

The Impact of US Regional and Global Nuclear Policies on China

-- A Strategic Perspective

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Global disarmament is now experiencing a depression after it had great progress in the early and mid 1990s. The US, as a sole superpower in the world today, has a decisive influence in forging the global disarmament pattern and pace. China is the only formal nuclear states in East Asia. To better understand the dynamics in the process of global and East Asian nuclear disarmament, we need to pay special attention to the impact of the US nuclear policies on China.

The US nuclear policies have some complicated connotations in the context of China. As the US is a global power and has many security concerns, China may not be a major factor in making most US nuclear policies. Some US nuclear policies, for example, the US-Soviet (Russia) strategic nuclear reductions agreements were not designed for China, but they may have some side effects on China. Some US policies, for example, missile defense, are relevant to China but the weight of China in the US intention is not clear. Only a few policies are specially aimed at China. This paper does not try to guess the intentions behind the US policies. Instead, it takes an approach of strategic analysis and mainly focuses on the strategic impacts of the US nuclear policies on China.

A policy of one country could have impacts on another country in many different areas in many ways. Strategic analysis pays attention to the major direct impacts of military move of one country on the military security of another country. This approach defines the security structure between two countries by comparing the elements and configurations of their military arsenals. It is different from political approach that pays more attention to the security policy-making process. So strategic analysis is good at providing rational paths for countries to avoid falling into serious conflicts and political analysis is good at changing policy by making use of the influences of different decision-makers. Strategic approach is always used to analyze nuclear issues because the results of nuclear exchanges are much more explicit than conventional wars.

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This approach was a leading school in analyzing the US-Soviet relations in the cold war and provided some useful insights on their nuclear relations.

Unlike the US-Soviet relations in the cold war, the Sino-US relations in nuclear area are not a number one issue in the overall Sino-US relations, which have many other important elements: economical, political and cultural elements. Nuclear weapons could become very important in the Sino-US context only when the overall relations become very bad. So, the strategic analysis in this paper outlines the bottom lines of Sino-US security relations. The analysis does not necessarily represent the full panorama of the overall Sino-US relations of today. But we expect that it would provide useful insights for preventing Sino-US conflicts from escalating and that it would provide policy recommendations in promoting Sino-US cooperation on nuclear disarmament and nonproliferation in East Asia and globally.

The Sino-US relations in the area of nuclear weapons have two major components: cooperative and rivalry. The cooperative component includes the cooperation of the two countries on nuclear nonproliferation and anti-terrorism in nuclear area, and the technical and personnel exchanges between their nuclear complexes. The rivalry component refers to the contrariety of their nuclear forces. This paper focuses only on the rivalry component. This does not suggest that the cooperative component is not important. Contrarily, the cooperative component, for example, the Sino-US cooperation on North Korea nuclear issue, has been growing in recent years and it may play important roles in shaping the overall Sino-US relations. The definition of the scope of the paper in this way is based on the philosophy in exploring the bottom line of the Sino-US nuclear relations.

1. Security Background Before and After the End of Cold War

After World War II, the whole world including East Asia was originally divided into two major camps, respectively led by the former Soviet Union and the US. The security situation in Asia began to change as the Sino-Soviet relations broke. Before the end of the cold war, the Asian security structure had three noticeable characteristics. First, the Soviet Union deployed heavy military forces on the Sino-Soviet and Sino-Mongolian borders to pose pressure on China. It added a new military confrontation to the cold war confrontation between the US and the former Soviet Union and their allies. Second, China was on the US side on almost all security issues except Korea issue, for example, on the issues of Cambodian and Afghanistan Wars. As Japan and the US also need China in countering the Soviet threats, they adjusted their China policies and sequentially normalized their relations with China. The US withdrew its military force on Taiwan and committed to cut its military sale to Taiwan as steps in improving Sino-US relations. In nuclear area, the US partially dropped China from its nuclear targeting plan. China's cooperation with western countries was quickly extended from security to economic, social and cultural areas. This laid a very broad basis to stabilize China's relations with Japan and US after the cold war. Third, Korean Peninsula was the only place that kept the cold war security structure before the end of the cold war but the alliance structures on the two sides were also very different. The US security commitments to South Korea were much stronger and visible than

those made by the former Soviet Union and China to North Korea in the later period of the cold war. So North Korea relied more on self-help for its security comparing to South Korea and this made the Soviet Union and China have very limited influence on North Korea's security policies.

The end of the cold war again dramatically changed the security structure in Asia. The core change is that Russia stopped its military rivalry with the US and stopped its military expansion. This led to the following three other big changes in Asia. First, the disintegration of the former Soviet Union was another prickly to North Korea after China and South Korea got close to each other. North Korea lost its confidence in military alliances and instead relied more on self-help in dealing with the US military pressure. This led more efforts in North Korea in acquiring missile and nuclear capabilities. Second, the US and Japan no longer felt that they need Chinese help in countering the Soviet threat and therefore lose their original interests in cooperating with China. However, they had had so many economic, cultural and educational exchanges with China and this added new interests for the US, Japan and China to promote their relations. Third, the end of the cold war led to some significant adjustments of the US nuclear policies. The details in the changes will be discussed in the next section.

The end of the cold war suddenly brought the US extra military resources and this led to intensive domestic debates between two schools in the US on how to utilize the dividend of peace. The liberal school suggested to reduce the huge US military machine that was designed for fighting the cold war and this would enhance the US security by reducing the risk of nuclear war and nuclear proliferation.¹ The conservative school suggested to give up arms control agreements that may constrain the US flexibility of military buildup and the US can deter or defeat any attempt of other countries in competing with the US in developing military strengths in an environment of no arms control². A third driving force in the security policy-making comes from defense interest groups. The military and the defense industry that were built in the cold war need to keep their jobs in a new security environment. As the US nuclear policies are always compromises of the above three players, sometimes we cannot easily explicitly identify the intentions of a policy. So the paper mainly examines the consequences rather than origins of the policies.

2. Evolution of US Nuclear Policies

The evolution of the US nuclear policies after the cold war can be divided into two phases. In the first phase the liberal school had dominant influence and the US adopted very active arms control policy. This phase ended in later 1990s when the influence of conservative school grew up. The US lost its interests in arms control in this phase and it began to abandon arms control quickly after President Bush entered white house. The history and the latest changes of the US global nuclear policies are summarized in the following four areas in this section and the first two are more relevant to strategic weapons.

(1) Strategic weapons

Offensive strategic weapons in the US and Russian nuclear arsenals traditionally include Inter-Continental Ballistic Missiles (ICBMs), Submarine-Launched Ballistic Missiles (SLBMs) and Strategic Bombers and they constitute the core part of strategic weapons. This structure is sometimes referred as to triad of strategic weapons. Some other elements, for example, strategic missile defense systems, also belong to strategic weapons, but they are not yet operationally as important as the triad and will be discussed below separately. The US was very active in pushing forward strategic nuclear reductions in the early 1990s. During this period, the US and the successors of the former Soviet Union ratified the Strategic Arms Reduction Treaty (START I),³ which cuts the number of nuclear warheads on deployed strategic weapons of both side to 6000; the US and Russia signed START II, which cuts the nuclear warheads on deployed strategic weapons of both side to 3000 to 3500 and reduces Multiple Independently-Targeting Re-entry Vehicles (MIRVs) on ICBMs to single warheads.⁴ In the second half of 1990s, the US-Russian strategic nuclear reductions began to have troubles because of US development of missile defense and other security problems, for example, the NATO expansion. START II treaty went to its end in 2002 as a Russian response to the US withdrawal of the Anti-Ballistic Missile (ABM) Treaty. In 2003, the US and Russia signed a new agreement, Treaty on Strategic Offensive Reductions (Moscow Treaty). This treaty calls for reductions of nuclear warheads on operationally deployed strategic weapons of both sides to 1700-2200 by December 31, 2012.⁵ As the American conservative school, which has a leading influence now, does not like treaty-based arms control, Moscow Treaty is very short and has no implementation arrangements. In the past US-Soviet (Russia) strategic arms control, strategic stabilities⁶ had been a core goal to reduce the risk of nuclear war and to prevent nuclear arms races. However, the latest changes in this area actually departed from strategic stabilities, for example, the legal constraints on missile defense and MIRVs were abandoned due to the ends of the ABM and START II treaties. The conservative school believes that strategic stabilities are a cold-war concept which is no longer important because the nature of the overall US-Russia relation is different. Some analysis suggests that the US could conduct very deep strategic reductions in the security environment of post-cold war and the US should make the reductions irreversible.⁷ But it seems that the US government is reluctant to do so and the arguments include that future threats are more unpredictable and the operational factors should be taken into account.⁸ In the public version Nuclear Posture Review (NPR) of 2002,⁹ some new ideas are applied. First, the US nuclear force is based on the US capabilities rather than the need to counter defined threats. In another words, the US would keep a nuclear force large enough as long as it can afford it. Second, strategic missile defenses and the infrastructure to re-enlarging US nuclear forces are parallel to its offensive strategic nuclear forces. Third, conventional strike capabilities are added to US offensive strategic weapons.

A classified version of NPR was leaked later and its contents are more aggressive.¹⁰ The classified NPR defines China as one of the seven target countries. Actually, the US re-targeted China in about 1998-1999 when the two countries signed their de-targeting agreement.¹¹ NPR also lists the military confrontation over Taiwan as a contingency in which the US may consider use of its nuclear weapons. This document also decides to develop capability to attack mobile targets, including mobile ICBMs. One approach to improve this capability is to develop sensors that can rapidly and accurately locate and track mobile targets. The second approach is to deploy killing vehicles closer to the targets, for example, sending submarines close to the targets and

deploying space-based weapons. After the cold war, the US did re-locate some of its strategic submarines from Atlantic Ocean to Pacific Ocean.¹²

In summary, three main changes have happened to the US strategic weapons. First, strategic stabilities are no longer a guided goal in ruining US strategic nuclear force. Second, the size of the deployed US strategic nuclear force is shrinking without enforceable arms control agreement. Third, some other elements besides strategic nuclear offensive weapons are increasing their roles in US strategic nuclear force.

(2) Ballistic missile defense

The development of ballistic missile defenses (BMD) has been another major security issue around the end of the cold war. In 1983, Strategic Defense Initiative (SDI) was proposed in the US to develop layered strategic missile defense systems in the space and air based on directed-energy and kinetic energy technologies. After a few years, the SDI program had to be cut for two reasons. First, the political incentives declined because the US-Soviet relations were improved; and second, the technologies were proved to be immature. In the senior Bush Administration, a smaller system, Global Protection against Limited Strike (GPALS) based on space-base kinetic weapon technology, was proposed to replace the initial SDI plan. In the first Clinton Administration, the main rhythm of missile defense is the development of Theater Missile Defense (TMD) for intercepting missiles with ranges up to 3000 kilometers. To allow TMD development, the US negotiated with Russia on the demarcation between TMD and strategic missile defense limited by the ABM treaty. But the republicans were not satisfied with TMD and asked for the development of National Missile Defense (NMD) system that is for defending the whole US territory against strategic missiles. The deployment of a NMD system violates the ABM treaty. In the US, there had been intensive domestic debates on the roles of ABM treaty and NMD deployment.¹³ The NMD advocates believe that missile threats to the US are growing and traditional deterrence strategy can not counter these threats. They argue that NMD deployment will not change the Russian and Chinese nuclear policies, so the Russian and Chinese responses should not be taken into account. The opponents believe that a NMD system will not work in a real world and they worry about the political and strategic costs of NMD in damaging global arms control regimes. In international debates, the overwhelming voices were preserving the ABM treaty, which can be observed in the votes on calls for preserving the ABM treaty at the United Nations (UN) General Assembly in 1999 and 2000. However, all these did not prevent President Bush from announcing the withdrawal of ABM treaty in the end of 2001. The treaty ended half-year later and it led to two direct consequences: the legal bound over NMD was lost and the START II treaty died.

The basic ideas of the Bush Administration on missile defense include the following three points. First, the difference between TMD and NMD is no longer a question; second, the system will be layered; and third, all options, land-, sea-, air- and space-based missile defense are all in considerations. Among the four options of strategic missile defenses, land and sea-based are more mature than air- and space-based systems.¹⁴

(3) Tactical weapons

The US deployed about 2600 tactical nuclear weapons in South Korea and Japan in the cold war, which was part of the cold-war nuclear confrontation in East Asia. As the overall relations between the US and the former Soviet Union were improved in the early 1990s, President senior Bush made an announcement to withdraw the major part of its tactical weapons worldwide and to dismantle most of these weapons. This initiative got very positive feedback from the Soviet leaders and Russian leaders later on.¹⁵ Since then, tactical nuclear weapons have been reduced in the US and Russia without any treaty requirements.¹⁶

In recent years, the interests in tactical nuclear weapons and the notion of nuclear war-fighting have been revived in the US. The Nuclear Posture Review in 2002 calls for developing capabilities in defeating hard and deeply buried targets with nuclear weapons.¹⁷

(4) Nuclear nonproliferation

The US was very active in promoting global and regional nuclear nonproliferation by developing and strengthening arms control agreements and institutions. It played a leading role in concluding the Comprehensive Test Ban Treaty (CTBT) and pushed very hard for the unlimited extension of the Nuclear Non-Proliferation Treaty (NPT). In Asia, the US signed Framework Agreement with North Korea in 1994¹⁸ to freeze North Korea nuclear programs and supported Mongolia's Single-State Nuclear-Weapon-Free Zone¹⁹. The US also expanded and strengthened US-led export control regimes, for example, the Nuclear Supplier's Group and Missile Technology Control Regime.

In recent years, the US is shifting its nonproliferation policy from constraining proliferation by international regimes to stopping proliferation by preventing wars. The junior Bush Administration is no longer interested in arms control treaties curbing nuclear proliferation, for example, CTBT. Its idea of eliminating proliferation threats through military preemption instead of arms control is fully embodied in the guiding document of the Bush administration, the new U.S. National Security Strategy (NSS).²⁰ This document formally announces that the United States will use military preemption to stop proliferation. Military preemption at this stage could be caused by false alert or could be abused by incautious decisions. For example, no evidence has been found to support the Bush administration's claims about Iraqi programs of weapons of mass destruction.

3. Impacts of US Nuclear Policies on Sino-US Strategic Stabilities

As explained in sections 2 and 3, there have been some significant changes in the US nuclear policies and overall security policies as well since the end of the cold war. To explore how these

changes impact the strategic stabilities between the US and China, we need first examine how the Chinese nuclear deterrence works.

(1) The evolution of Chinese nuclear deterrent capabilities

The discussions in this subsection are all in Sino-US context. In 1980s and in the first half of 1990s, the Chinese and US nuclear forces were not so hostile to each other from political perspective and mutual deterrence is not an accurate description about the nature of Sino-US nuclear relations during that period. The analysis here is based only on capabilities.

The goal of the Chinese nuclear development is to defend its vital security interests by countering possible nuclear blackmail. China worries that its vital security interests would be offended by other countries when they are encouraged by possessing nuclear weapons. It expects that its nuclear arsenal would discourage the use of nuclear weapons or the threat of using nuclear weapons against China.

China began to develop nuclear weapons in later 1950s and its nuclear development may be divided into three stages. In the first stage, China had only a symbolic or existential nuclear deterrence. In the Sino-US context, this stage lasted until 1980 when China acquired the capability of launching ICBMs. After that, the Chinese nuclear deterrent capabilities entered into the second stage in which the deterrence is based on the quantitative ambiguity of its nuclear force.

It is widely believed that China has about twenty liquid-fuel silo-based ICBMs that can reach the U.S. since the last two decades. The two dozen land-based ICBMs that have been detected and located by the U.S. intelligence would have very little chance of surviving a U.S. preemptive nuclear strike. However, because China has neither confirmed nor denied any outside estimates about the size of its long-range nuclear force, it is difficult for the U.S. to rule out some errors in its estimate. If the U.S. considers launching a preemptive nuclear strike against China, it would understand that it may not know the exact number of the Chinese ICBMs. It may have some confidence that it could destroy all the two dozen detected Chinese ICBMs in a preemptive strike, but it would have to worry about a Chinese nuclear retaliation with a few undetected ICBMs. Such a worry would discourage and deter the U.S. from attempting a nuclear strike against China.

The total number of the Chinese ICBMs does not make direct contribution to the Chinese nuclear deterrent capabilities because multiplying this number does not increase the strength of the deterrence. The error or uncertainty of the American estimate about the size of the Chinese long-range nuclear force forms the perceived Chinese retaliatory capability in the U.S. and the scope of this uncertainty or error is directly relevant to the credibility of Chinese deterrence.

The above discussion shows that the nature of the Chinese minimum nuclear deterrence is quite different from that of the other nuclear states. In its current stage, the Chinese minimum nuclear deterrence comes from the quantitative ambiguity of its nuclear force. As long as this uncertainty is larger than a few ICBMs, the deterrence should be stable. Now, Chinese nuclear

deterrence is entering a third stage, in which China will have credible and visible minimum nuclear deterrence meaning that the Chinese long-range nuclear force could not be saturated by a U.S. preemptive strike. At least a few Chinese ICBMs or Submarine-Launched Ballistic Missiles (SLBMs) would be able to survive a U.S. preemptive strike and could be used in a retaliatory strike no matter how well the U.S. measures the total number of the Chinese nuclear weapons.²¹

The above analysis does not suggest that the US would certainly launch preemptive nuclear strike against China if China loses its nuclear deterrent capabilities. But the U.S. could become incautious in risking nuclear exchanges with China in a crisis and could therefore rely more on military approach in solving possible conflicts between the two countries.

According to the latest NRDC nuclear notebook about Chinese nuclear forces,²² China is modernizing its missile force as part of a program begun nearly two decades ago that features mobility, solid fuel, improved accuracy, lighter warheads, and a more robust command, control, communications, and intelligence (C3I) system. It seems that the main task of the Chinese nuclear modernization is to raise the survivability and reliability of its nuclear weapons. From strategic perspective, a nuclear modernization in this direction is not threatening and the future is predictable.

As China's nuclear deterrent capabilities rely on quantitative ambiguity of its nuclear forces, it prevents China from providing greater transparency in its nuclear forces. When it acquires a creditable nuclear deterrence by developing mobile ICBMs, China will have little interests in maintain the quantitative ambiguity and this will encourage China to increase its nuclear transparency.²³

(2) US Impacts on Chinese Deterrent Capabilities

Since the end of the cold war, there have been some moves and initiatives in the US nuclear policies that have had or may have impacts on the Chinese nuclear deterrent capabilities.

In the first phase after the cold war, the US was very active in promoting arms control including conducting serial strategic reductions (START I and II) with the former Soviet Union (Russia). The US-Russian bilateral nuclear reductions in this phase relatively narrowed the huge gap of strategic capabilities between the superpowers and China. Although such changes had very limited meaning from technical aspect, the reductions were still an encouragement for China to maintain the small size of its nuclear force. China's economic capacity began to grow fast since 1980s and financial burden would no longer be a serious constraint for its nuclear buildup if it had chosen to do so. The strategic nuclear reductions in the US and Russia again supported the Chinese leaders' judgment about the uselessness of large number of nuclear weapons²⁴ and the size of the Chinese nuclear force has been very stable since then.

Starting from the later 1990s, new US nuclear arms reductions no longer enable China to get relative gains. One reason is that during the bilateral nuclear arms reductions between the US

and Russia, as the US reduced the total number of nuclear weapons and reduced the number of nuclear weapons aimed at Russia, the US was also re-targeting or increasing the number of its nuclear weapons targeted China.²⁵ This re-retargeting policy enlarged US strategic pressure over China and drove the Sino-US nuclear relations become more hostile. Another reason is that the US was also re-locating its nuclear forces accompanying US-Russia strategic reductions. For example, it increased the number of its nuclear submarines in Pacific Oceans.²⁶ A Submarine-Launched Ballistic Missile (SLBM) has advantages in attacking mobile targets than an ICBM. Assume (1) that the yield of an US ICBM warhead is 5 times much as that of an SLBM warhead, (2) the flight time of an US ICBM is twice much as that of an SLBM, then the number of US ICBM warheads needed to destroy one Chinese mobile ICBM would be 1.4 times much of that of US SLBM warheads.²⁷ In average, a US submarine carries 180 nuclear warheads and the re-location of one submarine would mean a significant change of nuclear posture. China is now raising the survivability of its nuclear weapons by developing mobile ICBMs, which is good from strategic perspective. The re-location of US submarines that increased the US capabilities of attacking future mobile Chinese ICBMs and therefore would have counter effect on Chinese nuclear deterrent capabilities. However, the number of mobile ICBMs needed by China for creditable deterrence is not so dependent to the amount of US SLBMs targeting China.²⁸ So, these moves in the US nuclear policies would not significantly change the Chinese nuclear deterrence as long as China succeeds in transforming its strategic nuclear forces from silo-based to mobile-based.

The US is gradually raising its overall capability attacking mobile targets by developing more advanced detection systems.²⁹ If this capability incorporated with the US long-range precisely-targeted conventional weapons, it may become a serious concern in strategic context in the future.

Another big change in the US nuclear policies in recent years is the development of missile defense. As explained before, the current Chinese nuclear deterrence relies on quantitative ambiguity in its nuclear force, the deployment of a very small NMD system would in principle be large enough to deny the Chinese retaliatory capabilities. If China chooses to saturate a small NMD system with silo-based ICBMs, it would need to increase its nuclear force by hundred times to the Russian level, which does not seem to be a reasonable option for China. If China chooses to do the same thing with mobile ICBMs, the number of warheads China needs to increase would be comparable to that of deployed NMD interceptors.³⁰ Assume that all Chinese mobile ICBMs would have single warheads and four interceptors would be launched to kill one incoming warhead³¹, then the number of mobile ICBMs China needs to increase would be one-fourth of the number of deployed NMD interceptors. If this quantitative offensive-defensive competition happens in the future, it would become negative strategic interactions between China and US.

Some calculations³² show that every deployed land-based NMD interceptor costs about 88 million US dollars including its share of costs of the supporting systems. So the cost of four interceptors is about \$350 million. China needs to deploy one more ICBM to saturate the four interceptors in a defensive-offensive competition. A Titan II-like ICBM would cost \$110 million today after taking the inflation into account. Assume that this is the cost China needs to pay for

one of its ICBMs, the expenditure ratio of US in the competition to that of China would be 3 to 1. We can then compare the economic capacities of the two countries to discuss how heavy the financial burdens of the competition are for them. The US Gross Domestic Product (GDP) in 2000 is 9300 billion US dollars and the Chinese GDP in 2000 is 8200 billion Renminbi Yuan.³³ The Chinese GDP is about 1000 billion US dollars (about one ninth of the US GDP) according to the exchange rate today. However, if the factor of purchase-power-parity (PPP) is taken into account, the Chinese GDP could be multiplied by a few times. So the ratio of the US GDP to that of China is about 9 or a few times smaller. Comparing to the economic capacities of the two countries, the offensive-defensive competition is slightly favorable to the US or maybe equal to the two countries. This suggests that neither country can easily win the competition by building more missiles or interceptors. Some kind mutual understandings are important to guide future strategic interactions in this area in the two countries.

The above calculations are made according to the costs of land-based NMD interceptors. They should also be valid when describing the macro-framework in the case sea-based strategic capable missile defense. Airborne or sea-based boost-phase defenses politically look more aggressive but strategically are not as serious as mid-course defenses. The reason is that China has a large territory and China could deploy its ICBMs inland and this would provide little chance for boost-phase defense to succeed in the China context.

There are serious economic and technical problems for space-based NMD interceptors. A recent report³⁴ believes that “[i]f the perspective and the interests are local, a terrestrial or atmospheric solution would often be more economical” and “[a] response time near 10 minutes from weapon release to target kill is too short for this class of weapon.” So, in the near future, the space-based NMD would not be a realistic threat to China’s strategic weapons.

(3) Foreseeing China’s responses

Generally, the overall Sino-US relations are not hostile, so the roles of nuclear weapons are not important in most situations. If there is no case that would lead to serious military confrontation between the two countries, China could take a more relax attitude toward the changes in US nuclear policies. China would mainly rely on the social, economic and political linkages with the US in dealing with disputes with the US. However, there is one case, the Taiwan problem, which could lead to an escalation of the confrontation. Recently the separation fundamentalists in Taiwan are moving further and it could make the situation worse. The US NPR has defined this problem as a condition of possible use of its nuclear weapons and the roles of nuclear weapons in this case are rising. The Taiwan problem could drive China more worry about the strategic stabilities with the US and China may have to more closely watch the changes in the US nuclear policies.

As some changes in the US nuclear policies are harmful to the Chinese nuclear deterrent capabilities, China would have to think about how to compensate the losses in its capabilities. Among all the changes, it seems that US missile defense is still a major problem affecting China’s deterrent capabilities. It seems that there is not one simple choice for China in responding to U.S.

NMD deployment. As indicated by our previous studies,³⁵ many approaches including decoys and MIRVs would be considered by Chinese decision-makers to counter missile defense and the competition among these approaches would lead to a big range of uncertainties in China's nuclear modernization. This would make the Chinese nuclear development less predictable.

Another major impact is that China may feel reluctant in increasing transparency in its nuclear force. China's current nuclear deterrence relies on quantitative ambiguity in its nuclear force. If China successfully transforms its deterrence from current status to relying on mobile ICBMs, it would have more confidence in providing greater transparency which would be helpful for future arms control.³⁶ The US efforts in developing capabilities against mobile targets would be a negative factor for China to increase its nuclear transparency.

In recent years, the US nuclear policies have been driven by political attempts more than strategic calculations. For example, a report shows that the acquisition by the Chinese of the particular nuclear weapon information alleged by Cox Report would not appear to directly impair U.S. security.³⁷ But Cox Report still created an anti-China wave in the nuclear area. Some important exchanges, for example, the Sino-China Lab-to-Lab program, were suspended since then. In the Sino-US relations in nuclear weapon area, some negative interactions as mentioned above could be developed. To improve the relations, more strategic dialogues are needed between the two countries. This would be helpful for the overall Sino-US relations and also the disarmament and nonproliferation in East Asia and the whole world.

Endnotes

¹ See, Committee on International Security and Arms Control, National Academy of Sciences, "The Future of U.S. Nuclear Weapons Policy," National Academy Press, Washington, D.C. 1997.

² A typical discussion of this point of view, see, Keith B. Payne et al., "Rationale and Requirements for U.S. Nuclear Forces and Arms Control," Vol. I, Executive Report, National Institute for Public Policy, January 2001.

³ The provisions and chronology of START I, see, for example, Federation of American Scientists, "Strategic Arms Reduction Treaty (START I)," <http://www.fas.org/nuke/control/start1/>.

⁴ The provisions and chronology of START II, see, for example, Federation of American Scientists, "Strategic Arms Reduction Treaty (START II)," <http://www.fas.org/nuke/control/start2/>.

⁵ The provisions and chronology of Moscow Treaty, see, for example, Center for Arms Control, Energy and Environmental Studies, MIPT, "Treaty on Strategic Offensive Reductions Status, Comments, Expert Opinions," <http://www.armscontrol.ru/start/sort.htm>.

⁶ Strategic stabilities mean that countries have little incentives to launch strategic nuclear weapons first in a crisis of their relations (crisis stability) and little incentives to pursue a strategic buildup as response to nuclear development in other sides (arms races stability) in some configurations of their strategic arsenals. More discussions, see, Leon Sloss, "The Strategist's Perspective," in Ashton B. Carter et al. Ed., "Ballistic Missile Defense," Brookings Institution, Washington DC, 1984. p.28.

⁷ Bruce G. Blair et al., "Toward True Security, A US Nuclear Posture for the Next Decade," Federation of American Scientists, Natural Resources Defense Council, Union of Concerned Scientists, June 2001.

⁸ See note 2.

- ⁹ J.D. Crouch, "Special Briefing on the Nuclear Posture Review," 09 January 2002. <http://usinfo.state.gov/topical/pol/arms/stories/review.htm>
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- ¹⁴ The overview of BMD and its systems, see the Missile Defense Agency website: <http://www.acq.osd.mil/bmdo/bmdolink/html/bmdolink.html>.
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- ¹⁷ See note 10.
- ¹⁸ See "Agreed Framework between the United States of America and the Democratic People's Republic of Korea," <http://www.armscontrol.org/documents/af.asp>
- ¹⁹ Jargalsaikhan Enkhsaikhan, "Mongolia's Single-State Nuclear-Weapon-Free Zone," *Disarmament Times*, December 1998. <http://disarm.igc.org/dtmongol.html>
- ²⁰ The text of National Security Strategy of the United States of America in 2002, see <http://www.whitehouse.gov/nsc/nss.html>
- ²¹ The discussions here about Chinese nuclear deterrence in this sub-section are drawn from Li Bin, "China's Nuclear Disarmament Policy," in Harold Feiveson ed., "The Nuclear Turning Point", Brookings Institution Press, Washington D.C. (1999), pp.325-332 and Li Bin, "The Impact of U.S. NMD on Chinese Nuclear Modernization", Working Paper, Pugwash Workshop on East Asian Security, 3-6 April, 2001 - Seoul, South Korea. <http://www.pugwash.org/reports/rc/rc8e.htm>
- ²² Robert S. Norris et al., "NRDC Nuclear Notebook --Chinese nuclear forces, 2003," November/December 2003, Vol. 59, No.6, pp. 77–80. <http://www.thebulletin.org/issues/nukenotes/nd03nukenote.html>
- ²³ Li Bin, "China and Nuclear Transparency," in Nicholas Zarimpas ed., "Transparency in Nuclear Warheads and Materials: The Political and Technical Dimensions", Oxford University Press, Oxford. 2003. pp.50-57.
- ²⁴ Former Chinese leaders, Mao Zedong and his colleagues repeatedly asserted that big quantities of nuclear weapons are ridiculous. See China National Nuclear Corporation edited, "Mao Zedong and The Chinese Atomic Industry, In Memory of Mao Zedong on His 100th Birth Date (Mao Zedong yu zhongguo he gongye, Jinian Mao Zedong danchen 100 zhounian)," Atomic Energy Publishing House, Beijing, December, 1993.
- ²⁵ See note 11.
- ²⁶ Robert S. Norris and William M. Arkin, "U.S. Strategic Nuclear Forces, end of 1994," *Bulletin of the Atomic Scientists*, Vol. 56, No. 4, p. 70 Robert S. Norris et al., "U.S. nuclear forces, 2003," *Bulletin of the Atomic Scientists*, Vol. 59, No.3, pp. 73–76.
- ²⁷ After a ballistic missile is launched to attack a mobile target missile, the mobile target missile can move around to escape the attack. The area in which the mobile missile can move around is proportional to the square of the flight time of the coming missile (flight time)². The lethal radius of a nuclear warhead is approximately proportional to the cube root of the yield of the warhead (yield)^{1/3} and its lethal area would be proportional to its square (yield)^{2/3}. So, the number of warheads needed to destroy a mobile target is proportional to (flight time)²/(yield)^{2/3}. Take the ratios of the two figures into the equation, we will know that the number of US ICBM warheads needed to destroy one Chinese mobile ICBM would be 1.4 times much of that of US SLBMs.
- ²⁸ See note 21.
- ²⁹ Christopher J. Bowie, "Mobile Ground Targets Destroying in an Anti-Access Environment,"

Northrop Grumman Corporation, December 2001.

http://www.capitol.northgrum.com/files/mobile_ground_targets.pdf

³⁰ Li Bin, "The Impact of U.S. NMD on Chinese Nuclear Modernization", Working Paper, Pugwash Workshop on East Asian Security, 3-6 April, 2001 - Seoul, South Korea.

<http://www.pugwash.org/reports/rc/rc8e.htm>

³¹ In a US official document, the ratio of interceptors to warheads is assume to be 4 to 5. See, "The ABM Treaty 'Talking Points'," Jan 20, 2002,

http://www.thebulletin.org/issues/2000/mj00/treaty_doc.htm

³² The calculations in this paragraph are drawn from Liu Zhiwei, "Economic Consequences of the Increase of Chinese ICBMs as a Response to US NMD," Master Degree Thesis, Institute of International Studies, Tsinghua University. May 2003.

³³ National Bureau of Statistics of China, compiled, "China Statistical Yearbook 2001," No. 20. In Appendix 2-4 Gross Domestic Product and its Growth Rate.

<http://210.34.5.88/yearbook2001/indexC.htm>

³⁴ Bob Preston et al., "Space Weapons Earth Wars," RAND, Washington DC. 2002. p143, p152.

³⁵ See note 30.

³⁶ See note 23.

³⁷ Richard L. Garwin, "Why China Won't Build U.S. Warheads," Arms Control Today, April/May 1999. http://www.armscontrol.org/act/1999_04-05/rgam99.asp