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Chinese Military Modernization and its Impact on the United States and the Asia-Pacific**

New Frontier in Sino-U.S. Relations: Challenges in Space

The United States must grapple with China's rapidly growing power and influence in the world on many different levels, but China's military modernization is the Gordian knot in this relationship. Despite close economic ties, the objectives of China's evolving military strength cause great angst about the direction China is taking and how the United States should respond. Space is very unique to this relationship because as an indispensable and dual-use technology, it is the nexus of deeply held economic and security interests on both sides. As such, it also holds very decisive opportunities for cooperation.

The United States must wake up to the fact that China views outer space as far more than just another asset to be pursued in competition with others. Satellites play an important role in China's ambitions for globalization, commerce, finance and continued economic development. Manned space is an important driver for advanced science and technology and national prestige. And space, the moon and Mars are valued for their potential as resources. On the security front, China has long understood the centrality of space for military power in terms of service integration, force enhancement and force projection. China's worries over its nuclear deterrent and the status of Taiwan are also intimately connected to China's perception of its rights in space and the activities of others. These factors are key to both national sovereignty and national security and constitute the clear necessity to access space and protect its interests there.

Understanding how Beijing will act to exercise its perceived rights in space and address threats to those interests is central to America's future security in space and entails a discussion of several issues. First, what preparations has China made for conflict in space? This requires an examination of background information ranging from capabilities to organizational changes to principles guiding war in space. Second, why did China test the anti-satellite (ASAT) weapon, and why now? Analyzing the motivations behind this act will bring into focus China's larger intentions in space, and how this is to be balanced against its military preparations and thinking on space warfare. Third, what are the consequences of the test and China's larger ambitions for the United States, China's neighbors, and the international community? Perhaps more importantly, how can the United States respond in a way that does not imperil national security or that of the security of outer space?

Space Conflict Preparations

The ASAT test has raised a lot of speculation (and suspicion) of China's objectives in space, especially with regard to its preparations for military conflict. In attempts to divine Chinese thinking in this realm, there is a tendency to rely heavily on a determination of its military

space capabilities and then draw a speculative line to its intentions. This is, in part, a result of the paucity of reliable and accurate information on China's military space program, but regardless, it holds limited insight into where China is heading in space and why. China's intentions in space and the security implications for the United States are also a product of the current security architecture of space and China's changing strategic perception and interests in space.

Capabilities: An analysis of China's ASAT capabilities should be divided into two basic categories: what is known and what is speculated. We know China has the ability to use a medium range ballistic missile as a direct ascent, kinetic energy ASAT (also known as a kinetic kill vehicle, KKV). The extent of that program is not known, but mated with a larger booster, a KKV could reach satellites in higher orbits. With China's civilian and military space programs closely intertwined, much of this real and potential ASAT-enabling capability falls under existing dual-use technologies.

Everything else regarding Chinese ASAT capabilities falls into the second category, what is speculated, including a number of dual-use programs that are under research and development, but which have no known dedicated weapons programs. Several of these technologies could conceivably lie within China's technical capability including co-orbital interceptors, space mines, either conventional or nuclear. In addition, China has been researching and developing laser technology since the 1960s. Among those most relevant to ASAT capabilities are free-electron and chemical oxygen-iodine high energy lasers, which could provide the technology base that could dazzle or permanently blind optical sensors of space-based missile defense components, or at higher power could damage those satellites. High power microwave weapons for jamming have also been designed and tested. Other relevant R&D with dual-use potential includes China's small and mini-satellites, which would allow China to launch swiftly using small, mobile launchers and which would have the potential to disrupt, degrade or destroy space assets. While a number of required support capabilities for an effective ASAT program are improving in connection with China's manned and commercial space programs, tracking, surveillance, and launch-on-demand capabilities are probably still insufficient.

Institutions: An important measure of China's preparation for conflict in space is the state of its organizational and institutional make-up. This is a diverse subject, and could include aspects from staff management to logistics and R&D support (e.g., ASAT-related research falls under China Aerospace and Technology Corporation [CASC] and its subsidiaries, China Academy of Launch Vehicle Technology, the Shanghai Academy of Spaceflight Technology, and the China Academy of Space Technology, and numerous others). This is described in great detail elsewhere; however, two points are worth stressing in this respect.

First, there has been movement on the status of the organizational leadership relevant to military space that is indicative of internal thinking on the subject. In fact, to date, there is no separate military space command; however, this may be changing as evidenced by calls within several key military organizations to create a dedicated military space command with a stated purpose of tackling the growing strategic and national security threats in space. The driving force behind this new command system appears to be the PLA General Armament Department (GAD). Presently, command over civilian space experiment activities is roughly divided between the State Council, the Central Military Commission (CMC) and functional

sections of the GAD. Although the institutional hierarchy of China's military space program is not fully understood, military space activities will be led by the CMC and the PLA General Chief Department, with significant personnel coming from the GAD. Under a new powerful supreme command department for space, an agency with the Chinese president as the supreme commander, military space would take on a new priority in terms of budgeting and military and political authority; similar to what occurred with the establishment of the Second Artillery, China's strategic force. The PLA Air Force appears to be challenging the calls for an independent space command arguing that a service integrated with the Air Force would better serve the nation's security interests. Reports in 2005 for a feasibility study on such a command have given additional credence to its impending creation. Despite the outcome of this debate, it demonstrates that attention to the relevant security issues in space are mounting.

Calls for a separate space command have additional significance for this discussion on China's preparations for conflict in space. With organizational and industry constituencies taking root in the system and vying for political and economic influence and authority, a degree of imperviousness to outside influence may grow in tandem. The closed and nontransparent nature of China's military establishment, which largely runs the space program, only exacerbates this tendency. The sum of these realities suggests that once set in motion, national defense considerations planned over a long period to address security threats may be responsive to a degree by external factors, but cannot be altered at the whim of those factors. These tendencies may impact the degree to which China's space program is malleable to fine tune its course of developing military capabilities.

The second point regarding institutional status is the history of China's priorities on spending in space. The vast majority of China's space related program, whether manned space, satellites or military assets, largely falls under GAD and its subsidiary institutions. The official budget for China's space program is approximately \$2.5 billion and employs up to 200,000 workers. With 90 percent of space technology being dual-use, it is difficult to ascertain the degree of focus and spending that goes directly or indirectly to military programs. This does not negate the fact that a decision was clearly made in the early 1990s under Project 921, whether by choice or by necessity, to orientate China's space efforts to a civilian program. Advancements in dual-use, ASAT-enabling technologies such as systems integration software, propulsion, orbital docking, systems diagnostics, miniaturization and navigation are real. But, while space technology may have dual-use applications, that is far less true for hardware development and testing. China's decision to primarily develop civilian space over military, its known ASAT capability notwithstanding, makes funding and institutional interests for a larger, dedicated military space program ambiguous at best.

Guiding Principles: Finally, the last element of China's preparations relevant to space warfare is the development of doctrine, generally defined to include strategic, tactical and operational levels. Open source literature contains little definitive information on official war fighting doctrine for space. A number of recent scholars and reports have made attempts to discern China's thinking in this realm either by inferring doctrinal elements from other areas (land, air, sea) or by analyzing relevant but unofficial publications. However, their applicability to Chinese military thinking for space is debatable.

From what can be deciphered from open sources, China's guiding principles in space warfare for the foreseeable future can best be described as limited deterrence in space. The outline of this strategy has a number of salient characteristics. One is that it is defensive in nature and as such is circumscribed by China's overall defensive military strategy. The concept of 'comprehensive defensive actions' is often divided into 'passive defense' and 'active defense', with China's space force tasked with both passive and active strategies. However, the focus is on capabilities to enhance the survivability of China's satellite networks, and to ensure its access to space, that is considered indispensable for future 'informationalized warfare.' 'Passive defense' emphasizes a preventative quality stressing protection against attack and includes measures for satellite assets including hardening, encryption, camouflage, stealth, and redundancy and duplication in satellite network systems and subsystems. 'Active defense', a central component of this strategy, includes countermeasures such as interference and jamming techniques, and in extreme situations using micro-satellites to actively guard other satellites, act as decoys or even counter-attack. In the long term, missile defense will also be part of the overall space force.

A second characteristic of this limited deterrence in space is an emphasis to protect against an adversary's capability to prevent or restrict China from accessing space to its economic and national security advantage. The PLA believes that U.S. intentions in space are not only to exercise its right to protect its satellites and other space assets, but also to deprive other countries of the same. China sees in space known (e.g. orbital slots) and unknown (planetary) resources and assets to which it has sovereign rights to utilize and explore. The ability to guarantee its access to space in light of threats to that goal can perhaps best be summed up as the ability to *deny the denial*. The line between offensive and defensive doctrine in a straightforward strategy and capability of *denial* in space is surely a blurry one. Without taking the point too far, *denying* others a capability *to deny* is subtly, and arguably, distinctive in placing a premium on defensive posture. While offensive measures have been discussed by some Chinese authors, they are largely dismissed as being strategically destabilizing and not within China's reach for the foreseeable future.

A wide reading of the open literature strongly suggests that China's preparations for space warfare remain ambiguous or simply indeterminate. This state of affairs is certainly due in part to a lack of transparency or strategic and political expediency. However, while that may be true for certain aspects of China's space warfare preparations, it is much harder to make that case across the board, from capabilities to organizational culture and doctrinal thinking, all of which are instrumental for the future of China's military space program. Thus, the alternative cannot be dismissed: that a degree of the ambiguity reflects reality and that many elements of China's preparations for conflict in space remain indefinite. That is not to be naïve about what China may be up to by overstating its ASAT and other weapons programs -- presuming worst-case scenarios is the greater risk because it can inadvertently spur on the Chinese military space program and lead to negative security consequences for American security in space.

ASAT Test: Strategic Response

While capabilities, institutions and doctrine help provide the broad strokes of where China's program is currently, they have limited utility for the country's longer term objectives and its

intentions in space. Important political, diplomatic and strategic factors critically influence its direction, and in China's case, may be determinative. On balance, while these issues add up to a strategic logic for China to build ASATs and other assets for conflict in space, there are powerful reasons for China to avert a military competition in space with the United States.

In this light, China's recent ASAT test is instructive. Why was it tested and what does that mean for space security and the United States? China's ASAT test should not be interpreted as a direct threat to U.S. space *power* but a challenge to its ambitions for space *control* and *dominance*. With little information emanating from Beijing regarding the test, discounting the possibility of internal struggle, miscommunication or clumsy miscalculation within China as a partial explanation for the test is obviously difficult. However, based on China's past behavior, its interests in space and the huge stakes involved, it is also implausible that the test was executed without a careful consideration of the consequences. Rather, the balance of China's perceived threats, economic development goals, techno-national and international image interests related to space point to the test primarily as a strategic response to the United States.

In the past decade, China has derived a number of key conclusions from its observations of U.S. military activities in space that have fundamentally shaped China's own strategic posture. The first is the profound implications of space for information and high-tech wars. China witnessed with awe and alarm the power of the U.S. military using satellite communication, reconnaissance, geo-positioning and integration capabilities for an impressive show of force beginning first with the Gulf War in 1991, to the recent campaign in Afghanistan and Iraq. The U.S. military's almost complete dependence on space assets has not escaped the close examination of Chinese analysts. ASATs are seen by some analysts as weapons in line with China's asymmetric military strategy to hit enemies' vulnerable and hugely expensive assets in space with relatively cheap and easy countermeasures.

Coupled with a number of key U.S. policy and military documents that call for control in space and the development of space weapons, as well as the U.S. refusal to enter into any restrictive space arms control treaty, China has concluded that America is determined to dominate and control space. This perceived U.S. intent leads Beijing to assume the inevitable weaponization of space, which mainly centers on the current administration's goal of being able to shoot down missiles of all ranges, in all phases of their flight (boost, midcourse and terminal) and to do this from land, sea, air and space.

These capabilities are extremely worrisome for China as they directly impact China's core national interests and security. Components of this layered missile defense system (particularly boost-phase) will rely on space-based early warning systems, and the U.S. Missile Defense Agency plans to include space-based interceptors having both defensive and offensive capabilities that could effectively negate China's minimum nuclear deterrent arsenal. The 'Shriever' space war games conducted by the U.S. Air Force in 2001, 2003 and 2005 strongly reinforced the conclusion that U.S. space control sets China as a target. An accelerated development of the U.S. ballistic missile system, especially as it is being developed in close cooperation with Japan, has been cited as threatening China's homeland and nuclear deterrent and may deeply upset the region's strategic balance or lead to regional proliferation.

Most central to China's concerns, however, is the direct affect U.S. space dominance will have on China's ability to prevail in a conflict in the Taiwan Straits. Two scenarios are commonly cited as the most likely regarding space assets. One would involve China's own reliance on force enhancement capabilities and specifically reconnaissance and targeting (of U.S. aircraft carriers for instance) with anti-ship missiles. The second scenario would entail disabling U.S. satellites in preparation for a conflict in the straits and would involve identification, tracking and ASAT capabilities. In both situations, China is vastly the weaker power in space and hence more vulnerable.

Experts have noted the significant financial, political and technical barriers to most of the U.S. space weapons and even components of the multilayered missile defense programs. Yet, given the growing budgets for U.S. military space and missile defense activities, the current administration is set to continue pursuing these systems. Moreover, a significant portion of the U.S. military space program is classified, making a determination of the extent of U.S. military space program highly problematic. In fact, it can be reasonably argued that as a best case scenario, "the jury is still out" on whether the United States will ultimately pursue weapons in space. This is particularly problematic from a Chinese perspective that misreads these nuances in the United States and combines them with other U.S. actions and words in its conclusion regarding U.S. plans for space weaponization.

However, in addition to the above strategic factors in space, China's angst is compounded by its own growing interests in space. China now stands at the cusp of becoming a heavily invested power in space. It has deep and growing interests in terms of the lucrative commercial satellite industry, its civilian, manned and exploratory space programs as well as military programs in space. China plans to launch up to 100 satellites during the Eleventh Five Year Plan (2006-2010), an almost four-fold increase from the number launched in the preceding five-year plan. It's manned and unmanned civilian exploratory programs are equally ambitious for the next 15 years with launches planned for manned docking in orbit, voyages to the moon and the beginning of a Mars program and a sun mission. Several new satellite and micro-satellite research and production facilities have significantly boosted China's indigenous satellite production program. Also, a brand new launch center is under construction in Hainan Province, which will vastly increase China's capacity to launch vehicles into geostationary orbit. China is cooperating with many countries on a broad range of projects. All told, China's ambitions in space are impressive and the growth of its programs unprecedented. Moreover, space is far more than a monetary investment for China. It's aspirations in space are also part of a larger and more comprehensive economic, social and scientific development plan. Presently, China remains less dependent and therefore less vulnerable in space than the United States, but that situation is changing. The ASAT test was a clear message that China also has deep and growing interests in space that require defending.

Thus, the confluence of China being at the threshold of becoming a space power along with China's strategic vulnerabilities as a result of U.S. military developments in space have thus engendered a fundamental response: America's pursuit of space control and dominance and its pursuit to develop space weapons pose an intolerable risk to China's national security and interests. China's own ASAT test embodied this message, redressing what it perceives as a critically imbalanced strategic environment that increasingly endangers China's evolving interests. Yet, China has an overwhelming interest to avoid the weaponization of space, and

such a test may have been a desperate measure to pull the United States back from the brink. Failing that however, the ASAT test also demonstrated China's determination to defend its interests through deterrence. Its willingness to risk international opprobrium (and endangerment of its own space assets, let's not forget) through such a test, and instigate the very U.S. reaction it seeks to avoid, conveys the importance of space to national security and China's grim resolve to defend it.

The timing of the test may also indicate China's desire to avoid a costly arms race. China has repeatedly said it will not enter a space race with the United States, certainly not in terms of achieving strategic parity (which it cannot afford). The ASAT test could be a last ditch effort to gauge U.S. determination to pursue its goals for space control. If they prove unbending, China would demonstrate the resolve to deter these ambitions while the United States remains more invested and vulnerable in space and at the same time alter the degree and manner in which China itself invests in space (for instance, China would avoid building up expensive and vulnerable space assets).

China has been calling for arms control in space for a long time, culminating in the draft resolution on Preventing an Arms Race in Outer Space in 2002 at the Conference on Disarmament (CD). Yet, every call by China's diplomatic effort at the CD has been effectively blocked by the United States. The latter's rejection of a treaty to ban weapons in space, based on the rationale that it was not needed because there was no military space race, is widely rejected and is perceived as a U.S. preference to maintain its freedom to unilaterally act in space. With the ASAT test, the Chinese may have, inadvertently or not, put paid to the argument. While an open military competition in space may not yet exist, there is a clash of interests in space, along with an increase in threats, both perceived and real, between the United States and China.

Many have pointed out the contradiction between China's diplomatic offensive and its decision to conduct an ASAT test. However, the latter was more likely the product of a separate and perhaps independent hedging track rather than a deliberate intention to develop space weapons covertly. Although most aspects of China's military program in space are largely unknown, the open source literature indicates that it proceeded in several stages as a response to developments in the United States. This process largely began in late 1980s with a realization that the U.S. missile defense, ASAT and space weapons program could endanger China's national security interests. Yet, at that time, it seemed that China preferred to solve this perceived threat through a diplomatic approach. With gridlock at the CD beginning in the mid-1990s, however, the military option – independent of a diplomatic one – took on greater urgency with the call for a development of relevant space technology. An awareness that effective defensive capabilities in space would take a long time to develop provided further impetus to these trends. The second phase was marked by the Shriever war game exercise in 2001, which vindicated China's long-held fear of being a primary target of the U.S. military space program and triggered China's determination to resolve this threat in space – either through military or diplomatic means. From China's perspective, all U.S. actions since that time have served to diminish a diplomatic solution while underscoring the necessity of a military hedge in space.

To sum up, the ASAT test and China's overall military preparations for conflict in space are closely linked to the perceived threats to its interests in space, both strategic and other, by

the United States. But the balance of those interests strongly suggest that China's intentions include, if not necessitate, avoiding the weaponization and an arms race in space. The challenge, as defined by recent events, is to the current imbalance of the strategic architecture in space (U.S. dominance), not U.S. power in space *per se*.

Threats

China's ASAT test implies a clear but limited threat to the United States (and its allies) that should be considered in close connection with a potential conflict in the Taiwan Straits. However, considering the sum of China's preparations for conflict in space as well as a careful consideration of its intentions as described above, the threat to international space security is arguably more benign than this spectacular test, and the orbital debris cloud it created, would suggest.

The destruction of the defunct FY-1C at 850 kilometers above the earth using a medium-range rocket puts at risk critical and vulnerable space-based components in low earth orbit (LEO) such as the space-based tracking satellites (e.g., SBIR Low) as well as the giant keyhole optical and Lacrosse radar reconnaissance satellites in LEO. As they are big and few in number, they are not immediately replaceable if lost. If mated with a larger booster, a similar kinetic kill vehicle might be able to reach satellites in higher orbits. However, U.S. satellites monitoring the globe for missile launches -- Defense Support Program spacecraft -- in geo-synchronous orbit at some 24,000 miles high, and GPS constellation in medium altitude at 12,000 miles are both too high to be of threat to this kind of ASAT. A number of other capabilities as described in the first section could provide a far greater threat range, but the development level of these capabilities in China's space program is largely indeterminate.

The degree to which China's ASAT test directly threatens Japan is roughly proportional to U.S.-Japanese cooperation in development of the missile defense system and how their alliance could play out in a Taiwan scenario. Systems including PAC-3, Aegis/SM-3 and THAAD and the overall interoperability with the United States might encourage Japanese involvement in a Taiwan conflict. In addition, the U.S. Navy and Air Force have bases in Japan, which may require the United States to seek support from the Japanese in a sustained conflict, including the conflict over Taiwan. Given the legacy of mistrust between China and Japan, this Chinese action may fuel Japan's development of its own military space capabilities, especially as it came in the midst of the North Korean nuclear crisis.

In India, the Air Force's recent 'China threat' lobbying and its push to establish a military space command may have been given a significant boost by the ASAT test. With India rising as an Asian power, China certainly has concerns over U.S. cooperation with India on missile defense, a development that could deeply alter the region's strategic balance. Certainly the ASAT test holds an inherent threat to any space faring nation and particularly a potential strategic competitor to China. However, Sino-Indian relations have recently made significant progress and without a closer connection to the Taiwan situation, the ASAT test should not be seen as an immediate threat to India.

In terms of greater threat to the international community, the main threat from this ASAT test is the debris it created, stretching from approximately 425 to 3,000 kilometers, endangering over 100 satellites owned by a variety of nations and commercial companies,

particularly Earth-observation and weather satellites. However, China has shown a vigorous desire to cooperate in space with any willing nation. China is jointly engaged in developing a number of satellite programs, with eight other countries under the Asia-Pacific Space Cooperation Organization treaty, as well as with Nigeria, Venezuela, Brazil, Russia and a number of countries in the European Union.

More importantly, does the test and China's ambitions in space pose a larger strategic threat to the United States? The nature of China's intention by ASAT testing is paramount to answering this question. As analyzed previously, the test was fundamentally a deterrent *response* to the United States and therefore represents a hedging strategy. If correct, this would suggest that the inevitability of China's pursuit of space weapons is connected to the inevitability of America's space domination goals. This does not diminish U.S. vulnerability to the ASAT test, but it does have implications for a longer term strategic threat and solutions to addressing it as outlined in the following section.

Cracking the Security Dilemma

The paradigm the United States faces with regard to China in space, particularly in the aftermath of China's ASAT test, is one of a classic security dilemma commonly defined as two states that are drawn into conflict because the actions of one state to increase its security are interpreted as threatening to the other state, leading to a cycle of provocation. Space is highly susceptible to this zero-sum dynamic because of the blurring between defensive and offensive capabilities in space as well as the dual-use nature of space technology. China has demonstrated that it has interests in space and will no longer accept the status quo of U.S. plans for space dominance. While this may have had a deterrent and defensive intent, it is perceived as inherently threatening to U.S. assets in space. The security dilemma in Sino-U.S. relations is particularly troublesome as the two countries develop a complex relationship that is economically close, politically ambiguous and potentially adversarial militarily. How can the vicious circle of the security dilemma in space be broken? It will require a highly creative mix of measures to give China greater strategic room and access to outer space that will not at the same time appear as U.S. weakness (which may encourage China), or as giving up substantial strategic ground (which is politically infeasible).

Purely technological solutions to the security dilemma are limited. Passive protective measures such as hardening, encryption, camouflage, stealth, and redundancy of satellites would be relatively uncontroversial. The Chinese ASAT test has certainly underscored the vulnerability of U.S. assets in space and has spurred an already growing consensus around requirements for improving situational awareness. Passive protective measures would enhance the ability to see and understand what is going on in space through upgrading and expanding the Space Surveillance Network. Most of these measures would roughly fall into a non-offensive category as well, but even here, verification and inspection capabilities could be ambiguous in undercutting China's security.

Beyond passive defense technologies, most capabilities in space will drive the security conundrum if not accompanied by a clearer intent of purpose. This goes for many aspects of the currently envisioned multilayered ballistic missile defense system. The system is hardly offensive in concept, yet China considers many components of it as threatening. Upper tier, boost-phase and mid-course interceptors, and Aegis-based systems, could negate China's

nuclear deterrent and protect against China's most potent coercive tool against Taiwan—short and medium range ballistic missiles.

In fact, China's worries over U.S. intentions in space are most closely connected to the strategic balance in the Taiwan straits. Taiwan is a core national interest to China, and is also virtually the only conceivable point of conflict between China and the United States for the foreseeable future. This greatly complicates any solutions as Taiwan is a particularly knotty challenge in its own right. But it also underscores the importance of a political solution over a technical one. Due to the security dilemma that defines Sino-U.S. relations in space, this is surely fiendishly difficult but it is not impossible. Recognizing the close linkage between strategic stability in the Taiwan Straits (foreign policy) and U.S. space weapons programs is essential. This is rarely acknowledged in any systematic way, let alone factored into military decision-making.

China's evolving notions of sovereignty in space could increasingly become another point of tension in Sino-U.S. relations in space and one that China will likely seek to redress. China claims equal sovereign rights (under international law) to access space, which is impeded by U.S. national security objectives in space. At the same time, China is threatened by U.S. satellites -- particularly those with military utility -- passing over Chinese territory. Although outer space is viewed as the global commons, its exploitation, whether for commercial, military or other purposes, overwhelmingly favors the United States. This is in contrast to international waters, where U.S. fleets safeguard shipping lanes that serve a truly international trade. In space, the strategic advantage this bestows on the United States is not lost on China. It does not have the ability (or the motive) to challenge the United States on the high seas, but it is showing a growing willingness to exercise its rights in space.

Other smaller steps may be more politically feasible, however, and could also go a long way to managing the competitive Sino-U.S. relationship in space. Clearly defining threats and parameters for acceptable norms of behavior in space has not been accomplished in any significant way. A 'code of conduct' and 'rules of the road' for space, with measures such as mutual noninterference of satellites and space traffic management, and procedures for 'incidents' in space would help to build confidence for mutual security. A reconsideration of the U.S. position at the CD could go a long way to not only addressing core values and interests in space but the fundamental problem of the perception of an inevitability of space weaponization. The argument that there is no space race and therefore no need for further treaties beyond the Outer Space Treaty is increasingly untenable.

Naturally, it takes two to talk. Despite the fact that blame also lies on the Chinese side in terms of its hedging behavior and its allergic reaction to transparency, it is precisely because we know so little about China's intentions, whether regarding the ASAT test or its larger military ambitions in space, that the imperative to talk is all the more stark. Dialogue across a broad range of space issues, at many different levels and in a systematic way is obligatory, not an option. Space is rapidly becoming the node where crucial strategic, military and commercial ambitions intersect, of both nations, and so these discussions should become part of strategic talks. While high barriers to effective test bans or arms reductions in space will always be elusive, negotiations can also serve to open channels of communication for conflict management. China will likely maintain a secretive posture for some time to come but when carefully considered, China has more interest to avert a space race than join one.

Moreover, the ASAT test and military space program are fundamentally a response to U.S. goals in space and China is therefore malleable to a strategic solution. That window will not stay open forever.

Effective communication on such issues must be predicated on a well-considered analysis of the nature of the threat and an understanding of the other side's interests. This entails a reading of a vast body of literature that is largely inaccessible to the majority of students of Sino-U.S. relations, on both sides of the ocean. The problem is magnified however in the United States where few specialists (let alone non-specialists) have the language skills to read the material first-hand, a fact that is further compounded by the fact that material's authoritativeness is extremely difficult to discern. This creates a 'gatekeeper phenomenon' where much analysis relies on selected translations, where conclusions about China's military space ambitions are difficult to contend. A language task force to provide wider and more uniform access (civilian and government) to these materials could drastically minimize this problem.

In conclusion, many of the above measures are palliative in nature, requiring high diplomacy, and may or may not come to fruition. To focus solely on them would be to miss the larger strategic undercurrent of the security dilemma in space. China did not challenge U.S. power in space; it was challenging the U.S. self-described right to dominate it. China will unlikely accept U.S. objectives in space if pursued at the exclusion of China's own core national values and interests. A failure to heed this evolving reality will likely lead to more friction, and perhaps even further testing. The future course of action is not about pleasing or appeasing Beijing: it is about reaching accommodation and common ground that is not only equitable but inevitable. The United States needs to come to grips with the reality that China will demand more 'strategic room' in space. While it is not the message Washington wants to hear, and may be difficult to achieve politically, it is increasingly the reality that the United States must confront.

Appendix

During the past decade or more, there has been a vast proliferation of literature directly and indirectly related to ASATs and military space issues in China. Not only has the information increased in volume, but has diversified in viewpoint, ranging from the hawkish and dovish at the fringes, and everything in between. Understanding this body of information in China requires discerning analysis.

First, who is writing? The authors and their institutional affiliation are essential to discriminating the publication's relevance to military and policy/strategy decision-making regarding China's military space program. There is no set formula for determining the authoritativeness of an article or book but an important indicator is the nature of the references used (popular science, newspapers and *digests* as opposed to academic publications or papers produced at high levels). Second, what is the writing about? Is it 'lessons learned' and descriptions of other countries' capabilities (e.g., the United States or Russia), or proposals and depictions of China's own program? The majority of publications fall into the former category but are often interpreted within the latter. Third, and most basic, is the fidelity of the translation. This task can be more art than science, but the mistranslation of a few key words can drastically alter the meaning and intent of an article. All of these are

critical to reaching balanced and informed conclusions about China's military space capabilities, doctrines and intentions.

The paper submitted to this commission on Jan. 19, 2007, "The Assessment of China's Anti-Satellite and Space Warfare Programs, Policies and Doctrines" commits all of the critical errors described above. First, the study claims to represent the majority of openly available sources, but only quotes from approximately 30 articles and 3 books that are not representative of a far larger pool of sources (the World Security Institute's China Program has a library of over 1,000 articles and 30 books on the subject dating back to the 1980s). Based on a wide reading of the literature, the references used in this report appear to exploit the most strident and extreme voices. The degree to which these particular sources are not representative of China's military space efforts should have been recognized and acknowledged. This report does neither, and therefore misleads the reader. One important instance in this regard, is the use of the book by Col. Li Daguang called *Space War* (2001), upon which eight of the 30 central findings are based. At the time of writing, Li was an associate professor at China's National Defense University. His resume states he specializes in international strategy, national defense strategy, defense science and technology development, and Sun Tzu's theory and its application in business competition. His role in China's doctrinal thinking on space warfare and influence in shaping China's military space capability build-up is unknown, but he is certainly not a prominent and authoritative voice and his book draws on popular science and digests. As for the other two authors, Jia Junming and Yuan Zelu, their books were only their PhD theses in the years 2000 and 2004 respectively. Yet, the most authoritative references --for instance *Military Astronautics* (2005, 2nd ed.), a book by Maj. Gen. Chang Xianqi, former president of the PLA Armament Command and Technology Academy) -- are not used as sources in the report. Chang's book represents the findings of a key task force on space forces and space war-fighting under the PLA's 10th Five Year Plan. Its tone is far less strident than *Space War*. (A brief review of *Military Astronautics* can be found in *China Security Quarterly* at www.wsichina.org).

Second, the vast majority of the sources utilized in the study submitted are highly technical articles dealing mainly with theoretical aspects of space war fighting and its capabilities. There is indeed a large body of research papers discussing specific technologies and weapons platforms of other countries, but few of them speak directly about China's "space warfare programs, policies and doctrines" as stated in the title of the report. Certainly, technology development is suggestive of larger doctrinal issues, but the line between them is far from clear. This nuance is almost entirely absent, confusing theory and technology assessment with China's policy intentions.

In addition, a number of the extensively translated articles in the report are actually studies of other countries' capabilities, notably the United States (and/or Russia). The report 'reads into' these studies a reflection of China's own program. One example is the errors made in the use of Liu Huanyu's article on "sea-based anti-satellite platforms" (pp. 24-29). Whole sections of the article are rearranged in such a way as to inappropriately fall under a heading of proposals for what "China needs" in terms of weapons platforms. For instance, all of Section 3 (pp. 26-28), dealing with "anti-satellite weapons" is clearly a descriptive analysis of U.S. (and Russian) capabilities, a kind of 'lessons learned' approach, yet it is relocated under this "proposals" section. Another example is found on Page 46 (ref. #39), where the translation of the headline for a section and its reference omit the word "foreign", distorting

the fact that the article is clearly a study on the high power microwave weapons of foreign countries, not China's.

Translation errors, of commission and omission, frequently occur, many of which go beyond minor technical nitpicking. China has certainly spent a lot of effort to carefully study U.S. weapons systems, from those used in the Gulf War to the current conflicts in Iraq and Afghanistan, as evidenced by the large body of literature. But the leap from that to what China will do with its own program is debatable and one that should not be insinuated through mistranslation. On Page 43 (Section 6) of the report, for instance, a crucial sentence is absent within the translated section. The missing sentence specifically states that "China has not conducted research in this area." More critically, at the beginning of the report's executive summary (pg. 3), it states that "...Chinese Colonels Li, Jia and Yuan all advocated **covert** deployment of a sophisticated antisatellite weapon system to be used against United States in a surprise manner without warning." However, in *Space War*, penned by the first author mentioned (Li Daguang), the use of "covert deployment" is never used in this context. Rather, he proposed that "China needs to build a small but capable space warfare special experiment force...[and] considering certain restrictions of the international society, this force should be secretly built and kept under low profile." Interpretation of books' themes is one thing, but mistranslation of quotes is another. Particularly, when a Chinese author is advocating such a provocative program, it is imperative to accurately translate the Chinese authors' words.

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In sum, the purpose of this critique is not to discredit this report or dismiss its findings based on technicalities. But flaws go deeper than mere cosmetics. Neither is this intended to downplay the realities of China's military space program. To be blind to the fact that China may be hedging its bets in space by engaging in ASAT and/or space weapons efforts would be naïve, or worse, dangerous. But the conclusions drawn about the exact nature of the threat, and the underlying motivation and intention, must be based on careful and objective analysis. Misinterpretation based on problematic analysis and translation could lead to a worsening of U.S. security in space through misjudgment and overreaction. The gravity of this subject dictates a careful, comprehensive and accurate study of China's military space program.