 miles from the Earth's surface. China has not demonstrated the ability to attack satellites in more distant orbits – most communications and global positioning system (GPS)

constellations are located more than 20,000 miles from the Earth. The US can also compensate for China's limited ability to use the new ASAT to disrupt the delivery of the services provided by satellites – in remote sensing, geonavigation and communications – by using aerospace or “near-space” alternatives, such as unmanned aerial vehicles (UAVs). A preemptive attack by China on US or allied space assets with a kinetic weapon would be an act of war, and the Chinese should realize that this would have serious and damaging repercussions for China's space launch infrastructure.

In the 1990s, the only potential opponent who could consider an anti-satellite effort was China. The Russians had the capability, but relations at that time with the US ruled out their programs as a threat. China's military, on the other hand, began to explore the idea of attacks on US space systems early in the 1990s. This does not mean, however, that there is an arms race in space. Space race is a term loaded with connotations. The race with the Soviets was really part of a larger competition between two different political systems. Any competition between the US and China today is very different.

As with many of China's military modernization programs, a robust US response can undercut China's efforts to develop asymmetric threats in space. In anti-satellite weapons, the US can reinforce its advantage in space by continuing to harden its satellites, by moving to a flexible military space architecture, by accelerating its Operationally Responsive Space programs and by developing alternative technologies, such as high-altitude UAVs and mini-satellites. These alternate technologies could provide “space-like” services that would render attacks on satellites useless. Since the US 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 US interest to ensure that this continues to be the case.

The Illusion of Arms Control

Multilateral arms control for space, under current conditions, would not provide or ensure this continued robustness for US security. Attempts to mechanically apply the nostrums of the static past to today's dynamic security situation could even be counterproductive, by discouraging a realistic assessment of risks and threats that would otherwise deter conflict.

The US has asymmetric vulnerabilities in space which our opponents will attempt to exploit. But it also has asymmetric advantages. An effective military space strategy would attempt to reduce asymmetric vulnerabilities while exploiting areas of asymmetric advantage. This strategy runs contrary to the desires of those who would extend arms control into space. The new US space

policy's greatest flaw in the eyes of many is that it does not commit the United States to adherence to the UN treaty process.

Prior to the test, many nations, including China, castigated the US for its plans for future military activities in space. The US ignored them, and this has proven to be the right decision. Space arms control efforts would not help the US retain its military advantage, nor would they make a positive contribution to national security. A UN treaty banning weapons in space would harm US national security. We would observe it; others would not. One reason China has been an advocate of a treaty is because it calculates that an agreement would put the US at a disadvantage.

The means for anti-satellite warfare are ubiquitous and not easily controlled. Kinetic weapons are only one part of this arsenal, and in many ways the least sophisticated and least attractive. Alternate modes of attack include high energy weapons, whether ground- or space-based, including both lasers and other kinds of electro-magnetic impulses capable of damaging a spacecraft's electronic circuitry (an orbital vehicle capable of "microwaving" adjacent satellites), jamming from either ground or from adjacent satellites, and network attacks to disable and disrupt control and communications between Earth and satellites. Some of these attack modes are attractive because they will either appear to be the result of natural causes or it will be difficult to attribute the source of the attack. A ban on kinetic weapons, such as the Chinese used in their anti-satellite tests, would actually leave the most dangerous anti-satellite capabilities untouched.

Given the range of technologies that can be used to attack satellites, a "space weapons ban" would be unverifiable, even if an inspection regime was put in place. There are many ways to attack satellites and the services they provide, and the kinetic weapon China used is the most primitive and most detectable means of attack. No treaty could credibly address all of them. It is also difficult to negotiate seriously with a partner who has little experience of arms control and whose credibility, after years of denying that it had anti-satellite programs and asserting that its intentions in space are entirely peaceful, is badly tattered.

It is difficult to imagine why anyone would recommend that the UN, with its hosts of largely irrelevant arms controllers squabbling in Geneva, would make an admirable watchdog for space, especially after the spectacular failure of UN treaties vis-à-vis nuclear proliferation in Iran and Korea. The UN process does not seem to have worked so well in preventing these programs from moving along. Similar problems would dog any expanded role for the UN in space. In other areas where it has attempted to commit arms control, the UN has had little success and there is no reason to think that space would be any different.

And of the 161 nations gathered by the UN in Geneva, there are only three who have space weapons and perhaps only two or

three others who may be considering their development. Of the three with known weapons programs, precedent suggests that two would cheat when it comes to declaring their programs, much less ending them. The other 156 nations are spectators, many of whom hold a grudge against the US and who are, when left to their own devices, timid or indecisive. It is open to question as to whether giving this body a greater role in space security would make the US more secure. The outcome is more likely to resemble the Washington Naval Treaty of 1922, where the US, France and the UK restricted their navel construction while Japan and Germany built in secret, than the arms control initiatives of the 1970s and 1980s.

Concluding Thoughts

Current discussions of the militarization of space come at a difficult moment for the American strategic concepts. The Bush administration's inept management of the conflict in Iraq and its assertive but unproductive foreign policies has reenergized interest in what some call "soft power." Soft power uses the tools of persuasion to advance national interests, while hard power uses coercion. Space programs are an element of soft power – they provide prestige and technological prowess that can be turned into influence and leadership on the international stage. When NASA manages to launch a space shuttle, the world is reminded of America's history of technological prowess.

But soft power is inadequate to constrain a hostile and determined opponent. Realists might say that soft power can only be effective when it is backed up by more traditional elements of power: a coherent strategy, a robust economy, a strong military and efficient diplomatic and intelligence services. The use of space is irrevocably a part of this "hard power". Other nations may rely more on commercial services than government satellites to provide military benefit, but the powers of the next century will all perform military and intelligence activities from space. The US benefits more from space than others when it comes to preserving its national security. Asking the US to restrict its military use of space is really asking the US to give up both its military advantage and a good measure of its own security.

Space has been militarized from the beginning. Many countries make use of space and satellites for these purposes. Space had never been a sanctuary – the first programs for anti-satellite weapons appeared in the 1950s – but in the bipolar strategic environment, it had been remarkably safe. The end of that bipolar environment meant that military competition would return to space. The notion that space should somehow be demilitarized, like the Great Lakes between Canada and the US, is a bad one. Demilitarization would damage the capabilities of US forces more than it would damage the capabilities of our potential opponents.

Asymmetric warfare works both ways – this is an important point for space. Other countries are more vulnerable than the US, which may explain why there are continual efforts in the UN to bind US capabilities in the military use of space. In a conflict or war, the US would have considerable advantage and opportunity to limit an opponent's use of space. Moving the conflict to this level could legitimize other's attacks on our own space infrastructure, but the knowledge that the US could do this might have a deterrent effect against attack on the US space infrastructure; while opponents could possibly damage and reduce our capabilities, we could have the potential to eliminate theirs.

If we have entered a period of multipolar competition that remains just short of outright clashes, if the goal for competitors is to seek asymmetric advantage, the US must adjust its thinking to reflect this. The implications for space are clear. Space is an area of US advantage, an advantage so great that it can be called asymmetric. It is in the US national security interest to expand and exploit its asymmetric advantage in space.