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**Sino-U.S. Competition
in Strategic Arms**

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ABSTRACT

As technology advances, the trade-off between offence and defence has become more complex. On the one hand, offensive weapons have become more powerful, lethal and precise, making counter-measures more difficult. On the other hand, defensive weapons have become more capable than ever before of denying and neutralizing offence. In particular, the use of space, for both offensive and defensive purposes, has proliferated, further complicating this offence-defence calculus.

This is where Sino-U.S. security relations stand at present. Both countries are declared nuclear states, with overwhelmingly asymmetric numbers of strategic nuclear weapons in the United States' favour. This nuclear balance has become even more complex since President Bush decided to accelerate the development of a comprehensive missile defence system, as well as a "New Triad" strategic capability to cope with the volatile external environment in post-Cold War era. Adding to this complexity are Chinese perceptions that the United States is attempting to dominate and control space.

This paper aims to analyze how China perceives the United States' effort to build up its missile defences, "New Triad," and space capabilities, how China assesses and is attempting to respond to these developments, and the policy implications and potential environmental changes as a result of China's responses.

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Sino-U.S. Competition in Strategic Arms

Ballistic Missile Defence and China's Threat Perception

Building a missile defence system able to intercept attacking missiles has always been a dream for strategists and arms experts. Beginning in the 1960s, both the United States and Soviet Union had endeavoured to develop such a system, but ended up with the Anti-Ballistic Missile (ABM) Treaty.¹ Entering the 1980s, President Reagan announced the development of a Strategic Defense Initiative.² After the Cold War had ended, President Clinton decided to build a ballistic missile defence (BMD) composed of theatre missile defence and national missile defence systems.

After taking office in January 2001, Bush administration decided to develop and deploy a missile defence system with initial capability. His speech at the U.S. National Defense University urged the development of a global-wide BMD in May 2001, and later, after negotiation with Russia, he decided to withdraw from the ABM Treaty in December 2001 so that all possible barriers for developing such a system could be lifted. The BMD structure involves defence against incoming missiles in three phases of ballistic missile trajectories: boost, midcourse and terminal.³ Boost phase is the portion of flight immediately after launch, when the missile is to gain acceleration under power to lift its payload into the air (airspace). This lasts 3–5 minutes and ends at altitudes of 300 miles or less. During this phase, the rocket is climbing against the Earth's gravity. Intercepting a missile in its boost phase is the ideal solution, because a large area of the globe can be defended, and midcourse decoys can be prevented from being deployed by destroying the missile early in its flight. There are two types of boost defence elements: directed energy systems using high power lasers, i.e. the Airborne Laser (ABL), and kinetic energy interceptors (KEI). Between the two, the ABL is the most mature, while the KEI is being developed and will be fully tested between 2010 and 2011.

Midcourse phase is the longest part of the missile flight. It is where the missile payload has separated from the booster rocket and follows a more predictable glide path

¹ Its formal name is Treaty on the Limitation of Anti-Ballistic Missile Systems which was signed on May 26, 1972 with a goal to restrict volume and locations of deployed anti-ballistic missiles so that effective regional defense zone or the beginning of nationwide system can be prevented from being created. See <http://www.state.gov/www/global/arms/treaties/abm/abm2.html>.

² President Reagan started the program in March 1983 with a goal to explore the technical feasibility of missile defenses in the hope that such defenses, if feasible, might provide the basis for a shift from offense-dominated deterrence to a form of deterrence that relied increasingly on strategic defenses. See http://www.nuclearfiles.org/menu/key-issues/missile-defense/history/reagan_strategic-defense-initiative.htm.

³ Unless otherwise cited, this section is drawn from U.S. Missile Defense Agency, MDALink,

toward a target. This phase can be as long as 20 minutes, allowing the longest window of opportunity for interception. More than one interceptor could be launched to ensure a successful hit. The Midcourse Defense Segment has ground-and sea-based elements: Ground-Based Midcourse Defense (GMD) and Aegis Ballistic Missile Defense (Aegis BMD). The GMD defends against long-range ballistic missile attacks by “hit-to-kill”: during a GMD intercept, a booster missile flies toward a target's predicted location and releases a “kill vehicle” on a path with the incoming target. The kill vehicle uses data from ground-based radars and its own onboard sensors to collide with the target, thus destroying both the target and the kill vehicle using only the force of the impact. At present, a total of 23 interceptors have been fielded, three are currently housed in California with another 20 in Alaska’s Fort Greely. Current long-term plans call for a total of 54 interceptors; 40 at Fort Greely, four at Vandenberg and another 10 in Europe.⁴ The sea-based Aegis BMD system is intended to intercept short to medium range hostile missiles in the ascent and descent phase of midcourse flight. It builds upon technologies in the existing Aegis Weapons System now aboard U.S. Navy ships and uses the Standard Missile 3 (SM-3). To date, a test of launching SM-3 from an Aegis ship to test intercept has been made,⁵ 16 Aegis ships have been upgraded with long-range surveillance and track capability. It is expected that in 2009, 18 Aegis ships will so be equipped and will have operational engagement capabilities.

The final phase is called terminal. This is when the missile's warhead re-enters the earth's atmosphere and falls towards its target, propelled only by its momentum and the force of gravity. Because its speed can be thousands of miles per hour, this phase generally lasts from 30 seconds to one minute. The primary elements in the Terminal Defense Segment are: Terminal High Altitude Area Defense (THAAD) and PATRIOT Advanced Capability-3 (PAC-3). THAAD, which has the capability to shoot down a short or medium range ballistic missile in its final stages of flight, both inside and just outside of the atmosphere, will destroy a ballistic missile at its transition from the midcourse to terminal phase of its trajectory. PAC-3, which builds on the previous PATRIOT air and missile defence infrastructure, is the most mature element of the BMD system, and has been delivered to the U.S. Army in 2003. Interceptors of various

www.mda.mil/mdalink/html/basics.html.

⁴ “Two New Interceptors Planned at Fort Greely; Third Missile-Defense Interceptor at VAFB”, Associated Press. 9 October 2007, cited from *Missile Defense Update #9*, 1 November 2007, www.cdi.org/program/issue/document.cfm?DocumentID=4133&IssueID=139&StartRow=1&ListRows=10&appendURL=&Orderby=DateLastUpdated&ProgramID=6&issueID=139.

⁵ “Aegis BMD achieves ninth successful flight test intercept”, cited from *Missile Defense Update #6*, 11 July 2007, www.cdi.org/program/issue/document.cfm?DocumentID=4011&IssueID=139&StartRow=1&ListRows=10&appendURL=&Orderby=DateLastUpdated&ProgramID=6&issueID=139.

phases aside, sensors are also a vital part of the BMD system. They are composed of ground-based early warning radars, THAAD radars, ground- and sea-based X-band radars, sea-based SPY-1 radar, space-based space tracking and surveillance system, and space-based infrared system. Their goals are the detecting of missile launch, subsequent tracking and surveillance, identification and discrimination of warhead from decoy, cuing, and fire control.

In fact, China has closely observed strategic arms development by both the United States and Soviet Union (later, Russia). However, little attention has been paid to observe China's response during the Cold War era, because the two superpowers with a thousand nuclear weapons targeting each other have attracted worldwide attention, while China was only a small actor. Also, China was completely insulated from the outside world and there was no exchange at all. Attention to China's responses to the U.S. nuclear supremacy has surged substantially since the end of the Cold War. Research on China's response to the United States' BMD policy has been voluminous. These works appeared at academic publications,⁶ conferences,⁷ various forums,⁸ and special and policy reports,⁹ focusing on how China perceived the U.S. BMD, and how China's security interests, especially nuclear security, would be impacted, and China's potential nuclear responses to counter unfavourable situation. All rightly point out that China's perception toward the U.S. BMD covers several dimensions, ranging from: (i) the negative impact on international strategic stability built upon the 1972 ABM Treaty and the complete destruction of the associated mutual assured destruction basis; (ii) the possible arms race by some countries to address their insecurity; (iii) potential missile proliferation as a result of possible technology conversion from the BMD system; (iv)

⁶ For instance, Arthur S. Ding, "China's Concerns About Theater Missile Defense: A Critique", *The Nonproliferation Review*, 6, (4) pp. 93-101 (Fall 1999); Michael J. Green and Tolby F. Dalton, "Asian Reactions to U.S. Missile Defense", *NBR Analysis*, 11 (3) (November 2000), www.nbr.org/publications/analysis/pdf/vol11no3.pdf; Michael D. Swaine with Loren H. Runyon, "Ballistic Missiles and Missile Defense in Asia", *NBR Analysis*, 13 (3) (June 2002), www.nbr.org/publications/analysis/pdf/vol13no3.pdf; and Arthur S. Ding, "The Impact of U.S. 'Missile Defense' and 'Nuclear Posture Review' on China's Nuclear Weapons Policy", *Wenti yu Yanjiu* [Issues and Studies], 44, (3) pp. 93-123 (May/June 2005).

⁷ For instance, Eric McVadon, "Chinese Reactions to New U.S. Initiatives on Missile Defense", read at the PLA Conference co-sponsored by American Enterprise Institute, the Heritage Foundation, and the U.S. Army War College, Carlisle, PA, 7-9 September 2001.

⁸ Bonnie Glaser, "Chinese Missiles and Taiwan TMD: Can a New Round of the Cross-Strait Arms Race be Averted?" read at the 5th Roundtable on U.S.-China Policy and Cross-Strait Relations, sponsored by the National Committee on American Foreign Policy, 29-31 August 1999.

⁹ Anthony H. Cordesman, "China and the U.S.: National Missile Defenses and Chinese Nuclear Modernization", A background paper for the CSIS, July 2000; Patrick M. O'Donogue, *TMD in Japan: Implications for the U.S.-China-Japan Strategic Relations*. Carlisle, PA: U.S. Army War College, September 2000, (www.ssi.army.mil/pdf/files/pub66.pdf)

Tom Sanderson, "Chinese Perspectives on U.S. Ballistic Missile Defense", A Report on the Stimson Center Fellowship in China, March 2002, www.stimson.org/eastasia/pdf/sandersonreport.pdf, and Brad Roberts, "China and Ballistic Missile Defense: 1955 to 2002 and Beyond", IDA Paper P-3826,

raising Japan's military capability and the possibility of a re-militarized Japan; (v) the build-up of "quasi-alliance" between the United States and Taiwan, which may lead to the likelihood of boosting Taiwan's confidence in seeking independence, and subsequently leading to the potential instability in the Asian-Pacific region; (vi) the further increase of chronic mutual distrust between the United States and China; (vii) the long-term trend of space militarization which likely results in arms race in space; to, the most important: (viii) jeopardizing China's limited nuclear deterrence capability.

In general, China has perceived that the U.S. BMD brought serious challenges to China's security interests.

Possible responses by China are also discussed in these works.¹⁰ They include: to quantitatively increase the number of China's nuclear arsenal to overwhelm the BMD system; to have China's nuclear warheads MIRVed to lower interception probability; to use decoy; stealth measures to lower probability of detection by radar and sensors; to make ICBMs mobile; to fasten the boost phase of missiles so that sensors do not have sufficient time to detect and track; to make missile spin; to launch missiles from SSBNs far away from Chinese mainland; and to launch anti-satellite weapons to knock out sensors deployed in space. China also made a diplomatic effort to counter the United States' decision of developing BMD. Their efforts included denouncing missile defence in bilateral talks with the United States,¹¹ partnering with Russia to oppose the revision and abrogation of the ABM Treaty,¹² forming coalition in multilateral meetings to oppose the missile defence programme,¹³ and proposing to work with the United States with a goal to find other alternatives for preventing WMD proliferation (rather than BMD).¹⁴ However, China failed in this regard.

September 2003, www.fas.org/nuclear/guide/China/doctrine/bmd.pdf.

¹⁰ Interestingly, these measures are also mentioned by China's weapon experts. See Jun Yuan, "Discussion of Ballistic Missile Penetrating Missile Defense System", *Aerospace Shanghai*, No. 1, pp. 48–51, (2005),.

¹¹ See "Report from the First U.S.–China Conference on Arms Control, Disarmament and Non-proliferation" Monterey, CA: Center for Nonproliferation Studies, September 1998, cns.miis.edu/cns/projects/eanp/research/beijing/report.htm#IMPACT%20OF%20MISSILE%20DEFENSE%20ON%20STABILITY, and "Missiles, Theater Missile Defenses, and Regional Stability" Report from the Second U.S.–China Conference on Arms Control, Disarmament, and Nonproliferation. (Monterey, Calif.: Center for Nonproliferation Studies, April 1999), cns.miis.edu/cns/projects/eanp/research/uschina2/report.htm#stability.

¹² "Chinese-Russian press communiqué on consultations on issues pertaining to the ABM Treaty, 14 April 1999". www.nti.org/db/China/chindocs/zchru499.htm.

¹³ At the Geneva-held Conference on Disarmament, the Chinese delegation took an active action campaigning for anti-NMD.

¹⁴ Eric McVadon's article points out that one Chinese interlocutor proposed that the United States and China should find options other than missile defences that could reduce the threat. McVadon, "Chinese Reactions to New U.S. Initiatives on Missile Defense", note 5.

It should be noted that China's opposition of the U.S. BMD is real and persistent despite the fact that sometimes China's official views have been mute and self-restrained, and showed a tendency for possible cooperation. As one Chinese analyst said, "For the Chinese, neither TMD nor NMD is welcome. China opposes any form of missile defence that is destabilizing. The merging [of TMD and NMD] itself does not change missile defence's impact and implication on China's security concern, and the credibility of Chinese deterrence."¹⁵ Another instance can be found at the exchange made between U.S. Defense Secretary Robert Gates and Lieutenant General Qinsheng Zhang, a deputy chief of the General Staff Department of the Chinese military at the Shangri-La meeting in June 2007. When Secretary Gates proposed cooperation on missile defence systems, General Zhang expressed concern about U.S. BMD in Asia, stressing the point that the [missile defence] system could destabilize the Asian region, "if Japan and the United States extend the missile defence system to cover Taiwan, the People's Republic of China will oppose such a move very strongly."¹⁶

"New Triad" and China's Perception

The Nuclear Posture Review (NPR) was briefly mentioned by the U.S. Department of Defense (DoD) in January 2002. But, in March, its brief content was leaked and reported by *New York Times* and *Los Angeles Times*, indicating that in an emergency, China, along with North Korea, Iraq, Iran, Libya and Syria, would be a target of U.S. nuclear force.¹⁷ China was shocked by the report, requesting clarification, and, at the same time, pledging that China will never surrender to nuclear intimidation posed by the United States.¹⁸ The U.S. nuclear force re-structure illuminated in the NPR became a factor in China nuclear strategy.

The NPR was worked out at the request of the U.S. Congress on the basis of the DoD-issued *Quadrennial Defense Review* with the purpose to propose a U.S. future nuclear force in accordance with a changed external environment. It aims at reviewing

¹⁵ Personal e-mail communication with the scholar, 15 August 2007.

¹⁶ "China to oppose U.S. missile defence shield plans in Asia", www.iiss.org/index.asp?pgid=20810&mtype=print.

¹⁷ Paul Richter, "U.S. Work up Plan for Using Nuclear Arms", *LA Times*, 9 March 2002, in www.nadir.org/nadir/initiative/agp/free/9-11/us_nucleararms.htm, and Michael R. Gordon, "U.S. Nuclear Plan Sees New Weapon and New Targets", *New York Times*, 10 March 2002, in www.why-war.com/news/2002/03/10/usnuclear.html.

¹⁸ "China 'Deeply Shocked' over Pentagon Secret Report: FM Spokesman", in www.china-embassy.org/eng/26489.html, "China Demands Official and Clearer Explanation on U.S. Nuclear Weapon Report, www.china-embassy.org/eng/26556.html, and "Nation Prompts U.S. to explain

the U.S. security environment in the future and nuclear related force structure, timing and target of the use of nuclear weapons, problems and flaws of current nuclear forces, and formulating nuclear force structure for the future, and relevant nuclear disarmament and arms control.¹⁹ The NPR envisions a brand new world environment. Adversary will be different. The United States perceives that, unlike the Cold War era in which the Soviet Union was the only rival confronting the United States comprehensively, in the post-Cold War era, the United States is faced with multiple potential adversaries, sources of conflicts, and unpredictable challenges.

Threat is also different. The United States is situated in a new environment in which 12 countries have nuclear development plans, 28 countries have developed ballistic missiles, 13 countries have basis on biological weapons, and 16 countries have chemical weapons. In other words, the United States is faced with WMD and missile proliferation-related threats, and these threats are completely different from that in the Cold War era in which the Soviet Union was the only threat. The perceived new threat propels the United States to take new policies. They include to amend the Cold War-based Mutual Assurance Destruction and nuclear deterrence; to further disarm nuclear forces to a certain level to fit in with the new security need of the United States and its allies; to develop and deploy missile defence system with a capability more advanced than that regulated by the ABM Treaty; and to place emphasis on developing advanced conventional arms systems.

Basis and method for defence planning have changed accordingly. Defence planning during the Cold War era was threat-based with an eye on the Soviet Union. However, there is no specific adversary in the post-Cold War era, and lack of specific adversary prompts a need for the defence planning to shift towards being capability-oriented, so that the United States possesses sufficient capability to prepare for a variety of contingencies brought on by multiple and unpredictable challenges. Logically, the NPR attaches great importance to active defence and non-nuclear military capability. Active defence is to reduce reliance on nuclear striking capability without jeopardizing deterrence. One critical element of the active defence is to develop a BMD system related capability so that potential adversaries' military action against the United States will be rendered useless, its action can be dissuaded, and behaviour can be changed. With regard to non-nuclear military capability, the United States attempts to shift to offensive deterrence by developing capability on

nuke report", *China Daily*, 13 March 2002, in www1.chinadaily.com.cn/news/2002-03-13/60618.html.

¹⁹ This section of NPR draws from <http://www.defenselink.mil/news/Jan2002/g020109-D-6570C.html>, and <http://www.globalsecurity.org/wmd/library/policy/dod/npr.htm>. It should be noted that the full content of the NPR has never been released, and remains confidential.

conventional striking and information operation so that reliance on nuclear weapons can be reduced. Further, it is conceived that effective command, control and intelligence, as well as planning, can facilitate capability-based force structure.

In terms of concrete deployment, the United States is to develop a “New Triad” force structure. It includes striking capabilities that are composed of nuclear and conventional forces, active defence (i.e. BMD system), and passive defence (e.g. hardening) as well as responsive infrastructure (command, control, intelligence and adaptive planning). This is much different from the Cold War-style “Triad”, which was composed of ICBMs, SLBMs, and nuclear weapons delivered by heavy bombers.

One point needs to be emphasized with regard to the conventional striking capability outlined in the NPR. The capability stresses an ability to launch long-range precision strike against mobile, non-mobile, as well as hard and deeply buried targets under any weather and terrain condition. The NPR does not exclude the possibility of using nuclear weapons when the United States is faced with attack of chemical and biological weapons.

The NPR classifies contingencies for the use of nuclear weapons into three categories: immediate, potential or unexpected. China is listed in the immediate or potential category:

- Immediate contingencies involve well-recognized current dangers ... Current examples of immediate contingencies include an Iraqi attack on Israel or its neighbours, a North Korean attack on South Korea, or a military confrontation over the status of Taiwan.
- Potential contingencies are plausible, but not immediate dangers. For example, the emergence of a new, hostile military coalition against the United States or its allies in which one or more members possesses WMD and the means of delivery is a potential contingency that could have major consequences for U.S. defence planning, including plans for nuclear forces.
- Due to the combination of China's still developing strategic objectives and its ongoing modernization of its nuclear and non-nuclear forces, China is a country that could be involved in an immediate or potential contingency.

Responsive infrastructure is the third pillar. Of this pillar, adaptive planning is intriguing, because it actually involves nuclear warheads. It is planned to keep 2,200 operationally deployed nuclear warheads by 2012, but those downloaded extra warheads will not be destroyed, because the United States is concerned that 2,200

warheads may not be sufficient to make necessary response. This consideration motivates the United States to store up downloaded warheads so that they can be re-deployed to enhance the United States' nuclear capability.

In general, it seems that the United States seeks to transform its nuclear forces through the implementation of the "New Triad", in which the value assigned to nuclear weapons is reduced, and the value of strategic defence illustrated by the BMD system and non-nuclear strike capabilities is augmented. Nevertheless, it created a contrary effect in China. Compared to BMD system, China is probably more apprehensive of the policy direction described in NPR.²⁰ The core concern involved China's security. If the United States possesses long-range precision nuclear and conventional striking capability with the ability to conduct active defence, China's limited nuclear deterrent and second-strike capability will be seriously negated.

The U.S. decision to reduce its nuclear warheads to 2,200 has not assuaged China's concern. Chinese strategists criticized that despite the fact that the United States decided to reduce its warhead size, and concluded the Moscow Treaty (on Strategic Offensive Reductions) with Russia to cut each other's warheads down to 1,700–2,200 by 31 December 2012,²¹ there is no verification in the treaty to make sure warheads are removed, and worse, not all of those removed warheads will be destroyed. Chinese strategists perceived that, the United States continues to maintain high level amount of nuclear warheads and with this size, the United States maintains superior advantage on strategic offence capability. China has been particularly concerned about a possible scenario over how to react if the United States launches conventional long-range precision strike against China's limited nuclear force. In addition to conventional warheads, the U.S. military has deployed special warheads able to penetrate and ruin the soil structure of ICBM silos so that ICBMs cannot be launched, not to mention the fact that the United States plans to develop warheads able to hit hard and deeply buried targets, and the United States has never renounced the first use of its nuclear weapons.²²

²⁰ Summary of a U.S.–China "track 1.5" conference on strategic nuclear weapons issue, held in Beijing, 20–21 June 2006, "Conference on U.S.–China Strategic Nuclear Dynamics", www.csis.org/media/isis/events/060620_china_nuclear_report.pdf.

²¹ Fact sheet on Moscow Treaty on Strategic Offensive Reductions, The White House, Office of the Press Secretary, 29 May 2002, www.state.gov/t/ac/rls/fs/10551.htm.

²² "Meiguo fazhan zuandi hedan de zhenzheng mubiao shi zhongguo zhouji dandao daodan" [The real target of nuclear bunker buster which will be developed by the U.S. is China's ICBMs], www.cmilitary.com/articleReader.php?idx=26066; and Yong Qiu, "Preliminary Study on the Threat of Precision Strike Conventional Weapons to Nuclear Weapons", read at the 7th ISODARCO-Beijing Seminar on Arms Control, co-sponsored by IAPCM, CICIR, ISODARCO and Xian JiaoTong University in Xian, China, 8–12 October 2002. Some Chinese analysts argue that this kind of warhead should be placed in arms control items list.

In fact, the U.S. superior conventional force has already complicated China's responses. Major General Chenghu Zhu's remark to the media vividly shows the difficulties China faces. He said that China would have no choice but to respond with nuclear weapons if the United States attacked Chinese territory with conventional (non-nuclear) forces during such a conflict. General Zhu's remark was made on 14 July 2005 as a response to a question from the Hong Kong media group over possible U.S. involvement in the Taiwan Strait conflict.²³ Reinforcing China's apprehension is the explicit expression in placing China in the "immediate" category for the use of nuclear weapons. It may imply that under certain conditions, the United States would opt to use nuclear weapons, and a nuclear escalation and exchange would be in the pipeline. This would inevitably lead Chinese military officials to ponder as to what conditions would compel the United States to use nuclear weapons, and to ask their American counterparts if "the U.S. would use nuclear weapons in response to the sinking of an (U.S.) aircraft carrier".²⁴

Related to the core concern is China's perception of the United States' aggressiveness. Blurring conventional and nuclear weapons, outlined in the NPR, is particularly worrisome to Chinese strategists, because, as they point out, nuclear weapons should only play a role of deterrence, and should be regarded as the last resort. The new U.S. nuclear policy deliberately blurs the boundary, lowering the threshold for the use of nuclear weapons, and formally making nuclear weapons usable in military conflicts. Chinese strategists perceived that the United States has totally changed their nuclear strategy, and regarded this as a dangerous signal.²⁵ Another issue is pre-emption. Chinese analysts perceived that with the New Triad, the United States has formally endorsed the principle of pre-emption, and, at the same time, the United States has dropped the principle of not using, and not threatening to use nuclear weapons against those countries without nuclear weapons. They point out that this violates the U.S. established policy adopted in 1978 which states that nuclear weapons would not be used against Non-Proliferation Treaty signatory states, unless a certain signatory state coalesces with a nuclear state to attack the United States.

²³ For an analysis on Maj.Gen. Zhu's remark and China's nuclear policy, see Bruce G. Blair, "General Zhu and Chinese Nuclear Pre-emption", *China Security*, 1 (1) (Autumn 2005), www.wsichina.org/back1_04.html.

²⁴ "Conference on U.S.-China Strategic Nuclear Dynamics", note 18.

²⁵ Feng Zhu, "Meiguo hetaishi pinggu baogao: konghe haishi zhengce" [U.S. NPR: Intimidation or Policy?]; *Xiandai guoji guanxi* [Contemporary International Relations], No. 4, pp. 17-23 (2002); Qiangguo Zhu, "Meiguo heweishe zhanlue de tiaozheng" [The Adjustment of the U.S. Nuclear Deterrence]; *Xiandai guoji guanxi*, No. 2, pp. 28-31 (2002). For a western analysis, see Evan S. Medeiros and Jingdong Yuan, "The U.S. Nuclear Posture Review and China's Responses", cns.miis.edu/pubs/week/020401.htm.

China has paid heed to another U.S. defence policy that is being undertaken. In March 2006, the DoD submitted a budget request to the Congress with a goal to convert nuclear warheads deployed at some Trident II SSBNs to conventional warheads.²⁶ China has been wary of this policy, which is now known as the Conventional Strike Missile, or conventionalization of strategic weapons. This policy is in line with the policy direction outlined in the NPR, and the Moscow Treaty on Strategic Offensive Reductions. The treaty says that “the United States plans to retire all 50 of its ten-warhead Peacekeeper ICBMs and *convert four Trident submarines from strategic to conventional service* (emphasis added)”. A Congress’ report also indicates that the DoD requested US\$127 million in FY 2007 to pursue the deployment of conventional warheads on Trident missiles, but most of the requests was rejected by the Congress.

Related to the new policy direction is risk management. A variety of preventive measures against potential accidents were proposed by the U.S. military to assure and mitigate other nuclear states’ concern. They included on-site inspection, different locations for missiles with conventional from nuclear warheads, consultation and notification.²⁷ The United States’ attempt in this regard is perceived by Chinese analysts as threatening. Tianfu Wu, a teaching staff of the Chinese military Second Artillery Command College publicly voiced his concern.²⁸ He points out that this move will have several problems. The foremost is exactly related to risk issue. He argues that it is very hard for other countries to differentiate nuclear from conventional warheads; consequently, a target country is likely to over-react. This is particularly for the SSBNs, which can cruise underwater, making identification of missile warheads completely impossible. Under this circumstance, the target country is likely to over-react to protect its own security interests.

Security crisis tends to reduce the effectiveness of risk management. In a crisis in

²⁶ For analyses by Chinese experts on this issue, see Lu Dong, Gang Guo and Wensheng Li, “Xi meiguo zhanlue daodan changgui gaizhuan de dongyin ji yingxiang” [Analysis on Reasons for the U.S. to Convert to Conventional Warhead of Its Strategic Missiles and Impacts], and Changhong Qu and Yong Qiu, “A Preliminary Analysis on Conventional Long Range Ballistic Missile”, both read at the 10th PIIC Beijing International Security Symposium, held in Xiamen, Fujian Province of People’s Republic of China, 25–28 September 2007.

²⁷ Amy F. Woolf, “Conventional Warheads for Long Range Ballistic Missiles: Background and Issues for Congress”, *CRS Report for Congress*, updated 19 June 2007, www.fas.org/sgp/crs/nuke/RL33067.pdf.

²⁸ This section draws from Tianfu Wu, “Zhongguo hezhengce benzhi shang shi yizhong anquan huxin hezhengce” [China’s nuclear policy essentially is a mutual confidence based security policy], delivered at the 10th PIIC Beijing International Security Symposium, held in Xiamen, Fujian Province of People’s Republic of China, 25–28 September 2007. It should be noted that Wu’s article was circulated at the conference, but he never showed up to present it. To some extent, this way actually reflects Chinese military’s concern over this direction of U.S. policy. The Second Artillery is China’s strategic rocket force responsible for ground-based strategic and tactical nuclear weapons in the Chinese military.

which the United States is directly involved, it is very likely for the United States to use these missiles in short notice. The political leadership of a target country will have to balance domestic against external pressures to reach a very critical decision in an extremely short time. The target country's lack of capable early warning systems able to identify the exact launching location may exacerbate the uncertainty, triggering the crisis to fully erupt. In essence, those preventive measures cannot eliminate the risk of a potential nuclear war at all. Secondly, this move is to substantially improve U.S. pre-emptive attack capability. On the one hand, the United States can launch conventional warhead-equipped long-range missiles to strike its adversaries without suffering retaliation by the attacked country. On the other hand, there is a possibility that the inability to retaliate may theoretically invite a subsequent nuclear strike from the United States, and this will result in a possible outcome of lowering the nuclear threshold. Thirdly, this policy direction, together with the changing U.S. defence policy outlined in the NPR, as well as its dedication to develop bunker buster warheads concerns China a lot. As pointed out earlier, China has been concerned that if the United States launched a conventional long range precision strike against China's limited nuclear force, or use bunker buster warheads to ruin the soil structure of ICBMs silo, should this kind of attack be regarded as nuclear attack or conventional attack? Different judgement will definitely make a different response.

Weaponization of Space

In January 2007, China launched a missile to shoot down its own aging weather satellite, and this shocked the United States, because this test show that China has developed the anti-satellite (ASAT) programme for some time, already has had anti-satellite capability. China's ASAT capability will be a threat to U.S. dominance in space.

For a long time, China's strategists advocate that space is a "new frontier" where there are many opportunities which all the major countries should endeavour to tab. They explicitly point out that whoever controls space will be able to control the earth. They also argue that technology spun off from space programmes can greatly benefit economic development. China has closely watched U.S. space-related development. President Reagan's Strategic Defense Initiative (SDI) programme, the U.S. BMD programme, various types of satellites, space shuttles, and space stations all have heightened China's awareness on the importance of space. Together with Europe's

Ariane space programme,²⁹ China felt an imperative to speed up its own space programme in late 1980s so that China's competitiveness can be enhanced. China's space programme, which was part of broader "863" high-technology development programme package, was launched in late 1980s.³⁰

It should be noted that military application of space probably was not a priority for China's space programme in the late 1980s, although military implication could be drawn from their programme and a military programme might possibly be hidden in the package.³¹ Two areas were singled out for the space programme at that time.³² They were "to develop advanced heavy rocket to upgrade China's commercial launch capability", and to continue to undertake space R&D. In fact, its purpose was to develop a large capacity rocket, a spacecraft from the earth to space, and eventually, a manned space station. In other words, China's space programme aimed high with a goal to catch up with advanced countries.³³ Nevertheless, China probably began to allocate more resources to military application entering the 1990s. Several events in the 1990s might serve as catalysts, enabling China to further realize the critical role of space, along with information technology, on military operation for command and control,

²⁹ **Ariane** is a series of a European civilian expendable launch vehicles for space launch use. France first proposed the Ariane project and it was officially agreed upon at the end of 1973 after delicate discussions between France, Germany, and the UK. The project was West Europe's second attempt to develop its own launcher. For an introduction, see http://www.arianespace.com/site/about/about_index.html.

³⁰ The "863" high-technology programme was proposed by several China's top notch scientists to Xiao-ping Deng on the grounds that if China does not develop these advanced technologies, China will lose its competitiveness in the world, becoming a second, or worse, third rank country. Deng approved the programme in March 1986. The originally approved high-tech programmes include information, space, laser, automation, energy, material and biotechnology. Later in the 1990s, oceanic survey technology, superconductor, remote sensing real time convey system, large capacity switch board exchange system, and rice gene mapping were included in the programme. For an excellent analysis on the genesis of the "863" programme, see Evan Feigenbaum, *China's Techno-Warriors: National Security and Strategic Competition from the Nuclear to the Information Age*. Stanford, CA: Stanford University Press, 2003. For a complete introduction of the "863" programme, see "Guojia gaojishu yanjiu fazhan jihua" [The National High Technology Research and Development Program of China], in www.863.org.cn/863_105/index.html. It should be pointed out that in June 1997, China launched a "973" Guojia zhongdian jichu yanjiu fazhan jihua [National Basic Research Program] as China's on-going national keystone basic research programme, which also covers IT, energy and materials fields, along with agriculture, resource environment, population as well as health fields and synthesis, and frontier science. For an English introduction of the "973" programme, see www.973.gov.cn/English/Index.aspx.

³¹ For a better story on how the "863" space programme evolved to the "921" manned-spacecraft programme, see "Zui wanzheng jiemi zhongguo hangtian" [The most detailed story of China's space programme], in military.china.com 2005-10-24, cited from military.china.com/zh_cn/critical3/27/20051024/12779635.html,

³² This sector draws from Chapter 1.2.1 of the "863" programme, in www.863.org.cn/863_95/863briefing/863bif001_22.html. It should be pointed out that space technology was briefly touched in Chapter 1 while it is completely removed from Chapter 2 without any explanation.

³³ For a complete story on how the "863" space programme evolved to the "921" manned-spacecraft programme, see "Zui wanzheng jiemi zhongguo hangtian" [The most detailed story of China's space programme], in military.china.com 2005-10-24, cited from military.china.com/zh_cn/critical3/27/20051024/12779635.html.

navigation, reconnaissance and surveillance.³⁴ They were the 1991 Gulf War, the 1995/96 Taiwan Strait crisis, the 1999 U.S. bombing of China embassy in Yugoslavia and the Kosovo conflict, which, together, impelled China to military application.

The year 2001 was another critical stage for China to put more resources on military application of its space programme. In January 2001, the United States held the first of its “Schriever” series space war games, and since then, the space war game is held every other year. The first “Schriever” space war game was held with a goal to explore “the requirements for space control, exploring ways to counter advanced adversary space capabilities, and evaluating the enemy's ability to deny U.S. and allied space capabilities”. The space war game extended across all branches of the U.S. military and incorporated dozens of federal agencies, commercial space companies and U.S. allies.³⁵ It was reported that not only was the space war game not confined to strategic level simulation focusing on using satellites for strategic-level decision making, but tactical operation issues were also touched. The case included the coping with the loss of U.S. satellites, and how U.S. forces might have to replace those capabilities with small satellites launched on quick-reaction rockets, high-altitude airships and unmanned aerial vehicles. Included was also exploring ways to reduce the time gap between locating an enemy target and engaging it, because it involves faster decision making than faster weapon delivery systems.³⁶ Chinese strategists believe that further development of the BMD will definitely lead to the weaponization of space. The media reported that the DoD is exploring concepts for basing missile interceptors in space with the objective of beginning deployment of three to five armed satellites for testing purposes as early as 2008. The guiding idea is to field satellites armed with multiple hit-to-kill interceptors capable of destroying a ballistic missile through a high-speed collision shortly after its launch. Ideally, the interceptor would hit the missile in its boost phase, when the rocket engines are still firing and the warhead has not yet separated from the missile.³⁷

³⁴ Wensheng Li, Lu Dong, and Yanli Dai, “Junshi hangtian liliang fazhan dui zhanlue heweishe shixiang de yingxiang ji geguo duice” [Impact of the development of military aerospace on the thought of strategic nuclear deterrence and countermeasures adopted by various countries], read at the 10th PIIC Beijing International Security Symposium, held in Xiamen, Fujian Province of People’s Republic of China, 25–28 September 2007. For a relevant western analysis on China’s endeavour to catch up with the United States in the field of information dominance, see Mark Stokes, *China’s Strategic Modernization: Implications for the United States*. Carlisle, PA: U.S. Army War College Strategic Studies Institute, 1999.

³⁵ “Air Force Gains Insight From First Space Wargame”, *Space Daily*, 29 January 2001, www.spacedaily.com/news/milspace-01d.html.

³⁶ “Space WarGame Focused On Tactical-Level Operations”, www.space.com/spacenews/archive05/gamearch_021405.html.

³⁷ Wade Boese, “U.S. Aims to Deploy Space-based Missile Interceptor in Five Years”, *Arms Control Today*, March 2003, www.armscontrol.org/act/2003_03/space_mar03.asp.

China tried to slow down the United States' effort of deploying space-based interceptors and other missile defence elements into space. In the Geneva-held Conference of Disarmament (CD), China tried to negotiate an agreement on the prevention of an arms race in outer space, which was rejected by the United States with an argument that the outer space issue is not ripe for negotiations because there is no current arms race in outer space. The United States and Israel were the only two CD members to abstain from a UN General Assembly vote in November 2002 for a resolution calling on the conference to work on outer space in 2003.³⁸ China is also wary of the U.S. National Space Policy, which was released October 2006. It seems that China is particularly apprehensive of two principles outlined in the policy:

- The United States considers space capabilities—including the ground and space segments and supporting links—vital to its national interests. Consistent with this policy, the United States will preserve its rights, capabilities, and freedom of action in space; dissuade or deter others from either impeding those rights or developing capabilities intended to do so; take those actions necessary to protect its space capabilities; respond to interference; and deny adversaries, if necessary, the use of space capabilities hostile to U.S. national interests; and
- The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests.

All these lead China to conclude that the United States is determined to dominate and control space,³⁹ and an inevitable trend of weaponization of space is seen.⁴⁰ From China's perspective, all the United States has done has been to diminish a diplomatic solution, but at the same time hasten the pace of military development in space.

Shaping Factors

³⁸ Wade Boese, "Annan Urges CD to Be Productive in Upcoming Year", *Arms Control Today*, March 2003, www.armscontrol.org/act/2003_03/cd_mar03.asp.

³⁹ For related analyses, see also Hui Zhang, "Action/Reaction: U.S. Space Weaponization and China", *Arms Control Today*, December 2005, www.armscontrol.org/act/2005_12/Dec-cvr.asp?print, and "Space Weaponization and Space Security: A Chinese Perspective", *China Security*, 2 (1) (Spring 2006), www.wsichina.org/attach/cs2_3.pdf, as well as Eric Hagt, "China's ASAT Test: Strategic Response", *China Security*, 3 (1) (Winter 2007), www.wsichina.org/cs5_3.pdf.

⁴⁰ Daozhong Li, "The Tendency of Space Weaponization and Its Impacts on the International Security", and Yong Qiu, "An Outlook on Preventing Space Weaponization", both read at the 10th PIIC Beijing International Security Symposium, held in Xiamen, Fujian Province of People's Republic of China,

Several factors will shape China's consideration in formulating its strategic arms strategy. The first and foremost one, is to build a reliable counter-strike system able to deter the United States from encroaching China's core interest, particularly in Taiwan, and effectively launch a retaliation against the United States, in case of need, so that China's national security interest and sovereignty can be ensured. Parallel to the need of building a reliable force, there is a need for China to keep workable and manageable, though not congenial and cordial, relations with the United States with a purpose to keep a peaceful external environment so that economic development can be further promoted and, subsequently, comprehensive national strength can be further enhanced. China's nuclear size and capability will likely play a critical yardstick used by the United States to assess if China would be enemy or not. Related to the Chinese leadership's decision making on the build-up of the counter-strike capability is the degree and nature of threat that they perceive. If they perceive the threat stemming from the defence deployment of the United States is imminent, there will be an urgent and strong need for China to build up more counter-strike capability in the short term.

The second is to balance military modernization with economic development. China's defence white paper, *China's National Defense in 2006*, vividly points out the need to coordinate these two needs so that no lop-sided development will occur: "China pursues a policy of coordinated development of national defence and economy. It keeps the modernization of China's national defence and armed forces as an integral part of its social and economic development, so as to ensure that the modernization of its national defence and armed forces advances in step with the national modernization drive."⁴¹ Behind the coordinated development concept is the realization of the relationship between economic development and military modernization. As economic reform is deepened and military modernization is furthered, China has realized that the military cannot be separated from the overall political, economic and social development, and the military can be nurtured and benefited from these. The Chinese military's comprehension of the revolution in military affairs (RMA) attests to their understanding; they see the RMA reflecting a larger and deeper revolution in social and economic development. They fully realize that the greatest test for China is if China can

25–28 September 2006.

⁴¹ It should be pointed out that before the 1990s, defence modernization was subordinate to economic modernization, and Xiaoping Deng urged the Chinese military to be patient, saying that once economic development is achieved, more resources can be channelled to the military. However, the military's need was elevated and the new slogan was 'coordinated development of defence and economy', beginning roughly mid-1990s. *China's National Defense in 2006*, english.pladaily.com.cn/site2/special-reports/2007-01/15/content_706615.htm.

continue to reform its political, social and economic systems to a level at which the Chinese people's innovation can be brewed, and RMA can be brought to Chinese military.⁴²

This implies that the military probably should not have unrealistic expectation for resource allocation unless China is faced with imminent threat in the near term. It is likely that political leadership would urge the military sector to economically find feasible ways to address those potential threats of the missile defence system, the New Triad and the weaponization of space. Associated with the coordinated development is probably international image. China's current diplomatic slogan to the international community is "peaceful development and harmonious world" to defuse the China threat theory, and a massive build-up of military arsenals as a countermeasure to those threats will be extremely counter-productive. Nevertheless, if necessary, China would rather run the risk of opprobrium, like the ASAT test in January 2007. A related issue involving the economy for feasible countermeasures is cost-effective consideration. As many Chinese analysts point out, developing a missile defence system is much more costly than an offensive system, let alone the fact that a missile defence system is not a perfect shield. Depending on how cost is calculated, the cost for building a missile defence system is nine to ten times that of an offensive missile system.

The third factor is technology. In general, the United States has technological advantage over China in almost every field, and the DoD's Military Critical Technologies List (MCTL) can serve as an useful index. In the MCTL, more than 6,000 technologies are reviewed, 2,060 are identified as militarily significant, and ultimately, 656 technologies are regarded as militarily critical. A technology-working group, composed of experts from the intelligence and academic community as well as industries, assigns a numerical grade ranging from 0 to 4, to assess the capability of a state's industrial base to produce a specific technology. "0" indicates that a state has no capability or that assessment consensus cannot be reached, and "4" indicates a country is believed to have the production capability in all elements of a technology area.⁴³ In general, in most of the 84 technology areas critical to the development and production of advanced military weapons, China is weak, having all necessary production capabilities only for nuclear weapons and nuclear materials processing. Areas where

⁴² Ji You, "Learning and Catching up: China's RMA Initiative", in Emily Goldman and Thomas Mahnken (eds), *Information Revolution in Military Affairs in Asia*. NY: Palgrave MacMillian, especially p. 99, 2004.

⁴³ For a detailed analysis on the MCTL assessment of China's technological capability, see Bernard D. Cole and Paul H. B. Godwin, "Advanced Military Technology and the PLA: Priorities and Capabilities for the 21st Century", in Larry M. Wortzel (ed), *The Chinese Armed Forces in the 21st Century*. Carlisle, PA: U.S. Army War College Strategic Studies Institute, pp. 159-215, 1999.

China has a majority of production capabilities are in armaments and energetic materials, chemical and biological systems, materials technology, power systems technology, and in theoretical models for signature control technology.

Specifically speaking, technological areas where China has deficiencies are: space sensors and surveillance (for target detection and location, precise navigation), guidance, navigation, and vehicle control, command and control, directed energy systems, information warfare, and information systems. A caveat should be made that in the past decade, China has poured tremendous resources into these areas, which is critical for totally transforming the Chinese military, and some progress should have been made. Under this circumstance, China needs to carefully decide how to make the best available technologies that they have and make responses. China has strengths in nuclear weapons, space propulsion (illustrated by the launch of manned satellites) and rocket, and it seems that China has made progress on command and control (which is evidenced by China's agreement to set up a hotline with the United States), guidance (evidenced by the manned satellites and lunar satellite), and ground-based laser. With these technologies, China should have more options that can help work out many countermeasures.

It is very unlikely for China to build a missile defence system of a scale similar to that of the United States. On the one hand, China will not fall into a trap of arms race on BMD system with the United States. For a long time, Chinese analysts have the perception that the SDI programme under the President Reagan period was a U.S. setup that eventually led to the Soviet Union's collapse because Moscow was lured to conduct an arms race with the United States. Let alone the fact that technology for missile defence is not mature and is extremely expensive to develop, although those technologies can be converted to offensive arms. China will be unlikely to build a massive arsenal of offensive missiles. As stated above, China may perceive the BMD systems, along with the New Triad and space development, as a setup to lure China into an arms race so that China's resources will be completely exhausted on military development. Concern about the China threat theory as a result of a massive build-up by other countries is also likely to be factored into China's consideration.

The fourth one involves the changing nuclear environment in China's neighbouring areas. North Korea's attempt to go nuclear as well as the action and reaction over nuclear development between India and Pakistan after India had tested a nuclear bomb on the ground that China is a threat to India in the summer of 1998, have

added new complexity to China's overall nuclear calculation.⁴⁴ In other words, approach to counter the potential threat brought by the BMD systems, the New Triad and space weaponization, has to be placed in a broader context of non-proliferation, and this is where China and the United States have common ground. A Chinese analyst's remark reflects China's recognition of this common ground, "There is common ground between China and the United States on arms control. This involves not just Sino-U.S. relations, but our national security need...From China's perspective, China is the country faced with the greatest nuclear threat. There is no other country in the world with so many nuclear countries in its neighbouring area, and China is regarded as an opponent by them. Once a nuclear country emerges in the Korea Peninsula, it definitely is a threat to China. If the Islamic world has nuclear capability, it would also threaten China directly."⁴⁵

In general, in formulating China's strategic arms strategy, China needs to balance the four factors: security, economy, technological feasibility and overall non-proliferation environment. It should be a dynamic balance because China needs to weigh those four factors equally.

Possible Roadmap

Making an assessment on the degree and nature of threat is a critical step for formulating policy. After long internal debates⁴⁶ and technological evaluation,⁴⁷ it seems that the Chinese leadership, advised by top notch scientists, have concluded that threat is not imminent, and there is no urgent need to take extreme action in general. The Chinese leadership's assessment on the missile defence system could probably be illustrated by remarks made by some of China's top-notch scientists. It is reported that very senior Chinese scientists told some Americans at a nuclear strategy-related dialogue that they had advised China's leadership to take a "wait and see" approach to

⁴⁴ Zhongchun Wang, "Nuclear Challenges and China's Choices", *China Security*, 3 (1), (Winter 2007). www.wsichina.org/cs5_4.pdf.

⁴⁵ Personal interview with a Chinese scholar in Beijing, March 2003.

⁴⁶ A Chinese interlocutor said that he was invited to attend a meeting on China's nuclear doctrine in 2001 and the meeting was chaired by Gen. Guangkai Xiong, a Deputy Chief of General Chief of Staff in charge of intelligence before his retirement in 2006. Personal exchange with a Chinese scholar, in Boston, Massachusetts, USA (November 2003). American sources also point out that "in the last several years, a critical mass of expertise, experience and political space on nuclear doctrine has emerged within China, and this situation has facilitated detailed internal discussions about China's nuclear security environment, nuclear doctrine and required capabilities". See "Conference on U.S.-China Strategic Nuclear Dynamics", www.csis.org/media/isis/events/060620_china_nuclear_report.pdf, note 18.

⁴⁷ Many magazines/journals published by various defence industries have been made public in the past several years, allowing outsiders to know what the issues are, what is being debated, and how Chinese technological experts assess U.S. weapons.

the changing size of the Chinese nuclear forces in response to U.S. missile defence efforts.⁴⁸

In fact, China's technological experts are closely watching the U.S. BMD development, and they point out many development problems at present stage. For instance, they notice that all tests, which have been undertaken so far, were not operation oriented, because all intercept locations were similar: all intercept missiles were launched from Vandenberg Air Force Base in California towards the Pacific region, intercept point was about 7,500 km from the interceptor launching pad, interceptors were launched 20 minutes after target missiles had been launched, and intercept altitudes were about 230 km.⁴⁹ This pre-set test pattern was more of a sub-system test rather than a fully-operational test, and it has a long way to go for achieving operational capability. They also notice that kill vehicles atop of interceptors have not been used during the tests. Following President Bush's instructions made in December 2002 to begin fielding limited missile defence capabilities, the Missile Defense Agency, which is responsible for developing missile defence system, started to field the initial BMD system by late 2004. The initial capability uses PAC-3, Aegis SM-3 and Ground-based interceptors stationed at Fort Greely, Alaska.

China's research shows that in all the tests so far, no kill vehicles of those being fielded were used to make an intercept test. Even those to be used for test in the future are not real kill vehicles, and they are only about 95% equivalent to real kill vehicle with slower velocity. Real operational test under various contingencies has never been done.⁵⁰ Assessment on the development of missile defence in boost, mid-course, and terminal phases was also made. For boost phase defence, those defence elements including ABL, KEI, and space-based laser, are still in the process of research and development. Progress has been made for the elements of mid-course phase defence, and they have initial capability, but they are not mature yet, and effectiveness cannot be predicted. The THAAD, and particularly, the PAC-3 system already have had substantially progress through participating in the 2003 Iraqi war.⁵¹ In general, at most, the U.S. BMD has initial and limited capability at present, and many are still in the process of development and research, as those experts have observed, while it takes a very long time to make a missile defence system really operationalized.

⁴⁸ "Conference on U.S–China Strategic Nuclear Dynamics", note 18.

⁴⁹ Xin-ren Xia, "Meiguo daodan fangyu xitong de xianzhuan yu fazhan" [U.S. Missile Defense System: Current Status and Development], *Aerospace China*, p. 43 (March 2007).

⁵⁰ Xin-ren Xia, "Meiguo daodan fangyu xitong de xianzhuan yu fazhan", note 46.

⁵¹ Xin-ren Xia, "Meiguo daodan fangyu xitong de xianzhuan yu fazhan", note 46.

It should be noted that China's assessment of the U.S. missile defence system has been very comprehensive, and the advice of the senior Chinese scientists to their political and military leadership was not groundless. This observation is made from thoroughly researching China's public sources, published by various defence industries enterprises and top rank military academies. These include: *Journal of National University of Defense Technology*, *Aerospace China*, *Infrared and Laser Engineering*, *Laser and Infrared*, *Aerospace Electronical Confrontation* (*Hangtian dianzi duikang*), *National Defense Science and Technology* (*Guofang keji*), *Ground-based Air-Defense Weapons* (*Dimian fangkong wuqi*), and *Ballistic Missile and Aerospace Carrier Technology* (*Daodan yu hangtian yunzai jishu*). A variety of technological issues are covered in these public sources. They range from ballistic missile spinning, obtaining of information by ballistic missile defence, counter- and counter counter-measures of radars in missile penetration, high-power laser's destruction capability against ballistic missile, technological development of infrared system of the BMD, network system of missile defence, and anti-air radar development of the United States.

With regard to the nature of threat, it seems that China does not perceive a nuclear exchange in the short term. This perception can be observed in *China's National Defense in 2006*, which, in the section of National Defense Policy, says "The PLA ensures that it is well prepared for military struggle, with winning *local wars* (emphasis added) under conditions of informationization and enhancing national sovereignty, security and interests of development as its objective."⁵² "Local war" is China's variant term of "limited war" in western countries. It means a war in which limited means by those directly involved are employed for achieving limited political goal, and the area involved is confined. It is very likely and very frequently that high-tech or "informationized" weapons are employed in local wars, as many Chinese analysts have observed.

China's perception can also be reflected in another statement with regard to overall security environment in the defence white paper. It says, "World peace and security face more opportunities than challenges. The world is at a critical stage, moving towards multi-polarity. Progress is expected in addressing the serious imbalances in the international strategic alignment. The major international forces compete with and hold each other in check. But, they also maintain coordination and practical cooperation in their mutual relationships, and draw on each other's strengths."⁵³

⁵² *China's National Defense in 2006*, Section 2, National Defense Policy, english.pladaily.com.cn/site2/special-reports/2007-01/15/content_706615.htm.

⁵³ *China's National Defense in 2006*, Section 1, "The security environment".

The above statement can be interpreted in several ways. World peace can be expected because no war is likely to erupt among major powers, and risk for a nuclear exchange among these powers is low. As the United States continues to be swamped with wars in Afghanistan and Iraq, the U.S. comprehensive national strength has been spread thin, and imbalance in the international strategic alignment can be somewhat addressed. The United States, instead of adopting unilateralism, would have to coordinate with other international actors for addressing urgent international issues. In brief, China perceives that the United States is somewhat constrained.

Nuclear Force and Nuclear Doctrine

Put together, the abovementioned factors are to shape China's nuclear force structure and related nuclear doctrine. Public source shows a *trend* that China basically adopts a modest, but critical step, placing priority on developing new survival and credible capability rather than a numerically massive expansion of its strategic force. Figures in the London-based International Institute of Strategic Studies (IISS) published *The Military Balance* reflect this trend. The table in the next page shows that as of 2007, increase in ground-based strategic nuclear weapons is rather limited. DF-5A numbers around 20; DF-31, 6; DF-4, 20. The first generation Xia class 092 SSBN remains to be the backbone of sea-based deterrent. Number of short-range ballistic missiles, including DF-15 and DF-11, has increased substantially in the past decade.

Some caveats need to be heeded. The first and foremost, is that, as accused by some countries, China has never disclosed its nuclear force size and structure, and there is no way to verify information carried by *The Military Balance*. Also, it is likely that many of the referees of *The Military Balance* could be misled or misinformed in one way or another. Thirdly, the time frame factor should be considered, and the likelihood for China to massively increase its number of nuclear weapons cannot be excluded in the future as China perceives more imminent threat. Therefore, Table 1 reflects only some "trend" of China's strategic weapons.

Table 1: China's Missile Deployment Tendency, 1993–2007

	DF-5/ DF-5A	DF-31	DF-4	DF-3/ DF-3A	DF-21	DF-15	DF-11	DF-7
1993–94	4		10	60				

1994–95	4		10	60+				
1995–96	7		10+	60+	ε10			
1996–97	7		10+	60+	ε10			
1997–98	7		10+	38+	ε8	4		
1998–99	7		10+	38+	ε8	4		
1999–2000	15–20		20+	38+	ε8	150		
2000–01	20+		20+	30+	50+	200		
2001–02	20+	1 brigade	20+	60–80	50	160	175	
2002–03	20+	1 brigade	20+	60–80	50	160	175	
2003–04	24	8	20	32	60	<100	<200	450
2004–05	24	8	20	32	60	24 launchers	32 launchers	30
2005–06	20	6	20	2	33	225	500	
2006	20	6	20	2	33	225	500	
2007	20	6	20	2	33	225	500	

Source: *The Military Balance* (London: Brassey's, various years)

Notes:

1. The recently reported new Jin-class 094 SSBN, which is armed with 12 JL-2 SLBMs with a range around 10,000 kilometres, is not listed in *The Military Balance*.
2. It was reported that all DF-5A ICBMs have been MIRV tested, while DF-31 is ground mobile.

Interestingly, a report released one year ago echoed the IISS's figures. Titled *Chinese Nuclear Forces and U.S. Nuclear War Planning*, the report says the DoD has exaggerated China's nuclear capability with a purpose to justify buying new generation of weapons. The report estimates that China's nuclear stockpile number around 200 warheads, and by 2015 after deploying new generation of ballistic missiles, the figure would go up to 220 warheads. China has about 20 ICBMs and by 2015, the number may rise to 75. None of China's long range nuclear forces are believed to be on alert, and by 2015, some of its long-range missiles might deploy with their warheads mated but be incapable of quickly launching on warning. China's sole SSBN has never gone on patrol, while it will take much time for the new SSBN to develop operational and tactical skill and procedures.⁵⁴

China's development and deployment of its second generation Jin-class 094 SSBNs is one indicator in this direction.⁵⁵ It seems that China has deployed at least two 094 SSBNs which each carries 12 JL-2 SLBMs with a range around 10,000 kilometres.

⁵⁴ Hans M. Kristensen, Robert S. Norris, and Matthew G. McKinzie, *Chinese Nuclear Forces and U.S. Nuclear War Planning*, November 2006. www.fas.org/nuke/guide/china/Book2006.pdf.

⁵⁵ The Federation of American Scientists website carries recent satellite photos of this submarine. www.fas.org/blog/ssp/2007/10/two_more_chinese_ssbn_spotted.php.

Some puzzles remain, however. These include how many more of this type of submarines will be produced and deployed? How will this submarine be deployed in sea? And is it a MIRVed warhead? Nevertheless, this submarine should provide China credible and survivable capability able to launch a retaliation strike. Another indicator to observe is the DF-31. It reportedly is a solid fuel missile, and can be mobile launched with a range around 10,000 kilometres. Its warhead is reportedly designed to be mixed with a decoy so that it can penetrate missile defence systems. Some confusion remains: China has yet to test the DF-31 to the full range reported by the DOD, and if it is equipped with a MIRVed warhead.⁵⁶

The third indicator is the controversial ASAT test. On the one hand, China was probably extremely impressed by the U.S. military using satellite communication, reconnaissance/surveillance, precision positioning and navigation capabilities in the wars that the United States was involved since the 1991 Gulf War. On the other hand, nevertheless, Chinese military also has noted the completely dependence of the U.S. military forces on those space assets, and this total dependence has become the United States' Achilles heel.

Although China's space capability as a whole is no match to that of the United States, its growing space capability, which can be illustrated from the launch of manned and lunar satellites, can ensure China's ability to launch countermeasure. After more than four decades of practical development experience, China has accumulated sufficient experience on tracking and targeting satellites. Further, China is developing low cost and easily-manufactured small and micro-satellites which can be used for ASAT mission,⁵⁷ and progress has been made. The programme started in 1998 and was executed by China's Tsinghua University under the sponsorship of the Chinese government. In July 1999, Tsinghua University sought technological collaboration with Surrey University of England to jointly develop a small satellite. The joint product, a 50-kg experiment micro-satellite with a 40-meter resolution, was completed in 2000, and launched into space in June 2000. Later, Tsinghua indigenously developed a smaller 25 kg micro-satellite, which was launched into space on 18 April 2004. Tsinghua is reported to be developing a micro-electric mechanic satellite of less than 5

⁵⁶ "China test launches new ballistic missile",

www.fas.org/blog/ssp/2006/09/china_testlaunches_new_ballist.php.

⁵⁷ Ying Tianxing, "Zhonggong zhongdian daxue jiji yanfa xiaoweixing weixing zhi yanxi" [Study on China's Top University actively developing small and micro satellites]; *Zhonggong yanjiu* [Studies on Chinese Communism] (Taipei), 39 (3) pp. 107–117 (March 2005); "Zhongguo 2010 nian zhicheng xiaoyunzai huojian fuzhe fashe xiaoweixing" [By 2010, China will produce a small carrier rocket for launching small satellites], *zhongshi wanbao* [China Times Evening], 1 November 2006, and *Military Power of the People's Republic of China* 2006.

www.defenselink.mil/pubs/pdfs/China%20Report%202006.pdf

kilograms now.

A fourth tool for the ASAT mission is laser. China reportedly has made progress in laser development, and has tried to test its capability by blinding against U.S. satellites. *Defense News* says, “China has fired high-power lasers at U.S. spy satellites flying over its territory in what experts see as a test of Chinese ability to blind the spacecraft, according to sources.”⁵⁸ U.S. Department of Defense’s *Military Power of the People’s Republic of China 2006* also points out China’s development in this regard: “...At least one of the satellite attack system appears to be a ground-based laser designed to damage or blind imaging satellites.”⁵⁹ The U.S. Department of Defense’s *Military Power of the People’s Republic of China 2006* has sent a warning that China has had ASAT capability. The report says, “Beijing continues to pursue an offensive anti-satellite system. China can currently destroy or disable satellites only by launching a ballistic missile or space launch a vehicle armed with a nuclear weapon... Evidence exists that China is improving its situational awareness in space, which will give it the ability to track and identify most satellites...”⁶⁰

If the above analysis is correct, it implies that what China has attempted to do is to develop a limited capability able to survive an adversary’s first strike and launch a counterattack/retaliation. With limited amount of nuclear weapons and less advanced command, control and navigation capability, it is unlikely for China to launch first nuclear strike, as China has reiterated that no first use remains its fundamental nuclear policy.⁶¹ To some extent, China’s nuclear capability has been enhanced, and credible minimum deterrence has been gradually accomplished in the past decade. On the one hand, entering the service of the mobile and solid fuel propellant-equipped DF-31 and the more stealth 094 SSBNs has made the United States difficult to target and detect. On the other hand, the progress on “strategic modernization”,⁶² which includes modernization on command, control, communication, intelligence as well as reconnaissance and surveillance systems will enable the Chinese to have fully control of its nuclear forces. The ASAT capability should help enhance China’s nuclear security. Although micro-satellites and laser could not take U.S. civilian assets as hostage, they

⁵⁸ “China Attempted to Blind U.S. Satellites with Laser”.
www.defensenews.com/story.php?F=2121111&C=america.

⁵⁹ *Military Power of the People’s Republic of China 2006*,
www.defenselink.mil/pubs/pdfs/China%20Report%202006.pdf.

⁶⁰ *Military Power of the People’s Republic of China 2006*,
www.defenselink.mil/pubs/pdfs/China%20Report%202006.pdf.

⁶¹ For China’s official version of its nuclear strategy, see *China’s National Defense in 2006*, Section 2, National Defense Policy. english.pladaily.com.cn/site2/special-reports/2007-01/15/content_706615.htm.

⁶² This term borrows from Mark Stokes, *China’s Strategic Modernization: Implications for the United States*. Carlisle, PA: U.S. Army War College Strategic Studies Institute, 1999.

can ruin the United States' space assets without directly killing people.

It is difficult to estimate the size of China's nuclear arsenal, and a couple of factors serve as a hurdle. The first one is the uncertainty of the U.S. NMD systems deployed in the East Asia. On the one hand, technology breakthrough may occur, and the United States has reiterated that the technological development of a missile defence system will be an on-going process so that the effectiveness of the defence system can be improved and upgraded as time goes by. On the other hand, missile defence re-deployment by Aegis warships can be made rapidly. Eventually, one hundred ground-based interceptors will be deployed in the Fort Greely base of Alaska. However, the capability of the Aegis missile defence system using SM-3 will be upgraded to be able to intercept long-range missiles. Aegis warships can be deployed around the world, and, in case of need, can be re-deployed in the Northeast Asian region. China's response has to bring these substantially increased interceptors into consideration. Further, space-based interceptors, which should be more capable in destroying boost phase missile, are being researched at present, and it will cause much serious problems for China's long-range missile in the future. We do not know how China calculates the survivability rate of its long-range missile. This includes, at least, two elements. It is very likely for China to harden its missile silos amid the United States' effort to develop bunker buster warheads. It is also likely for China to extend as wide as possible the mobile range of the mobile long-range missile to increase its survivability.

Under this circumstance, China has to keep flexibility in considering its countermeasures. The flexibility includes two aspects: number of strategic weapons and options of means, and these two aspects are complementary each other. The more options that China possesses, the more confident China will be, and the less dependent on the number of strategic weapons. In other words, if China possesses more effective options, it will be less likely for China to quantitatively build a large stockpile of strategic weapons. For a long time, China's nuclear doctrine has been portrayed as minimum deterrence, although the Chinese military has never revealed its official nuclear doctrine,⁶³ and Chinese strategists have different views on their country's nuclear doctrine.⁶⁴ It means that China keeps a minimum amount of nuclear arsenals, a small stockpile only able to undertake counter-value retaliation for deterring an

⁶³ China only says that it remains firmly committed to the policy of "no first use" of nuclear weapons at any time and under any circumstances, upholds the principles of counterattack in self-defence and limited development of nuclear weapons, and maintains a credible nuclear deterrent force. *China's National Defense in 2006*, Section 2, National Defense Policy, english.pladaily.com.cn/site2/special-reports/2007-01/15/content_706615.htm.

⁶⁴ For a recent effort on rigorously discussing China's nuclear doctrine, see Bin Li, "Understanding China's Nuclear Strategy", *World Economics and Politics*, No. 9, pp.16–22 (2006).

adversary country from launching first strike after absorbing the first strike. China's doctrine is different from that of France on one point, and that is to deliberately keep the number of its nuclear weapons in secrecy. It is not difficult to project the reason for doing so: it attempts to create an uncertainty in adversary's mind so that adversary behaviour can be manipulated. This strategy is in line with traditional strategist Zi Sun's strategy of concealment, and to some extent, China has been successfully in executing this strategy. This difference leads someone to portray China's nuclear doctrine as "counter strategy".⁶⁵ This school of thought, by emphasizing psychological manipulation instead of the real capability to retaliate, argues that what made China successful in deterring potential adversaries during the Cold War era from launching first-strike, was that China was able to successfully manipulate those adversaries' psychological behaviour by creating uncertainty in their calculation, along with the reiterated policy of "no first use".

One puzzle that the Chinese military has never offered any official interpretation is the "no first use" policy, and it is particularly the case if this policy is tied to minimum deterrence. This policy had been formally announced since China's first atomic bomb test in 1964, and it served to assuage adversaries' concern when China first tested the bomb so that the adversaries would not launch strike to destroy China's newly built capability. However, as China's capability on command, control, communication and intelligence have substantially improved in the past decade, would China flexibly interpret the "no first use" policy so that China flexibly deals with an adversary's action? The Chinese military has deliberately continued to keep this vague.

Policy Implications for Asia

There is no doubt that the United States and China is entering a period of arms competition, if not arms race. If military is an extension of politics, this competition actually reflects a complex political relationship between the two countries in the post-Cold War era. The United States is wary of China's continuous growth, portraying China, along with Russia, as a country on a cross road, and attempting to constrain, if not contain, China. China, on the other hand, envisions a rare opportunity to restore its glorious past as the regional, if not global, power, an aspiration long awaited by China.

⁶⁵ Chong-pin Lin, *China's Nuclear Weapons Strategy: Tradition Within Evolution* (Lexington, MA: Lexington Books, June 1988).

U.S. policies create a contrasting view between the two countries. The United States' determination to develop and deploy a missile defence system, the New Triad and the perceived determination of the United States to dominate and control space have given China a perception that the United States' effort has China as the target.⁶⁶ China has to make necessary response, thus resulting in the competition. This competition will leave this region in uncertainty. The United States' diplomatic move has reinforced China's perception. The strengthened U.S.-Japan security relations,⁶⁷ Japan's decision to join the U.S. missile defence systems,⁶⁸ and Japan's growing security role have heightened China's concern. China has been concerned that in a regional conflict involving the Taiwan issue, Japan is likely to assist the U.S. and be involved in a Taiwan Strait crisis, and would possibly help intercept China's long-range missiles towards the United States.⁶⁹

China's policy of placing priority on developing new survival and credible capability rather than a numerically massive expansion of its strategic force may slow down, if not halt, the competition. It would, to some extent, help reduce the voice of the China threat theory, giving less rationale to the United States for more rapid and massive investment in both offensive and defensive strategic systems. However, China tried to send a clear message to the United States. China is determined to defend its core interest, and will develop a capability able to neutralize the United States' intimidation, and to thwart U.S. action, if necessary. The January 2007 launch of a missile to shoot down its own aging weather satellite should exactly serve this goal. It seems that likelihood for the competition to be escalated is low in the near future. Politically, as President Bush's term is coming to an end, the influence of the ultra conservatives, who advocate the spending of more resources on arms build-up, and putting aside arms control mechanism, has declined. On the other hand, Congress has been dominated by the Democrats since the 2006 election, and it is expected a Democrat will win the presidential election in 2008. Democrats tend to value arms control mechanisms, and the missile defence system programme is likely to slow down if the Democrats have full control of the U.S. government.

Progress in the diplomatic front also shows good signs. North Korea's nuclear and

⁶⁶ In fact, Kristensen, Norris and McKinzie's report point out that the United States does have China as its target. See Kristensen, Norris and McKinzie, *Chinese Nuclear Forces and U.S. Nuclear War Planning*. Note 51.

⁶⁷ There is no doubt that China's missile test in the 1995–96 Taiwan Strait crisis served as a catalyst for the U.S.–Japan security arrangements. The point is action and reaction.

⁶⁸ For a comprehensive analysis on Japan's cooperation with the United States over BMD, see Richard P. Cronin, "Japan–U.S. Cooperation on Ballistic Missile Defense: Issues and Prospects", CRS Report for Congress, 19 March 2002. fpc.state.gov/documents/organization/9186.pdf.

⁶⁹ This involves collective defence, and has not been endorsed by the Japanese government.

missile programmes have served as the major rationale for Japan to strengthen its security relations with the United States, and make Japan decide to join the United States' missile defence system. North Korea's agreement to dismantle its nuclear facility, to some extent, can help reduce, if not totally eliminate, Japan's anxiety. Technological hurdles for BMD systems remain serious. Unless there is some unexpected technological breakthrough, serious technological hurdles need to be overcome, as pointed out by Chinese experts, before a really operational capability can be built up. It is estimated that it would take ten years to make initial capability fully operational. A caveat should be kept in mind. It is unlikely and unrealistic to completely terminate the U.S. missile defence programme, as can be evidenced from the history of missile defence-related development programme ranging from the ABM Treaty, the SDI programme of President Reagan period, President (Senior) Bush's Global Protection against Limited Strike (GPALS), to President Clinton's Theater Missile Defense and National Missile Defense programmes. As long as technological development advances, call for developing missile defence-related programmes will arise. Of utmost concerned should be not to trigger another round of arms race.

Finally, the willingness on both sides to have a dialogue is likely to facilitate some arrangement in the future. For instance, the U.S. side found a sharp difference in perception with regard to the New Triad in which, for the United States, the value assigned to nuclear weapons is reduced and the value of strategic defence and non-nuclear strike capabilities is augmented, while China has perceived that the United States' goal is to eliminate China's nuclear deterrent capability.⁷⁰ China's willingness to have a dialogue with the United States over strategic weapons-related issues is rising. There is no doubt that many chronic differences remain between the United States and China. Nevertheless, there is a gradual shift in China's behaviour indicating that China is increasingly willing to discuss nuclear weapons and doctrine with the United States as a result of an improved atmosphere between the two sides and the increasing recognition on the Chinese side of the dangers of mutual misperceptions on nuclear questions during a crisis.⁷¹ China's willingness can be evidenced from agreements reached between China and the United States recently. In Secretary Robert Gates' November 2007 visit to China, both sides agreed to set up a hotline for crisis communication, and to have a dialogue on nuclear weapon issues, along with others,

⁷⁰ "Conference on U.S.-China Strategic Nuclear Dynamics", www.csis.org/media/isis/events/060620_china_nuclear_report.pdf, note 18.

⁷¹ "Conference on U.S.-China Strategic Nuclear Dynamics", www.csis.org/media/isis/events/060620_china_nuclear_report.pdf, note 18. A potential crisis in the near future is the Taiwan issue in which Taiwan President Chen Shui-bian recently undertook a political campaign advocating joining the United Nations in Taiwan's name. China regards this move as a major step towards de jure Taiwan independence.

although no timetable was set.

All these political and diplomatic development will contribute to better manage the competition between the two countries in the future. It is not realistic to expect that the two countries can initiate formal arms control-related negotiations and reach an agreement on disarmament, due to long-established mutual distrust and differing views on the related issues, but initiating a dialogue on this field is definitely a good beginning, helping manage their competition and helping to stabilize the region.

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