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Certainty of Uncertainty:
Nuclear Strategy with Chinese Characteristics[1]

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Abstract

China's nuclear deterrent capability relies on so-called "first strike uncertainty," which means letting the other side be unconfident of a completely successful first strike. But the fact that the Soviet Union conducted nuclear threat against China in 1969 showed that first strike uncertainty must be high enough to deter nuclear attack or nuclear threat. This article examines the threshold. Only after China deployed the DF-3 intermediate-range ballistic missiles in mid-1970s, the United States and the Soviet Union began to believe China had some nuclear retaliatory capability. Chinese leaders were not confident until China's strategic missile forces gained independent launch capability in mid-1980s. U.S. missile defense is a potential destabilizing factor in Sino-U.S. strategic relations, both sides should work together in order to avoid negative security interaction.

Introduction

Chinese nuclear posture is special among the five nuclear non-proliferation treaty (NPT) nuclear weapon states for the following reasons: China keeps a very small nuclear arsenal; Chinese nuclear weapons are not on alert; China maintains an unconditional no-first-use policy. It is commonly held in western academia that China's nuclear strategy is similar to "minimum deterrence." Yet, scholars use varied terminology.[2] Bates Gill has been among those arguing that China's nuclear posture is shifting from minimum deterrence to credible minimum deterrence.[3] Jeffrey Lewis has contended that China's nuclear arsenal and arms control policy reflect a belief that "deterrence is relatively insensitive to changes in the size, configuration, and readiness of nuclear forces." As such, the purpose of China's nuclear weapons has been to gain "minimum means of reprisal."[4] Taylor Fravel and Evan Medeiros have argued that China's nuclear strategy is "assured retaliation," which is different from minimum deterrence.[5] John Lewis and Xue Litai believe that the best description of China's nuclear strategy should be "limited nuclear retaliation."[6] Li Bin has argued that China's nuclear strategy is anti-coercion rather than nuclear deterrence.[7] General Yao Yunzhu has described China's nuclear strategy in Western terms: strategic deterrence rather than operational and tactical utility; retaliatory rather than denial deterrence; central rather than extended deterrence; general rather than immediate deterrence; defensive rather than offensive deterrence and; minimum rather than limited or maximum deterrence.[8]

A question remains unanswered by all of this research. Given U.S. superiority over China and the low survivability of Chinese nuclear weapons, China has no retaliatory capability

[2] Iain Johnston argued that China's nuclear strategy was shifting for limited deterrence. But one and half decade past after his article got published, there is no evidence demonstrating that China's nuclear posture has ever changed substantially. Alastair Iain Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security*, Vol. 20, No. 3 (Winter 1995/1996), pp. 5-42.

[3] Bates Gill, James C. Mulvenon, Mark Stokes, "The Chinese Second Artillery Corps: Transition to Credible Deterrence," in James C. Mulvenon and Andrew N. D. Yang, eds., *The People's Liberation Army as Organization* (Santa Monica, Calif.: RAND, 2002), pp. 510–586.

[4] Jeffrey G. Lewis, *The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age* (Cambridge, MA: MIT Press, 2007), p. 20.

[5] M. Taylor Fravel and Evan S. Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," *International Security*, Vol. 35, No. 2 (Fall 2010), pp. 48–87.

[6] John Lewis, Xue Litai, "Zhongguo Junshi Zhanlue Fangzhen ji Hezhanlue zhi Yanbian" [Evolution of China's Military Strategy Guidance and Nuclear Strategy], *Lingdaozhe*, No. 38, February 2011, pp. 18-30.

[7] Li Bin, "Zhongguo Hezhanlue Bianxi" [Understanding China's Nuclear Strategy], *Shijie Jingji yu Zhengzhi*, No. 9, 2006, pp. 16-22. Li Bin, "China's Potential to Contribute to Multilateral Nuclear Disarmament," *Arms Control Today*, March 2011, http://www.armscontrol.org/act/2011_03/LiBin.

[8] Yao Yunzhu, "Chinese Nuclear Policy and the Future of Minimun Deterrence," in Christopher P. Twomey ed., *Perspectives On Sino-American Strategic Nuclear Issues* (New York: Palgrave Macmillan, 2008), pp. 111-124.

according to the strategic analysis approach applied to U.S.-Soviet relations during the Cold War. As a result, what is the source of China's nuclear deterrence? There are two answers to this question. The first is that China has no nuclear deterrence at all. Keir Lieber and Daryl Press have argued that the United States has disarming capability against China, and could transform this capability into coercive power.[9] The second, as argued by Avery Goldstein, is that although China's nuclear forces are weak, it still can create "first strike uncertainty" in the mind of the opposing side's leaders, which could deter.[10] These two answers represent two extreme points. Lieber and Press neglect all uncertainties, assuming unreasonably that the United States has perfect intelligence capability. In contrast, Goldstein's belief that uncertainty can deter is too optimistic. While the contribution of uncertainty to deterrence makes sense, it might be too low to deter. In order to deter, uncertainty would have to be adequate. This leads to another question, namely what's the threshold of first strike uncertainty to deter?

The basic question of this article is: "how *uncertain* is enough?" as opposed to the classical question in the Cold War: "how much is enough?" Specifically, do Chinese leaders believe that China's nuclear retaliation could be assured? Did China begin to believe that it had nuclear deterrent capability on the day when China detonated its first atomic bomb? If not, when? What are China's criteria for nuclear deterrent capability? Did China's potential adversaries begin to believe that it had nuclear deterrent capability on the day when China detonated its first atomic bomb? If not, when? What are their criteria? Do China and its potential adversaries have the same criteria? If not, why?

This article argues that once China's nuclear weapons gained delivery capability and a degree of survivability through mobility and concealment, China's adversaries would believe that it had nuclear retaliatory capability. Delivery vehicles of nuclear weapons could be bombers and ballistic missiles (land-based or submarine-launched). As for the case of China, since it has no strategic bombers, the delivery vehicles refer to China's ballistic missiles. It should be noted that from the perspective of China's adversaries, the operability of Chinese nuclear forces is not a part of the criteria. Usually it is difficult to acquire such intelligence; therefore they must adopt the worst-case assumption that once a missile is deployed, it is operational. But it can be concluded from Chinese nuclear history that it takes a nascent nuclear force many years to

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9 Keir A. Lieber, and Daryl G. Press, "The End of MAD? The Nuclear Dimension of U.S. Primacy," *International Security*, Vol. 30, No. 4, Spring 2006, pp. 7–44.

10 Avery Goldstein, *Deterrence and Security in the 21st Century: China, Britain, France, and the Enduring Legacy of the Nuclear Revolution* (Stanford University Press, 2000), pp. 111-138.

acquire independent launch capability. Therefore from China's perspective, in addition to delivery capability, mobility and concealment, nuclear deterrence criteria also includes independent launch capability.

The analysis contained within this article will be based upon publicly available literature. Regarding Chinese nuclear history, high preference will be given to Chinese literature, taking English literature as a complement. U.S. evaluation on Chinese nuclear capability comes from the declassified documents of the Central Intelligence Agency (CIA). Soviet evaluation comes from second-hand literature.

The structure of this article is as follows. The next section will be devoted to the general discuss of the first strike uncertainty. Then the author will review the history of Chinese nuclear weapons and the evolution of the first strike uncertainty. This will be followed by analysis of the perceptions of China and other countries on the issue of uncertainty, identifying a turning point. In the final section, the impact of missile defense on first strike uncertainty and Sino-U.S. strategic stability will be discussed.

2 Logic of Uncertainty

Uncertainty is an important attribute of war. While it might be reduced through intelligence, it is impossible to eliminate.[11] In the nuclear age, uncertainty has become even more important. First, given the massive destructive capability of nuclear weapons, uncertainty contributes to the survival or destruction of a country. Second, the existence of uncertainty enhances nuclear deterrence. As stated within the "Healey Theorem," originated by former U.K. Defense Secretary Denis Healey, "it takes only five per cent credibility of American retaliation to deter the Russians, but ninety-five per cent credibility to reassure the Europeans."[12] McGeorge Bundy has also argued "they [thermonuclear weapons] make it necessary to achieve a kill rate very near 100 percent. Anything less is not good enough for safety—only good enough, at best, for deterrence."[13]

Devin Hagerty first put forward the concept of "first strike uncertainty" in dealing with the strategic stability in South Asia. "[A]ll that is necessary to deter the launching of a preemptive

[11] Carl von Clausewitz, *On War* (Translated by J. J. Graham) (Wilder Publications, 2008), p. 44.
[12] Denis Healey, *The Time of My Life* (London: Penguin Books, 1989), p. 243. The author thanks David Holloway for providing this reference.
[13] McGeorge Bundy, "The Bishops and the Bomb," *The New York Review of Books*, June 16, 1983.

strike is 'first strike uncertainty,' or the planting of a seed of doubt in the minds of the potential attacker's leaders about whether it is possible to destroy all of the victim's nuclear weapons before it can retaliate."[14] His conclusion was that because of the existence of first strike uncertainty, India and Pakistan were likely to deter each other from nuclear and conventional attacks. The idea was also used in analyzing Sino-Soviet relations, although without referring to the term explicitly. Gregory Treverton believed that "Moscow must reckon that no matter what first-strike it launched against China, some Chinese missiles launched in a retaliatory strike would reach Soviet targets."[15]

First strike uncertainty is always connected with the concept of "existential deterrence," which was invented by McGeorge Bundy in analyzing U.S.-Soviet strategic relations. His assumption was that the nuclear forces of the opposing sides were survivable: "As long as each side retains survivable strength so that no leader can ever suppose that he could 'disarm' his opponent completely, nuclear war remains an overwhelmingly unattractive proposition for both sides."[16] Marc Trachtenberg reduced the criteria for existential deterrence to "the mere existence of nuclear forces." He contended, "whatever we say or do, there is a certain irreducible risk that an armed conflict might escalate into a nuclear war. The fear of escalation is thus factored into political calculations: faced with this risk, states are more cautious and more prudent than they would otherwise be."[17]

Lyle Goldstein provided counter-evidence for existential deterrence showing that in 1969, Chinese nuclear forces could not deter Soviet nuclear threat/attack.[18] Regarding this, he agreed with Joseph Nye's argument that "[t]he country that expects to create stable deterrence in a region by introducing nuclear weapons may have to pass through a dangerous 'valley of vulnerability.'"[19] Neither Goldstein nor Nye answered the question of when or how to pass through the "valley of vulnerability?" This article will try to answer it.

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[14] Devin T. Hagerty, "Nuclear Deterrence in South Asia: The 1990 Indo-Pakistani Crisis," *International Security*, Vol. 20, No. 3 (Winter, 1995-1996), pp. 79-114. Devin T. Hagerty, *The Consequences of Nuclear Proliferation: Lessons from South Asia* (Cambridge, Mass.: MIT Press, 1998).

[15] Gregory Treverton, "China's nuclear forces and the stability of Soviet-American deterrence," in *The Future of Strategic Deterrence*, Part I, Adelphi Papers 160, (London: IISS, 1980), pp. 38-44.

[16] McGeorge Bundy, "The Bishops and the Bomb," *The New York Review of Books*, June 16, 1983.

[17] Marc Trachtenberg, "The Influence of Nuclear Weapons in the Cuban Missile Crisis," *International Security*, Vol. 10, No. 1, 1985, pp.137-163.

[18] Lyle J. Goldstein, "Do Nascent WMD Arsenals Deter? The Sino-Soviet Crisis of 1969," *Political Science Quarterly*, Vol. 118, No. 1 (Spring, 2003), pp. 53-80.

[19] Joseph S. Nye, Jr., *Nuclear Ethics* (New York: Free Press, 1988), p. 90, quoted from Goldstein, "Do Nascent WMD Arsenals Deter?"

The idea of first strike uncertainty is also reflected in Chinese leaders' planning of nuclear arsenal. Marshal Nie Rongzhen, who oversaw Chinese nuclear weapon and ballistic missile programs, said that the purpose of China's nuclear weapons was to have "the rudimentary means of counter strike" (*qima de huanji shouduan*) when China sustained nuclear attack.[20] The word "rudimentary" means that Marshal Nie expected China's nuclear retaliation to be possible, rather than assured. A textbook of Chinese strategic missile force, *Second Artillery Operational Studies*, published in 2004, explicitly stated that the purpose of Chinese nuclear forces is to create uncertainty and confuse the United States.[21] This book was published internally with the objective of training Second Artillery officers. It, therefore, can be considered to reflect the Second Artillery's perception of the role that nuclear weapons play.

This is not to say that Chinese leaders are satisfied with an uncertain retaliatory capability. On the contrary, assured retaliation is undoubtedly an unshakable objective for Chinese leaders. China has been modernizing its nuclear arsenal and the survivability of Chinese nuclear forces is getting better and better. What is important is not whether Chinese leaders are satisfied with the uncertain situation or not, but whether they accept it or not. The fact that China's standard for nuclear deterrence is much lower than the western standard and that it has been reluctant to increase survivability at the price of decreasing political control on nuclear forces reflect China's special nuclear philosophy.

From China's perspective, because of the nuclear taboo, physical uses of nuclear weapons against China are unlikely. The most important utility of nuclear weapons of Chinese potential adversaries is nuclear coercion. So the purpose of Chinese nuclear weapons is anti-coercion.[22] China focuses on the deterrent effects of nuclear weapons and believes that nuclear deterrence is unlikely to fail. So the question of how to deal with a failure of deterrence should not be the determining factor in the development of a nuclear arsenal. This philosophy is evident in the rhetoric of Chinese leaders. The earliest appearance was that of Mao Zedong, who argued that nuclear weapons are "paper tigers."[23] Mao also later stated that "in the future our country might

[20] Nie Rongzhen, *Nie Rongzhen yuanshuai huiyilu* [Marshal Nie Rongzhen's memoirs] (Beijing: Jiefangjun chubanshe, 2005), p. 645.
[21] Gregory Kulacki, "Chickens Talking With Ducks: The U.S.-Chinese Nuclear Dialogue," *Arms Control Today*, October 2011, http://www.armscontrol.org/act/2011_10/U.S._Chinese_Nuclear_Dialogue.
[22] Li Bin, "China's Potential to Contribute to Multilateral Nuclear Disarmament," *Arms Control Today*, March 2011, http://www.armscontrol.org/act/2011_03/LiBin.
[23] Mao Zedong, *Mao Zedong waijiao wenxuan* [Mao Zedong's selected works on diplomacy] (Beijing: Zhongyang wenxian chubanshe, 1994), pp. 57-62.

produce a few atomic bombs, but we do not intend to use them."[24] Deng Xiaoping said in 1983 that from long term perspective Chinese nuclear weapons were just symbolic.[25]

U.S. nuclear philosophy is different from that of China. U.S. policymakers believe that nuclear policy-making should not be based on the nuclear taboo. U.S. nuclear posture has two objectives: nuclear retaliation (to deter), as well as damage limitation (if deterrence fails). The United States has maintained counterforce capabilities and plans during the whole nuclear age in order for disarming strike, damage limiting and/or denying the adversary's war aims.[26] It is reported that the Obama administration is preparing to modify U.S. nuclear war plan guidance and targeting doctrine, but this is unlikely to be done in near future.[27]

Both China and the United States acknowledge the massive destructive capability of nuclear weapons and the uncertainties associated with nuclear war. However, they act differently in dealing with the uncertainties. The U.S. principle is that U.S. nuclear forces should be able to deal with all uncertainties, while China's principle is that it should take advantage of uncertainties to reduce requirements for its nuclear arsenal. For the United States, uncertainties of nuclear war greatly increase nuclear arsenal requirements. But for China, uncertainty greatly decreases these requirements. In other words, the United States has been actually doing what China has been pretending to do.

In order to define "uncertain retaliation," we first need to explore "assured retaliation." Assured retaliation means that even under the worst-case scenario ("bolt-from-the-blue" nuclear attack, no early warning at all, regular alert status), after absorbing a first strike, some nuclear weapons would survive and be used for retaliation. There are two approaches to achieve assured retaliation. The first approach is to build a large number of nuclear weapons. In this mode, the survivability of single nuclear weapon is not important and the numeral requirement of nuclear weapons depends on the scale of the opposing side's nuclear arsenal. This mode applied to the United States and the Soviet Union/Russia. The second approach is to build very quiet SSBNs, keeping two patrolling undersea at all times. In this mode, the numeral requirement of nuclear

[24] *Mao Zedong waijiao wenxuan*, pp. 472-477, 540-541.
[25] Leng Rong and Wang Zuoling, *Deng Xiaoping Nianpu: 1975–1997* [Chronicle of Deng Xiaoping's life, 1975–1997] (Beijing: Zhongyang wenxian chubanshe, 2004), *pp.* 947-948.
[26] Scott D. Sagan, *Moving Target: Nuclear Strategy and National Security* (Princeton, New Jersey: Princeton University Press, 1989), pp. 10-57.
[27] Tom Z. Collina, "Pentagon to Revise Nuclear Guidance," *Arms Control Today*, June 2011, http://www.armscontrol.org/act/2011_06/NuclearGuidance.

weapons has nothing to do with the scale of the opposite side's nuclear arsenal. This approach applies to Britain and France.[28]

Neither of these two modes applies to China. First, the number of China's nuclear weapons is very low, approximately two hundred. The quantity of China's operational nuclear weapons is even lower.[29] Second, China has been unable to develop very quiet SSBNs. According to a U.S. intelligence report, both China's first- and second-generation SSBNs (Type 092, Type 094) are noisy.[30] As a result, China cannot conduct retaliation with 100% confidence. Only uncertain retaliation can be realized.

Sources of first strike uncertainty include the following. First and foremost, the offensive side cannot know the exact number and location of the defensive side's nuclear weapons. This could be achieved through such measures as secrecy regarding the location of nuclear weapons storage centers, dispersal of bombers to backup airports or tunnels, movement of land-based mobile missiles to unknown concealing sites, camouflage of silos, covert SSBNs patrol at sea. The offensive side could also be prevented from destruction of nuclear weapons due to their nature of deployment. For example, silos could be deliberately located at the "wrong" side of a mountain, so that the geographical location could obstruct a direct hit.[31] Finally, the kill probability would be unlikely to reach 100%. However, this final factor is not so important because the offensive side could increase the number of attacking warheads to make the kill probability very close to complete, particularly in asymmetric scenarios.

Concealment is the primary measure to induce first strike uncertainty. The effects of concealment are both concrete and psychological. On one hand, concealment could render one's adversary unable to find one's nuclear weapons, increasing survivability. On the other hand, concealment could create uncertainty in the mind of the opposing side's leaders. This lack of confidence would indicate that even though the concealment measure itself is not perfect, it remains a means of deterrence. A frequently mentioned case of successful concealment is that during the Gulf War. While the allies conducted 1,460 strikes against Iraqi Scud missiles, there

[28] In theory, land-based mobile missiles are difficult to find if they keep moving randomly. But in practice, it is very hard to be realized.
[29] Robert S. Norris, Hans M. Kristensen, "Chinese nuclear forces, 2010," *Bulletin of the Atomic Scientists*, Vol. 66, No. 6, 2010, pp. 134–141.
[30] Office of Naval Intelligence, *The People's Liberation Army Navy: A Modern Navy with Chinese Characteristics* (Suitland, MD: Office of Naval Intelligence, 2009), p. 22.
[31] Hans M. Kristensen, Robert S. Norris, Matthew G. McKinzie, *Chinese Nuclear Forces and U.S. Nuclear War Planning* (Washington D.C.: Federation of American Scientists & Natural Resources Defense Council, November 2006), p. 186.

was no evidence demonstrating that any Scud Transporter-Erector-Launcher (TEL) was destroyed.[32]

Besides concealment, another important measure creating uncertainty is mobility. Locating mobile missiles is a very challenging task. The U.S. Nuclear Posture Review 2001 admitted that "one of the greatest challenges today is accounting for the location uncertainty of mobile and relocatable targets," so the United States would develop long-range precision strike weapons and real-time intelligence systems to counter this threat.[33] One idea is to develop space-based radar to detect and locate mobile missiles.[34] Li Bin's research on space radar and China's mobile intercontinental ballistic missiles (ICBM) has concluded, however, that the proposed U.S. Space Radar system could be defeated by some relatively simple countermeasures.[35]

There are two deployment modes for mobile missiles discussed in U.S. academia. The first is random mobile, in which TELs move randomly. The second is dash mobile, in which TELs remain in garrison and ready to dash on tactical warning that a first strike is underway.[36] The first mode has higher survivability, but it is very difficult to realize. The second requires an early warning system (early-warning satellites or land-based early-warning radars) to monitor attacking missiles.

The logic of strategic stability through first strike uncertainty is different from that through transparency applied to U.S.-Soviet/Russia strategic relations. In U.S.-Soviet/Russia arms control treaties, each party undertook not to interfere with the national technical means of verification or use concealment measures that impede verification. Both sides also exchange databases related to their strategic offensive forces, including numbers, locations, geographic coordinates and site diagrams.[37] So U.S. and Soviet silos can be seen clearly from the Google Earth. But from the Chinese perspective, disclosure of the location of silos would undermine nuclear deterrence credibility and strategic stability. Therefore, China's silos are invisible in Google Earth.[38]

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[32] Mark E. Kipphut, "Crossbow and Gulf War Counter-Scud Efforts: Lessons from History," Air University, 2003, pp. 17-18, http://www.au.af.mil/au/awc/awcgate/cpc-pubs/kipphut.pdf.

[33] *Nuclear Posture Review* [Excerpts], 8 January 2002. http://www.globalsecurity.org/wmd/library/policy/dod/npr.htm.

[34] David A. Whelm, "Discoverer II Program Summary," 2000 IEEE International Radar Conference, Washington D.C., May 2000, pp. 7–8. John A. Tirpak, "The Space Based Radar Plan," *Air Force Magazine*, August 2002, pp. 62–66.

[35] Li Bin, "Tracking Chinese Strategic Mobile Missiles," *Science & Global Security*, Vol. 15, No. 1, 2007, pp. 1–30.

[36] Barbara G. Levi, Mark Sakitt, Art Hobson eds., *The Future of Land-Based Strategic Missiles* (New York: American Institute of Physics, 1989), p. 51.

[37] *Treaty between the United States of America and the Union of Soviet Socialist Republics on the Reduction and Limitation of Strategic Offensive Arms (START I)*, Article IX, http://www.fas.org/nuke/control/start1/text/start1.htm.

[38] Kristensen et. al., *Chinese Nuclear Forces and U.S. Nuclear War Planning*, pp. 177-179.

Having explored the general idea of first strike uncertainty and China's special nuclear philosophy, we will turn to the developmental history of Chinese nuclear forces and China's nuclear posture in the next section.

3 China's Experience

China successfully tested its first atomic device on 16 October 1964, which was put on a tower and was not deliverable. The second nuclear test on 14 May 1965 involved a gravity bomb, dropped from a modified H-6 bomber. This test marked China's achievement of deliverable nuclear weapons.[39] The H-6 is a license-built version of the Soviet Tu-16 medium-range bomber. Based on Sino-Soviet agreement in late-1950s, the Soviet Union provided two Tu-16s and associated technical documents. The first domestically produced H-6 was completed in 1968.[40] According to U.S. intelligence, China's Air Force had approximately sixty H-6s up to 1973.[41]

Besides the H-6, other nuclear capable aircrafts include the H-5 bomber and the Q-5 attacker. The H-5 is a Chinese version of the Soviet IL-28. The Soviet Union provided China three hundred IL-28s in 1950s. China began to produce the IL-28 indigenously from 1969.[42] The Q-5 is a Chinese-built ground attack aircraft. The Q-5 was modified to carry hydrogen bombs from 1967 and was successfully tested on 7 January 1972, dropping a hydrogen bomb.[43] Neither of these aircraft (H-6, H-5, Q-5) is strategic bomber in the strict sense, given the limited range (5760km for the H-6, the longest) and its weak penetration capability.[44] So after 1965, although China had nuclear capable aircraft and deliverable nuclear weapons, the efficiency of these aircraft was very low. In other words, these nuclear bombs and aircraft created a degree of first strike uncertainty. For example, the H-6 could theoretically reach Moscow on a one-way mission. But the uncertainty they created was very low and China thereby required nuclear delivery vehicles with higher efficiency, such as ballistic missiles.

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[39] Xie Guang ed., *Dangdai zhongguo de guofang keji shiye* [Contemporary China: Defense Science and Technology] Vol. 1, (Beijing: Dangdai zhongguo chubanshe, 1995), pp. 237-247.
[40] Xie Guang, *Dangdai zhongguo de guofang keji shiye* Vol. 2, pp. 82-87, 202-205.
[41] NIE 13-8-74, China's Strategic Attack Programs, 13 June 1974.
[42] NIE 13-8-71, Communist China's Weapons Program for Strategic Attack, 28 October 1971.
[43] Song Zhanyuan, "Jizai kongtou xiaoxing yuanzidan shiyan" [Test of dropping small atomic bombs from an airplance], in Gao Xingmin ed., *Kongjun huiyi shiliao* [Recollection materials of the Air Force] (Beijing: Jiefangjun chubanshe, 1992), pp. 601-605.
[44] Xie Guang, *Dangdai zhongguo de guofang keji shiye* Vol. 2, pp. 82-87, 202-205.

The Central Military Commission (CMC) of the Chinese Communist Party (CCP) made the decision to develop ballistic missiles on May 26, 1956.[45] China's missile program received Soviet assistance in its early phase. Moscow provided China two R-2 missiles at the end of 1957. The Chinese version of the R-2, codenamed DF-1, had a range of 600 km and was flight-tested successfully on November 5, 1960. At this time, however, Moscow also withdrew all Soviet experts working in China.[46] The DF-2 (CSS-1), a modified version of the DF-1 with twice the range, is capable of striking U.S. military bases in Japan if deployed in northeast China.[47] The first flight test of the DF-2 failed in 1962. In 1964, after significant redesign, the DF-2 was successfully flight-tested.[48] The DF-2A is an improved version of the DF-2, transforming the inertial-radio guidance system of the DF-2 to full-inertial guidance and possessing an extended range. The DF-2A was flight tested successfully on 13 November 1965. On 27 October 1966, China successfully tested a DF-2A armed with a live nuclear warhead, which marked China's possession of operational nuclear missiles.[49] The DF-2A had finished the finalization flight test and entered into production in 1966. However, because of the quality problems of the batch 02 and batch 03 products, substantial deployment of the DF-2A did not start until 1970.[50]

The DF-1 has three operational drawbacks. First, it uses non-storable propellant (liquid oxygen and ethanol), meaning that a fueled missile has to be launched in hours. Second, the loading of propellant requires huge equipment, restraining the missile's mobility, so the DF-1 is just semi-mobile, requiring fixed supporting facilities.[51] Third, the DF-1 uses inertial-radio mixed guidance system, whose signal could be easily detected and interfered with during wartime. The DF-2 retains all these three drawbacks. The DF-2A moves to full-inertial guidance system, but still uses non-storable propellant.

[45] Xie Guang, *Dangdai zhongguo de guofang keji shiye* Vol. 1, pp. 28-29.
[46] Dangdai zhongguo congshu bianjibu ed., *Dangdai zhongguo de hangtian shiye* [Contemporary China: Space Industry] (Beijing: Shehui kexue chubanshe, 1986), p. 15.
[47] John Wilson Lewis and Hua Di, "China's Ballistic Missile Programs," *International Security*, Vol. 17, No. 2, Autumn 1992, pp. 5-40.
[48] Zhou Junlun ed., *Nie Rongzhen nianpu* [Chronicle of Nie Rongzhen's life] Vol. 2, (Beijing, Renmin chubanshe, 1999), p. 820. Zhang Aiping ed., *Zhongguo renmin jiefangjun* [Contemporary China: The People's Liberation Army of China] Vol. 1, (Beijing: Dangdai zhongguo chubanshe, 1994), p. 523.
[49] *Hangtian gongyebu dier yanjiuyuan yuanshi* [History of the Second Academy of the Ministry of Aerospace Industry of China] (Beijing: Hangtian gongyebu dier yanjiuyuan yuanshi bianweihui, 1987), pp. 42-26.
[50] Gu Xiqiang, "Shoupi zhanlue hedaodan de jiannan chushi" [The hard coming out of the first batch of strategic nuclear missiles], in Zongheng jingpin tushu bianweihui ed., *Gongheguo junshi jianwen* [Military knowledge of the People's Republic of China] (Beijing: Zhongguo wenshi chubanshe, 2002), pp. 246-251.
[51] NIE 13-8-67, p. 7.

Compared to Chinese bombers, first strike uncertainty created by the DF-1/DF-2/DF-2A was higher because the shift from bombers to ballistic missiles marked a great leap in penetration capability. But the improvement was still limited. First, because of the drawbacks mentioned above, the pre-launch survivability of the DF-1/DF-2/DF-2A remained problematic. Second, the coverage of the DF-1/DF-2/DF-2A was limited, such that only U.S. bases in Japan and South Korea and several Soviet cities in the Russian Far East could be held at risk.

The DF-3 (CSS-2) was the first storable liquid propellant ballistic missile designed by China. Its range is 2,650 km, which is enough to reach the U.S. military bases in Philippine.[52] Four flight tests conducted from end-1966 to mid-1967 exposed the design problem of its rocket engine. Its full range flight test succeeded in 1968, and it was deployed since May 1971.[53] The DF-3 represented the bulk of Chinese nuclear missiles. China deployed about one hundred DF-3s in mid-1980s, according to one U.S. source.[54] The pre-launch preparation time was no less than four hours initially, because the propellant must be loaded after the missile is erected and the oxidizer and fuel were loaded separately. Then the preparation time was shortened to two and a half hours by loading the oxidizer and fuel simultaneously in 1978.[55]

Compared to the DF-2A, the first strike uncertainty created by the DF-3 was much higher. First, the DF-3 is a mobile missile. As such no fixed facility was needed because of the adoption of storable propellant. Second, the DF-3's target coverage is much larger than the DF-2A. But because of its long pre-launch preparation time, the DF-3 is far from a perfect weapon.

The DF-4 (CSS-3) is the first two-stage missile designed by China, which was based on the DF-3, adding a second stage. Batch 01 flight tests were conducted from 1969 to 1971. On 30 January 1970, the first short range flight test succeeded. On 15 November 1971, the first full range flight test succeeded. After that, the DF-4 was redesigned to extend its range from 4,000 km to 4,750 km, in order to hold Moscow at risk. Batch 02 flight tests were not conducted until May 1976. The finalization of the DF-4's design was finished in 1983.[56] The final deployment mode adopted by the DF-4 was "in-cave storage/preparation and out-cave erection/filling/firing."[57] The influence of the introduction of the DF-4 on first strike uncertainty

[52] Lewis and Hua, "China's Ballistic Missile Programs," pp. 5-40.
[53] Li Chengzhi, *Zhongguo hangtian jishu fazhan shigao* [A draft history of space technology in China] Vol. 2, (Jinan: Shandong jiaoyu chubanshe, 2006), pp. 322-335. Lewis and Hua, "China's Ballistic Missile Programs," pp. 5-40.
[54] Thomas B. Cochran, Milton M Hoenig, and William M Arkin eds., *Nuclear Weapons Databook: British, French, and Chinese Nuclear Weapons* (Cambridge, Mass.: Ballinger Pub. Co., 1984), p. 359.
[55] Lewis and Hua, "China's Ballistic Missile Programs," pp. 5-40.
[56] Li Chengzhi, *Zhongguo hangtian jishu fazhan shigao* Vol. 2, pp. 335-347.
[57] Li Chengzhi, *Zhongguo hangtian jishu fazhan shigao* Vol. 2, pp. 335.347. Lewis and Hua, "China's Ballistic Missile Programs," pp. 5-40.

was mixed. On one hand, the target coverage of the DF-4 is larger than the DF-3, increasing first strike uncertainty. On the other hand, the DF-4's mobility is less than the DF-3, decreasing first strike uncertainty.

The DF-5 (CSS-4) is a storable liquid propellant two-stage ICBM and is the father of China's space launch vehicles. Two depressed-trajectory flight tests were conducted on 10 September 1971 and 8 April 1973, but neither of them was fully successful. Then the CZ-2 space launch vehicle, modified from the DF-5, successfully launched several satellites. The batch 02 flight tests of the DF-5 began in 1978, including depressed and lofted trajectory. On 18 May 1980, the DF-5 passed successful full range flight test.[58] The DF-5 was first deployed in 1981. Up to 1992, there were only four DF-5s deployed.[59] The U.S. Department of Defense (DOD) report believed that China had about twenty DF-5s at present.[60] The DF-5 is silo-based and its survivability depends on the camouflage and concealment of its silo. The most important contribution of the DF-5 to first strike uncertainty is its target coverage, marking the first time in history that China held the continental United States at risk, meaning a great psychological shock to the United States.

The development strategy of China's first-generation solid ballistic missiles consisted of developing a submarine launched ballistic missile (SLBM) (JL-1) first then modifying it to a land-based mobile missile (DF-21, CSS-5), known as the "*julang shangan*" (JL go ashore). The JL-1 program was formally set up in 1967 with batch 01 flight tests began in 1981. On 12 October 1982, the JL-1 passed its first successful flight test launched from underwater. Batch 02 flight tests began in 1984, but in 1985, the JL-1 suffered three consecutive fails (28 September, 7 October, 15 October). In 1985, the DF-21 was successfully launched from a TEL. After redesign, the JL-1 passed two consecutive flight tests on 15 and 27 September 1987.[61]

Generally speaking, survivability of SLBMs is better than land-based missiles. But the JL-1's associated SSBN, the Type 092, is noisy, which constrained its operability. As a solid missile, with greater mobility and shorter pre-launch preparation time, the DF-21 signified a fundamental achievement in creating first strike uncertainty. The drawback of the DF-21 is its

[58] Li Chengzhi, *Zhongguo hangtian jishu fazhan shigao* Vol. 2, pp. 347-363.
[59] Ibid. Lewis and Hua, "China's Ballistic Missile Programs," pp. 5-40.
[60] Office of the Secretary of Defense, *Annual Report to Congress Military and Security Developments Involving the People's Republic of China 2010*, p. 66.
[61] *Hangtian gongyebu dier yanjiuyuan yuanshi*, pp. 224-251. Li Chengzhi, *Zhongguo hangtian jishu fazhan shigao* Vol. 2, p. 388.

limited range (1700km), which could only cover targets close to China. China needed solid missiles with longer range.

The development strategy of China's second-generation solid ballistic missiles was that developing a mobile ICBM (DF-31) first, then modifying it to a SLBM (JL-2), so called "*dongfeng xiahai*"(DF go to sea).[62] The DF-31 passed its first successful flight test in 1999; in 2007, the DF-31 and DF-31A, its extended-range version, became operational according to U.S. DOD.[63] It is reported that the JL-2 confronted with technological difficulties, lagged behind its associated SSBN (the Type 094).[64] The DF-31 (with a range of 7200km) and DF-31A (with a range of 11200km) represent the highest level of the first strike uncertainty created by Chinese nuclear weapons. The Type 094 SSBN is not quiet, according to the U.S. intelligence, so after the Type 094/JL-2 enter into service, China will not be able to realize "assured retaliation."[65]

After reviewing the history of Chinese nuclear forces and the evolution of first strike uncertainty, we will turn to the training and deployment mode of China's nuclear forces. In August 1978, Deng Xiaoping raised the idea of "the use of modern weapons for fighting guerilla war." After that, the Second Artillery put great effort into the maneuverability of strategic missiles.[66] The Second Artillery's requirement of maneuverable combat can be summarized as "integrating mobility, concealment, protection, and strike-back."[67] The training and deploying mode of Chinese land-based mobile missiles can be roughly concluded from Chinese media reports, as shown in Figure 1. In peacetime, missiles are stored in the underground facilities, and will be dispersed on strategic warning to concealing sites. Once a launch order is issued, the missiles would leave concealing sites and head for launch sites.[68] Another approach is that the missiles stay in the underground facilities, absorbing adversary's first strike. Once a launch order is issued, the troops would roll missiles out, and fire.[69]

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[62] Lewis and Hua, "China's Ballistic Missile Programs," pp. 5-40.
[63] David C Isby, "China tests DF-31 ICBM," *Jane's Missiles and Rockets*, 1 Feb. 2001. Office of the Secretary of Defense, *Military Power of the People's Republic of China 2008*, p. 3.
[64] Office of the Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2011*, p. 34.
[65] Wu Riqiang, "Survivability of China's Sea-Based Nuclear Forces," *Science & Global Security*, Vol. 19, No. 2, pp. 91-120.
[66] Zhang Aiping, *Zhongguo renmin jiefangjun* Vol. 2, p. 118.
[67] Ibid, p. 120.
[68] Zhao Xianfeng, Bi Yongjun, Wu Xudong, "Rexue lijian ren: Gao Jin" [A hot-blooded swordman: Gao Jin], *Jiangfangjun bao*, November 20, 2000, p. 1.
[69] "Zhuzao zhonghua heping dunpai: dier paobing fazhan jishi" [Cast the peaceful shield of China: the real record of the development of the Second Artillery], *Renmin ribao*, July 8, 1996, p. 1. Wu Xudong, Dong Jushan, "Yitian changjian daguohun" [Long sword leaning the sky, the spirit of a great power], *Keji ribao*, July 3, 2001, p. 8.

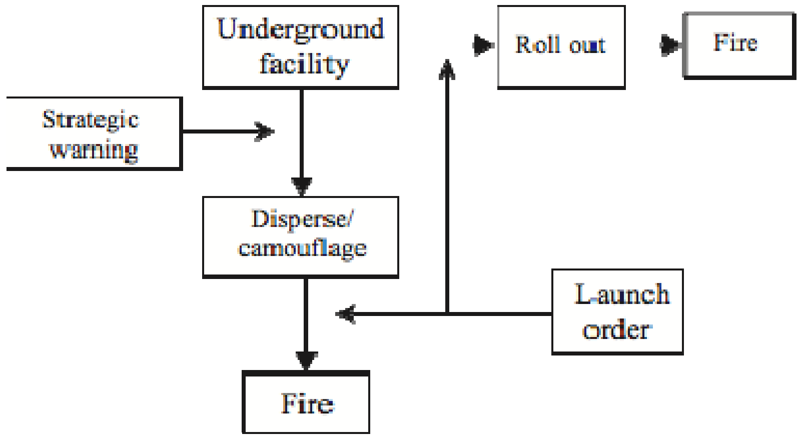

Figure 1 Deployment mode

The mobile capability of China's land-based missiles cannot guarantee "assured retaliation" because of many constraints. First, the launch units of mobile missiles are huge targets and could be easily detected. For example, the DF-21 launch unit is composed of six service trucks, for TEL, fire control, power, power distribution, aiming, and inspection respectively.[70] In addition to these, liquid missiles would require fuel trucks. Second, Chinese missiles can only be launched on pre-surveyed launch sites and cannot be launched randomly.[71] Theoretically, if the adversary finds and destroys all pre-surveyed sites, then even if missiles are survivable, they could not be launched.

Concealment and camouflage play very important role in the Second Artillery's training and deployment. We can see many discussions in publicly available literature on camouflage technology.[72] According to Chinese news reports, missiles could be camouflaged too well to be found by the naked eye or Chinese air- and space-based reconnaissance.[73] In order to prevent the

[70] *Hangtian gongyebu dier yanjiuyuan yuanshi*, pp. 244.
[71] Zhang Aiping, *Zhongguo renmin jiefangjun* Vol. 1, p. 527. Zhu Sixiong, Liao Wengen, "Daodan jiazu gengda, shencai gengxiao, weili gengqiang, jingdu genggao, jidong gengkuai, 108 mei xinxing daodan jiang liangxiang guoqing yuebing" [Missiles with bigger family, smaller body, more destructive capability, higher accuracy, higher mobility, 108 missiles will be shown in the National Day military rehearsal], *Renmin ribao*, September 28, 2009, p. 11. "Di'er paobing keji qiangjun daodan tuji nengli shixian xin kuayue" [The Second Artillery capability enhanced by science a new leap of missiles' attack capability], China News Website, July 23, 2007, http://www.chinanews.com/gn/news/2007/07-24/985779.shtml.
[72] Zhu Wei, Wang Jiaying, Li Hongwei, "Daodan zhendi fang hongwai chengxiang zhidao wuqi weizhuang fangfa yanjiu" [Study on the camouflage method for the missile sites against infrared imaging guidance weapons], in *Zhongguo tumu gongcheng xuehui fanghu gongcheng fenhui dijiuci xueshu nianhui lunwenji* [Proceedings of the ninth annual convention of the Protection Engineering Sub-Association of the Civil Engineering Association of China] (Changchun: 2004), pp. 1292-1296. Si Linsuo, Wang Tao, Zhao Junhong, *Daodan Zhendi Anquan Guanli yu Anquan Jishu* [Security Management and Technology of Missile Sites] (Xi'an, Shanxi Kexue Jishu Chubanshe, 2007), p. 244.
[73] Zhao, Bi, Wu, "Rexue lijian ren: Gao Jin." Yue Siping ed., *Yongyuan de fengbei* [Forever monument] (Beijing: Junshi kexue chubanshe, 2008), p. 543.

opposite side's satellites from detecting mobile missiles, once a satellite overfly warning is released, missiles will stop and concealment and camouflage measures will be deployed.[74] A silo camouflaged by plants is shown in Figure 2.

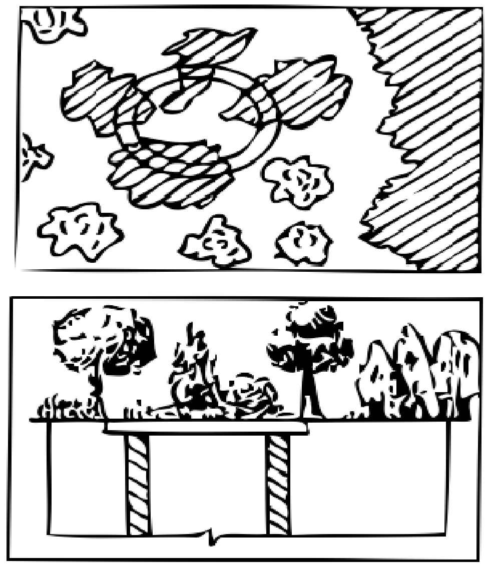

Figure 2 Silo camouflage[75]

China's missiles are kept de-alerted in peacetime. According to a U.S. intelligence official, "China keeps its missiles unfueled and without warheads mated."[76] Mark Stokes argues that "[Chinese nuclear] warheads are managed in peacetime through a system that is separate and distinct from Second Artillery missile bases and subordinate launch brigades."[77] From news report of China's media, it can be seen that the Second Artillery troops mate the warhead with its boosters at launch sites, and soldiers are trained in peacetime on how to mate the warheads quickly and accurately.[78] The advantage of de-alerting in peacetime is to avoid unauthorized or accidental launch, but the de-alerting status also makes Chinese nuclear arsenal vulnerable. For

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74 Li Yongfei, Wang Yongxiao, Xia Hongqing, "Tiantian yu jiangjun tongxing: di'er paobing moujidi guanbing xuexi jicheng yangyegong 'sizhong jingshen' jishi" [Follow with the general everyday: real record of the study of Yang Yegong's 'four spirits' in a base of the Second Artillery], *Jiefangjun bao*, August 17, 2006, p. 3.

75 Si Linsuo, Wang Tao, Zhao Junhong, *Daodan Zhendi Anquan Guanli yu Anquan Jishu*, p. 244.

76 Robert D. Walpole, National Intelligence Officer for Strategic and Nuclear Programs, Speech at Carnegie Endowment for International Peace, September 17, 1998, https://www.cia.gov/news-information/speeches-testimony/1998/walpole_speech_091798.html.

77 Mark A. Stokes, *China's Nuclear Warhead Storage and Handling System*, Project 2049 Institute, March 12, 2010, p. 2.

78 "Erpao chengwei juyou hefanji zuozhan nengli de zhanlue daodan budui" [The Second Artillery became a strategic missile force with nuclear counter-strike capability], PLA website, www.chinamil.com.cn/item/75/lshm/1980.htm. Yang Yonggang, Feng Jinyuan, "Moujidi chuangjilu huodong wei junshi xunlian tian dongli" [Military training improved by breaking the record activities in a base], *Jiefangjun bao*, March 9, 2007, p. 3.

example, under some extreme scenarios (not probable, but still possible), if the adversary launches a "bolt-from-the-blue" attack, China's nuclear forces would not have enough time to re-alert. As a result, the probability that some warheads would survive the first strike and could be used for retaliation would be decreased.

China's deterrent capability relies on strategic warning. This article defines strategic warning as signals that show another nuclear state is preparing to launch a nuclear attack on China, which is still under preparation rather than already underway. Stokes believes that "[w]arheads are mated with missiles assigned to brigades only in elevated readiness conditions and perhaps on occasion for training purposes."[79] As noted in *China's National Defense in 2008*, "[i]n peacetime the nuclear missile weapons of the Second Artillery Force are not aimed at any country. But if China comes under a nuclear threat, the nuclear missile force of the Second Artillery Force will go into a state of alert, and get ready for a nuclear counterattack to deter the enemy from using nuclear weapons against China."[80]

On the contrary, U.S. nuclear posture does not depend on strategic warning. "Satisfactory U.S. nuclear operations with intercontinental forces depend in theory on no more than tactical warning for bombers and no warning at all for ballistic missiles."[81] China's reliance on strategic warning reflects China's belief that nuclear war is unlikely. Even in the event that the "unlikely" occurs, there must be some signals. According to this logic, a "bolt-from-the-blue" nuclear attack is unimaginable. So while it would be possible in theory, such an attack should not be the determining factor of one's nuclear posture.

This sector reviewed the history of China's nuclear forces development and China's special nuclear posture. It can be concluded that the guiding principle of China's nuclear build-up is first strike uncertainty rather than assured retaliation. The developmental history of China's nuclear forces represents the history of the evolution of first strike uncertainty. In the next section, we will discuss perceptions of the first strike uncertainty, including that of China and other countries.

[79] Mark A. Stokes, *China's Nuclear Warhead Storage and Handling System*, p. 12.
[80] Information Office of the State Council of the People's Republic of China, *China's National Defense in 2008*, Beijing, January 2009.
[81] Richard K. Betts, *Surprise Attack: Lessons for Defense Planning* (Washington, D.C.: Brookings Institution, 1982), pp. 228-254.

4 Evolution of Perception of Uncertainties

1969 Sino-Soviet Conflict

The 1969 Sino-Soviet conflict is the only ground conflict in which two nuclear powers were involved. China faced the only nuclear threat since its testing of nuclear weapons in 1964. In this section, we will discuss the process of this crisis, focusing on the Soviet nuclear threat and Chinese perception of and response to it.

The 2 March 1969 clash on Zhenbao/Damansky Island in the Ussuri River was China's deliberate response to Soviet provocations on Sino-Soviet border. The Soviet Union was completely surprised. During the second clash on 15 March, Soviet troops were still not well prepared and could not get help because Soviet top leaders were abroad. After these two clashes, both sides criticized each other and prepared for war. On 13 August, Soviet troops moved across the border in Xingjiang and completely destroyed a PLA patrolling unit in an ambush. Thereafter, the Soviet Union released a series of nuclear threats against China. The airport meeting between Chinese Premier Zhou Enlai and his Soviet counterpart Alexei Kosygin on 11 September did not change China's pessimistic judgment. Most of China's top leaders dispersed from Beijing before planned bilateral negotiations occurred. Marshall Lin Biao, who was in charge of the CMC's daily affairs, issued "No. 1 Order" on 17 October, placing all Chinese military forces, including the Second Artillery, on alert. This is the only time that Chinese nuclear forces were put on alert.[82]

Documents regarding the 1969 Sino-Soviet conflict are still classified in both China and Russia. The only document revealing the internal decision-making process of the Soviet Union during that crisis is the memoir of Arkady Shevchenko, a defector and former deputy secretary of the United Nations. According to Shevchenko, "the Politburo was terrified that the Chinese

[82] Li Danhui, "1969 nian zhongsu bianjie chongtu: yuanqi he jieguo" [1969 Sino-Soviet border conflict: causes and results], *Dangdai zhongguoshi yanjiu*, No. 3, 1996, pp. 39-50. Xiong Xianghui, "Dakai zhongmei guanxi de qianzou" [Prelude of the opening of Sino-US relations], *Zhonggong dangshi ziliao*, No. 42. Xu Yan, "1969 nian zhongsu bianjie de wuzhuang chongtu" [1969 armed conflict on Sino-Soviet border], *Dangshi yanjiu ziliao*, No. 5, 1994. Yang Kuisong, *Zhonghua renmin guoheguo jianguoshi yanjiu 2* [Historical research of the founding of the People's Republic of China 2] (Nanchang: Jiangxi renmin chubanshe, 2006), pp. 266-295. Chi Zehou, "'yihao haoling' fachu qianhou" [The issuing of the No. 1 order], in Ding Kaiwen ed., *Chongshen Lin Biao zui'an* [New concepts of Lin Biao's incident] Vol. 1, (New York: Mirror books, 2004), pp. 91-131. Zhang Yunsheng, "Shihua shishuo 'yihaoling'" [Facts about the No. 1 order], in Ding ed., *Chongshen Lin Biao zui'an* Vol. 1, pp. 63-90. Zhang was Lin Biao's secretary in 1969. Wu Faxian, *Suiyue jiannan: Wu Faxian huiyilu* [Hard years: Wu Faxian's memoir] (Hongkong: Beixing chubanshe, 2006), pp. 760-768. General Wu was the commander of China's Air Force and a member of the CMC Administrative Group. John Wilson Lewis, Xue Litai, *Imaged Enemies: China Prepares for Uncertain War* (Stanford, California: Stanford University Press, 2006), pp. 44-74.

might make a large-scale intrusion into Soviet territory which China claimed," and in a Politburo conference, Marshal Andrei Grechko, the Defense Minister, called for unrestricted use of nuclear weapons to "once and for all get rid of the Chinese threat."[83]

After the 13 August clash, the Soviet Union began to release nuclear threats against China. A *Pravda* editorial of 28 August said that in a war with China, "lethal armament and modern means of delivery" would be involved."[84] Victor Louis, a well-known KGB agent, published an article in *London Evening News* on 16 September indicating a potential Soviet nuclear attack on China's nuclear facilities.[85]

Besides direct signals from the Soviet Union, there were also some indirect signals from the United States. On 18 August, a mid-level Soviet diplomat in Washington was instructed to query U.S. reaction to a potential Soviet strike on Chinese nuclear facilities. In late August, American intelligence detected a stand-down of the Soviet air force in the Russian Far East, "which permits all aircraft to be brought to a high state of readiness simultaneously, is often a sign of a possible attack; at a minimum it is a brutal warning in a intensified war of nerves." Now it was the time for the United States to express its concern. On 27 August in a background briefing to a group of journalists, the CIA director disclosed that the Soviet Union appeared to be sounding out its East European allies on the possibility of a Soviet preemptive attack on China. This brief was released by the *Washington Star*.[86]

Obviously China received all of these signals. At the end of August, Chinese intelligence reportedly confirmed information that the USSR was preparing a nuclear surprise attack on China.[87] According to Zhang's recollection, this intelligence was a turning point, representing the shift of Lin Biao's attitude from ignorance to dealing with it seriously.[88] In a report to the Politburo on 10 September, the CMC Administrative Group argued that although it was very difficult for the Soviet Union to launch a general war, there was a possibility of war.[89] A Chinese embassy in an Eastern Europe country even reported the D-day.[90]

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[83] Arkady N. Shevchenko, *Breaking with Moscow* (New York: Knopf, 1985), pp. 164-166.
[84] Harry Gelman, *The Soviet Far East Buildup and Soviet Risk-Taking Against China* (Santa Monica, CA: RAND Corporation, 1982), pp. 37-38.
[85] Ibid, pp. 39-40.
[86] Henry Kissinger, *The White House Years* (Boston: Little, Brown & Company,1979), pp. 183-84.
[87] Zhang, "Shihua shishuo 'yihaoling,'" pp. 63-90. Wu, *Suiyue jiannan*, pp. 760-768.
[88] Zhang, "Shihua shishuo 'yihaoling,'" pp. 63-90.
[89] *Zhongguo renmin jiefangjun junshi* [The history of the People's Liberation Army] Vol. 6, (Beijing: Junshi kexue chubanshe, 2011), p. 105.
[90] Chi, "'Yihao haoling' fachu qianhou," pp. 91-131.

China began to seriously prepare for war.[91] Before the 13 August clash, the focus of China's war preparedness was to adjust the main strategic direction from south against the United States to north against the Soviet Union.[92] On 28 April, Mao Zedong said at the first plenary session of the Ninth Central Committee that "[We] should get ready to fight." Mao also envisaged two kinds of war: "small fight" on border; and luring the foe deep into the country for "big fight."[93] From end-June to early-July, the CMC Administrative Group held a three-northern-regions (Northeast, North and Northwest China) combat conference. The conference summary, afterwards approved by Mao, became the guiding document of war preparedness in northern China, marking a shift of focus within China towards defense from the Soviet Union.[94] Concerned with the domestic chaos induced by the Cultural Revolution, the CCP issued a decree on 23 July demanding Shanxi Province, and applied to all provinces, cease armed struggle and restore social order.[95]

After 13 August, the focus of China's war preparedness shifted to preventing Soviet surprise attack.[96] On 27 August, the National Civil Air Defense Leading Group was established. Premier Zhou Enlai was made its director and its responsibilities included: mass evacuations, industry moving and preparing for nuclear war.[97] The next day, the Central Committee of the CCP issued an order, demanding all border provinces and regions conduct war preparedness to prevent adversaries' surprise attack.[98]

After the Zhou-Kosygin airport meeting, the CCP held a series of conference judging the situation. The conclusion was that the airport meeting was a camouflage for Soviet surprise

[91] *Zhongguo renmin jiefangjun junshi* Vol. 6, pp. 109-139.

[92] Liu Zhinan, "1969 nian, zhongguo zhanbei yu dui meisu guanxi de yanjiu he tiaozheng" [China's war preparedness and study and adjustment of the relations with the United States and the Soviet Union], *Dangdai zhongguoshi yanjiu*, No. 3, 1999, pp. 41-57.

[93] "Maozhuxi zai zhongguo gongchandang dijiujie zhongyang weiyuanhui diyici huiyi shang de jianghua" [Chairman Mao's talk at the first plenary session of the Ninth Central Committee], in Zhongguo renmin jiefangjun dangshi dangjian zhenggong jiaoyanshi ed., *Zhonggong dangshi jiaoxue cankao ziliao* [References for the teaching of the history of the CCP] Vol. 26, No. 2, p. 336.

[94] Liu Zhinan, "1969 nian, zhongguo zhanbei yu dui meisu guanxi de yanjiu he tiaozheng," pp. 41-57.

[95] Zhonggong zhongyang wenxian yanjiushi ed., *Zhou Enlai nianpu: 1949-1976* [Chronicle of *Zhou Enlai*'s life: 1949-1976] Vol. 3, (Beijing, Zhongyang wenxian chubanshe , 1997), p. 311. "Zhongguo gongchandang zhongyang weiyuanhui bugao (July 23, 1969)" [Decree of the Central Commission of the China's Communist Party (July 23, 1969)] in Zhongguo renmin jiefangjun dangshi dangjian zhenggong jiaoyanshi ed., *Zhonggong dangshi jiaoxue cankao ziliao* Vol. 26, No. 2, pp. 356-357.

[96] Liu Zhinan, "1969 nian, zhongguo zhanbei yu dui meisu guanxi de yanjiu he tiaozheng," pp. 41-57.

[97] Yang, *Zhonghua renmin gongheguo jianguoshi yanjiu 2*, pp. 266-295. Zhonggong zhongyang wenxian yanjiushi, *Zhou Enlai nianpu: 1949-1976* Vol. 3, pp. 316-317.

[98] Zhonggong zhongyang wenxian yanjiushi, *Zhou Enlai nianpu: 1949-1976* Vol. 3, p. 317. "Zhongguo gongchandang zhongyang weiyuanhui mingling (August 28, 1969)" [Order of the the Central Committee of the China's Communist Party(August 28, 1969)] in Zhongguo renmin jiefangjun dangshi dangjian zhenggong jiaoyanshi ed., *Zhonggong dangshi jiaoxue cankao ziliao* Vol. 26, No. 2, pp. 365-367.

attack. A new round of measures for emergent war preparedness was issued.[99] On 22 September, Premier Zhou said in a PLA conference for war preparedness, "we need to prepare for the war, especially for the adversary's surprise attack."[100] Two dates were believed the most probable for the Soviets to launch an attack on China: 1 October, the National Day of China; and 19 October, when the Soviet delegation planned to arrive in Beijing for border negotiations. Before the National Day, airplanes on the airports near Beijing were dispersed and emergency measures were undertaken to avoid Soviet occupation of the airports. Lin Biao also proposed to release the water of Miyun reservoir outside Beijing to avoid the horrible consequence in case its dam was destroyed. However, this proposal was rejected, due to Premier Zhou's opposition.[101] Nothing occurred on National Day.

After National Day, Lin Biao inspected Zhangjiakou's defense projects, which was supposed to be an important gateway for Soviet ground troops to attack Beijing from Mongolia.[102] The politburo conference on 15 October made the decision to move the CCP's high leaders out of Beijing.[103] The next day, Mao Zedong left Beijing for Wuhan and Lin Biao headed for Suzhou. On 17 October, Zhou Enlai and the CMC Administrative Group moved to the advance command post under Beijing's Western Hills.[104] Finally, what arrived in Beijing on 19 October were Soviet negotiators, rather than nuclear bombs. According to Lin Biao's No. 1 Order, ninety five divisions, more than four thousands aircrafts and six hundreds warships were dispersed.[105] The alert status was not cancelled until 24 April 1970.[106]

Perceptions in Late-1960s and early-1970s

In 1969, Chinese leaders' reaction to Soviet nuclear threat shown that they were not confident of China's nuclear retaliatory capability. On November 23, 1969, regarding Soviet nuclear threat, Premier Zhou said: "they wanted to intimidate us by atomic bombs, based on their position of strength. This cannot frighten us."[107] It is worth to note that Premier Zhou only said

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[99] Yang, *Zhonghua renmin gongheguo jianguoshi yanjiu 2*, pp. 266-295.
[100] Zhonggong zhongyang wenxian yanjiushi, *Zhou Enlai nianpu: 1949-1976* Vol. 3, p. 322.
[101] Ibid, p. 325.
[102] Wu, *Suiyue jiannan*, pp. 760-768.
[103] Ibid.
[104] Ibid. Zhang, "Shihua shishuo 'yihaoling,'" pp. 63-90.
[105] Chen Donglin, Du Pu eds., *Zhonghua renmin gongheguo shilu: Neiluan yu kangzheng: Wenhua dageming de shinian (1966-1971)* [The real record the People's Republic of China: Chaos and struggle: a decade of the Cultural Revolution (1966-1971)] (Changchun: Jilin renmin chubanshe, 1994), pp. 526-527.
[106] Zhang, "Shihua shishuo 'yihaoling,'" pp. 63-90.
[107] Zhonggong zhongyang wenxian yanjiushi, *Zhou Enlai nianpu: 1949-1976* Vol. 3, p. 335.

that China would not yield to nuclear blackmail and did not mention China's nuclear retaliation at all.

Chinese leaders' perception resulted from their clear understanding that China's nuclear forces were too weak. As mentioned above, Chinese nuclear weapons deployed at that time included a very small number of H-6 bombers and DF-2 medium range ballistic missiles (MRBMs). Chinese leaders were not satisfied with both of these two delivery vehicles and doubted their survivability and penetration capability. Regarding the H-6 bomber, Marshal Nie said in October 1965, "Soviets said it was not good in 1957 and they did not produce it anymore. It is clumsy, slow, and vulnerable to adversary's radars and missiles."[108] The reason China produced the H-6 is because "if we do not produce this plane now, we are unable to design intermediate-range bombers indigenously, so I agree to produce tens of Tu-16s during the third five-year plan, on one hand, as equipment complement, on the other hand, as means of technical training."[109] Regarding the DF-2, Marshal Nie stated in 1963, "Although it is not perfect, it is still useful. It can be used for training technicians and troops, which is good for follow-on research and improvement."[110] In July 1964, he said, "Regarding the DF-2, after design finalization, we should produce a batch of operational missiles as well as training missiles, and try to flight test it with atomic warhead. … at least it can embolden ourselves."[111] So Chinese leaders' expectation for the DF-2 is just "training troops" and "embolden ourselves", rather than deterrent or operational capability.

American perceptions of Chinese nuclear forces can be divided into two phases by Defense Support Program (DSP)'s entering into service in 1970. During the pre-DSP phase, the United States relied on photographic intelligence and did not understand the technical characteristics of Chinese nuclear missiles very well. For example, a U.S. intelligence estimate released in 1967 did not have a good understanding of China's 1966 nuclear missile test. "There is no conclusive evidence as to the distance the missile might have flown, but we believe it probably was fired from the Shuang-ch'eng-tzu Missile Test Range (SCTMTR). Just prior to the test, a new launch complex was constructed at SCTMTR at a location well away from other facilities, suggesting a special concern for safety. This may have been the site from which the missile was[were] fired."[112]

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[108] Zhou, *Nie Rongzhen nianpu* Vol. 2, p. 1003.
[109] Ibid.
[110] Ibid, p. 905.
[111] Ibid, p. 942-943.
[112] NIE 13-8-67 Communist China's Strategic Weapons Program, 3 August 1967, p. 4

After DSP entered into service, the United States could monitor Chinese missiles' flight tests, so that the United States had very good knowledge about Chinese missiles' technical characteristics. DSP can see the exhaust plumes of long-range ballistic missiles and infer the launch point, launch azimuth and range. In 1971, an intelligence estimate judged correctly that the unknown missile launched from Jingyu/Ching-yu test base (the DF-4) was "a two-stage variant of the CSS-2 [DF-3] IRBM [intermediate-range ballistic missile]," the CZ-1 space launch vehicle which launch China's first satellite was modified from the Ching-yu system, while another unknown missile launched from the Jiuquan/Shuang-ch'eng-tzu test base (the DF-5) was an ICBM during very early development phase.[113]

During this period, both the United States and the Soviet Union did not think China had nuclear retaliatory capability. In 1967, the U.S. intelligence estimate believed that the DF-2 should be ready for deployment, the production plant for the H-6 was completed and China would begin to deploy these two weapons in 1967 or 1968.[114] In 1971, the U.S. intelligence community believed that China had deployed a small number of DF-2s and 30 H-6s. But as mentioned above, given their poor survivability and penetration capability, their deployment could not guarantee China nuclear retaliatory capability. The general evaluation of China's nuclear forces in 1971 was that "China is now in a critical transition phase," because the important DF-3 missile was ready for deployment.[115] Consistent with the U.S. intelligence community, in August 1971, Kissinger said, "In fact we have no disarming capability against the USSR but we do have some against China."[116] Regarding Soviet perception of China's nuclear forces during that period, the author was unable to find first hand materials. Only some personal recollections are available which show the same conclusion. Vitaly Shlykov, a former military intelligence officer who oversaw intelligence estimates during the early-1970s, recalled that during this period Soviets did not feared China's nuclear potential.[117]

In sum, during 1969 Sino-Soviet conflict, China's nuclear forces were too weak to be perceived as being able to retaliate. If both Chinese and U.S./Soviet leaders had the same evaluation, then a question naturally arises, what deterred the Soviet Union from undertaking a nuclear strike against China? The answer is likely to be China's "people's war strategy" rather

[113] NIE 13-8-71, Communist China's Weapons Program for Strategic Attack, 28 October 1971, p. 18-19, 29.
[114] NIE 13-8-67 Communist China's Strategic Weapons Program, 3 August 1967, pp. 10-11, 15.
[115] NIE 13-8-71, Communist China's Weapons Program for Strategic Attack, 28 October 1971, p. 3, 24, 33.
[116] U.S. National Security Council, Memorandum of Conversation, "Subject: Minutes of NSC Meeting of Defense Strategy," August 13, 1971.
[117] Goldstein, "Do Nascent WMD Arsenals Deter?" pp. 53-80.

than nuclear weapons. During the airport meeting with Kosygin, Premier Zhou stated that if the Soviet Union launched a preventive war, China would resist it "to the end."[118] Again, Premier Zhou did not mention nuclear retaliation, he appealed to China's tradition of conducting a people's war. The Soviets knew this point well. In his book, Shevchenko said that in 1970 he had a conversation with Marshal Nikolai Ogarkov. The latter told him that a large-scale nuclear strike against China would inevitably mean world war and that a "surgical strike" would lead to endless guerrilla warfare.[119]

Perceptions in Mid-1970s

During the Cultural Revolution, the Seventh Ministry of Machine Building, which is responsible for the development and production of ballistic missiles, suffered serious struggles between various cliques. Premier Zhou met with two cliques in the ministry a number of times to try to moderate the conflict.[120] In 1975, Deng Xiaoping resumed and began to conduct consolidation and adjustment in all industries. On 8 March 1975, General Zhang Aiping was appointed as the director of the Defense Science and Technology Commission. Solving the issue of clique struggles in the Seventh Ministry of Machine Building was his most notable work.[121] General Zhang's consolidation led to a positive net effect on China's missile industry. But at the end of 1975, when Deng Xiaoping was again denounced, so was General Zhang.[122]

Clique struggles in the Seventh Ministry of Machine Building greatly disturbed normal development and production activities. For example, Plant 230, which is responsible for the production of the stabilizing platform for the DF-5 ICBM, had produced only seven platforms from 1971 to 1977. After the Cultural Revolution, they produced five platforms during the first half of 1978.[123] From 1972 to 1974, China launched just one satellite and failed. But after General Zhang's consolidation in 1975, China successfully launched three satellites.[124] The chaos in the Cultural Revolution also resulted in very low quality military products. Premier Zhou stated in 1970 "under the shock of the Cultural Revolution, many waste products have

[118] Mikhail Kapitsa, "Kosygin yu Zhou Enlai zai Beijing jichang de huitan" [Kosygin-Zhou Enlai talks in the Beijing airport], *Zhonggong dangshi yanjiu*, No. 1, 1997, pp. 62-68.
[119] Shevchenko, *Breaking with Moscow*, pp. 164-166.
[120] Zhonggong zhongyang wenxian yanjiushi, *Zhou Enlai nianpu: 1949-1976* Vol. 3, pp. 295-296, 305, 309-310, 311-312.
[121] *Zhongguo renmin jiefangjun junshi* Vol. 6, pp. 279-280.
[122] Zhang Sheng, *Cong zhanzheng zhong zoulai: liangdai junren de duihua* [Coming from the war: dialogues between two generations of military officers] (Beijing: Zhongguo qingnian chubanshe, 2007), p. 389.
[123] Song Renqiong, *Song Renqiong huiyilu xuji* [The sequel to Song Renqiong memoir] (Beijing: Jiefangjun chubanshe, 1996), p. 49. Song was the Minister of the Seventh Ministry of Machine Building from October 1977 to December 1978.
[124] *Zhongguo renmin jiefangjun junshi* Vol. 6, p. 286.

appeared in our military products. The effective product inspection system of the past should be remained."[125] In 1971, Marshal Ye Jianying was made the responsibility of consolidating the quality of military products.[126] Late in 1975, Marshal Ye still expressed his worries about the quality of Chinese military products.[127]

The Second Artillery also suffered serious internal conflicts. On 6 June 1966, the Central Committee and the CMC of the CCP jointly decided to set up China's strategic rocket force, named the Second Artillery. It was formally established on 1 July. But because of the chaos of the Cultural Revolution, the leadership of the Second Artillery did not take office for a long time. On 4 July 1967, the CMC appointed General Xiang Shouzhi as the commander, General Li Tianhuan as the political commissar. Surprisingly, this appointment of commanders was not been announced for a long time. General Xiang himself did not know. Forty-three days after that appointment command was made, General Xiang was denounced, without knowing of the appointment, let alone taking office.[128]

The Second Artillery was established based on the merger of the People's Public Security Force of China and the division of the Artillery responsible for missiles, which resulted in a serious clique struggle. Clique conflicts in the Second Artillery resulted in a lack of operational capability. Premier Zhou warned the Second Artillery of becoming an "empty shell."[129] Up to the end of the Cultural Revolution, the Second Artillery had not yet established independent capability to launch missile without outside technical support from the defense industry or missile test bases.[130] General Li Shuiqing, former commander of the Second Artillery after the Cultural Revolution, recalled that when he took office, "although one type of IRBM, as a main battle equipment, has been equipped, there were very few missile regiments with independent launch capability."[131]

Contrary to China's chaotic domestic situation, during this period, because of the deployment of the DF-3s, other countries' evaluation of China's nuclear deterrence changed. A U.S. intelligence estimate in 1974 argued that "China's force suffers from a number of

[125] Zhonggong zhongyang wenxian yanjiushi, *Zhou Enlai nianpu: 1949-1976* Vol. 3, p. 377.
[126] *Zhongguo renmin jiefangjun junshi* Vol. 6, pp. 213-214.
[127] Liu Jixian ed., *Ye Jianying nianpu* [Chronicle of Ye Jianying's life] Vol. 2, (Beijing: Zhongyang wenxian chubanshe, 2007), pp. 1102-1103.
[128] Xiang Shouzhi, *Xiang Shouzhi huiyilu* [Xiang Shouzhi's memoir] (Beijing: Jiefangjun chubanshe, 2006), p. 334.
[129] Xu Jian, *Daguo Changjian: Zhongguo Zhanlue Daodan Budui Jishi (the Long Sword of a Great Power: A Description of China's Strategic Missile Force)* (Beijing: Zuojia Chubanshe, 1995), p. 123.
[130] Zhang Aiping, *Zhongguo renmin jiefangjun* Vol. 2, p. 111-112.
[131] Li Shuiqing, *Cong hongxiaogui dao huojianbing siling: Li Shuiqing jiangjun huiyilu* [From a little revolutionary soliders to the commander of the rocket forces: General Li Shuiqing's memoir] (Beijing: Jiefangjun chubanshe, 2009), pp. 511-512.

vulnerabilities but has achieved a measure of survivability through concealment, mobility, and hardening," and so China had achieved "a modest but credible nuclear retaliatory capability against the USSR."[132] This is the earliest U.S. intelligence evaluation showing that China had nuclear retaliatory capability. The estimate believed that China had deployed 30-35 DF-3 launchers, which seemed insignificant compared with enormous U.S. nuclear arsenal.[133] It can be concluded that even a very small nuclear force can create moderate first strike uncertainty, making good use of the measures of mobility and concealment. The estimate also argued that China's deterrence was marginal if the stake was high enough. "In the case of the Soviet Union, it depends on Soviet fears for the security of some few cities in Siberia and the Soviet Far East, and perhaps on Soviet uncertainty about IRBM deployment in western China which might be within range of some cities in the Urals. In the case of the US, it rests on US fears for the security of a few US bases and cities of allies in the Far East."[134] On the Soviet side, consistent with U.S. evaluations, Russian scholars also believed that China's substantial nuclear forces were only created in 1974.[135]

In sum, in mid-1970s, Chinese defense industry and nuclear forces had fallen into chaos because of the Cultural Revolution. They were producing defense products of very low quality, slow paced nuclear weapons deployment and deployed nuclear weapons lacking in operational capability. Chinese leaders had clear understanding of this status and did not think that China had nuclear retaliatory capability. On the contrary, during the same period, the United States and the Soviet Union thought that China had already created nuclear retaliatory capability. This leads to the question of when Chinese leaders would begin to be confident of nuclear retaliatory capability. The answer to this question will be discussed in next two sections.

Perceptions in Late-1970s to Early-1980s

After the Cultural Revolution, China's most important task was consolidation. A working group was set up in March 1977 to conduct the consolidation of China's space industry. Members of this group came from Beijing, Hebei Province, Shandong Province, Shanxi Province and the People's Liberation Army. In April 1978, this working group finished its work and was

[132] NIE 13-8-74 China's Strategic Attack Programs, 13 June 1974, p. 1, 3.
[133] Ibid, p. 13.
[134] Ibid, p. 5.
[135] V. Stefashin, "Evolyutsiya Voennoy Strategii Kitaya" [The Evolution of China's Military Strategy], *Voennaya Mysl 3* (March 1994):73, quoted from Lyle J. Goldstein, "Do Nascent WMD Arsenals Deter? The Sino-Soviet Crisis of 1969," *Political Science Quarterly*, Vol. 118, No. 1 (Spring, 2003), pp. 53-80.

dismissed.[136] Regarding the Second Artillery, in September 1977, General Li Shuiqing was appointed as the commander and began consolidating the Second Artillery. By September 1979, the status of the Second Artillery gradually returned to normal.[137]

During this period, the Second Artillery's primary task was to gain the independent launch capability without outside support. In an exercise in March 1977, the Second Artillery troop conducted its first independent launch.[138] This exercise marked a great leap of the Second Artillery's capability. But this is just the very beginning of the Second Artillery's training for independent launch. In early-1980s, General Li recalled that although the Second Artillery had conducted independent launch exercise, only one missile regiment was involved and the missiles launched were an old retiring type. This illustrated that most of the missile regiments still did not have independent launch capability.[139] Thus, one of the most important tasks in his term was to increase launch capability of every missile regiment and for every missile type.[140]

The Second Artillery was also undertaking measures to improve the training levels of troops. In September 1983, the Second Artillery conducted its first campaign exercise, during which four IRBMs were successfully fired.[141] In early-1980, the Second Artillery also solved the problem of a "hibernation period," which means that every year after the demobilization of veterans, the Second Artillery could not operate missiles for a half year. Chinese military leaders were shocked after this problem was reported by foreign military journals.[142] This problem was solved by separating the training of the new recruits and the veterans. The new recruits were trained in a special training unit before entering combat troops.[143]

We can see from Chinese leaders' speech that during this period Chinese leaders still lacked confidence in China's nuclear retaliatory capability. In 1978, Deng Xiaoping said, "we do not worry about Soviet invasion, … China is undeveloped with very few symbolic atomic bombs. But China has three characteristics: big territory, large population and with experience and endurance of long-standing war. Our strategy is Chairman Mao's people's war, fighting

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[136] Song, *Song Renqiong huiyilu xuji*, pp. 36-37.
[137] Li, *Cong hongxiaogui dao huojianbing siling*, pp. 502-510.
[138] Han Huaizhi, Tan Jingqiao eds., *Dangdai zhongguo jundui de junshi gongzuo* [Contemporary China: military affairs of PLA] Vol. 2, (Beijing: Zhongguo shehui kexue chubanshe, 1989), p. 324.
[139] Li, *Cong hongxiaogui dao huojianbing siling*, pp. 522-525.
[140] Ibid.
[141] Han, Tan, *Dangdai zhongguo jundui de junshi gongzuo* Vol. 2, pp. 321-327. Li Xuge, "Yitian zhujian" [Casting the sword leaning the sky] in Guangrong jiyi zhongguo renmin jiefangjun zhengcheng qinliji bianweihui ed., *Jingbing zhilu* [The road of troop reductions] (Beijing: Jiefangjun chubanshe, 2007).
[142] Xu Jian, *Daguo changjian: zhongguo zhanlue daodan budui shiji* [The long sword of a great power: a description of China's strategic missile force] (Beijing: Zuojia chubanshe, 1995), pp. 253-260.
[143] Li, "Yitian zhujian." Xu, *Daguo changjian*, pp. 253-260. Zhang, *Zhongguo renmin jiefangjun* Vol. 2, p. 120.

protracted war."[144] This statement is very much similar with Premier Zhou's in 1969 airport meeting with Kosygin, e.g. China appealed to people's war strategy and the endurance for long-standing warfare rather than nuclear retaliation to deter aggression. In 1981, General Zhang said that China had two weak points. One was nuclear weapons and the other was its Air Force.[145]

Other countries' evaluation of China's nuclear retaliatory capability, following the mid-1970s, is unavailable. But it is reasonable to assume that first strike uncertainty would be gradually enhanced as China continuously modernized its nuclear forces. So we can conclude that from mid-1970s on, other countries began to consider China able to absorb a first strike and launch nuclear retaliation.

Perceptions in Mid-1980s and Later

In 1984, the Second Artillery began to enter the list of day-day combat readiness on duty, indicating that Chinese leaders became confident of their retaliatory capability.[146] In 1985, an article on the journal of *Liaowang* said China possessed nuclear counterattack capability.[147] Chinese leaders also began to talk of China's nuclear retaliatory capability. In December 1986, General Zhang said, "under adversary's nuclear threat, we worked out nuclear weapons, although the number is low, and quality poor, we had capability to strike back."[148] The leaders of the Second Artillery stated in January 1988 that the Second Artillery had had a certain capability of nuclear counterattack combat.[149]

After entering the combat duty, there was still huge space for the improvement of Second Artillery training. In 1984, the Second Artillery began to conduct integrated training of missile battalions. The reason is because in order to conduct combat mission, the missile troops need not only just the missiles and launchers, but also other support elements such as target intelligence, geodesy, weather forecast, firing data, engineering protection, electronic countermeasure, early warning, air defense, nuclear detonation detection, command/control/communication and logistics.[150] On this basis, the Second Artillery conducted integrated trainings at the level of

[144] Leng Rong and Wang Zuoling, *Deng Xiaoping Nianpu: 1975–1997*, pp. 135-136.
[145] Zhang Aiping, *Zhang Aiping junshi wenxuan* [Selected military works of Zhang Aiping] (Beijing: Changzheng chubanshe, 1994), pp. 371-378.
[146] Zhang, *Zhongguo renmin jiefangjun* Vol. 2, p. 113.
[147] Guo Qingsheng, "Zhongguo yongyou hefanji nengli: fang zhongguo zhanlue daodan budui" [China possessed nuclear counter strike capability: interview in China's strategic missile force], *Liaowang*, Aril 22, 1985, pp. 23-25.
[148] Zhang, *Zhang Aiping junshi wenxuan*, pp. 573-584.
[149] Chen Zhiqiang, Zhao Su, Cheng Guanglong, "Juyou yiding hefanji nengli woguo zhanlue daodan budui chuju guimo" [With some nuclear counter strike capability Our strategic missile force achieve initial scale], *Renmin ribao*, January 9, 1988, p. 1.
[150] Han, Tan, *Dangdai zhongguo jundui de junshi gongzuo* Vol. 2, pp. 321-327.

missile brigades during the mid-1990s. The purpose was all the battalions affiliated with the same brigade could conduct combat missions simultaneously and the brigade command could organize, control and support all the battalions simultaneously.[151]

The Second Artillery also put great effort into building missile sites. In the summer of 1995, the "Great Wall Project" was completed, which took more than ten years.[152] The purpose of this project was to construct underground facilities for land-based strategic missiles to increase survivability. Since detailed information on this project is classified, one must rely on media reports. According to foreign media, the project stipulated that there should be a series of underground facilities, interconnected by tunnels, in which missiles could move randomly.[153] China's CCTV released some videos of the tunnels, which showed that the tunnels were big enough to house heavy vehicles and there were rails on the ground.[154] It can be concluded that the completion of this project further increased Chinese leaders' confidence of the survivability of China's strategic missiles.

In sum, from mid-1980s, Chinese leaders believed that China had nuclear retaliatory capability. But ten years ago did the United States and the Soviet Union begin to share this belief. The perception gap shows that countries always prefer to overestimate other countries' nuclear capability because of the existence of uncertainty and worst-case assumptions of policymakers.

U.S. Missile Defense and First Strike Uncertainty

In this section, the impact of U.S. BMD on first strike uncertainty and Sino-U.S. strategic stability will be explored. Only the strategic BMD will be discussed. As mentioned above, Chinese leaders' confidence of nuclear retaliatory capability depends on first strike uncertainty. Although the number of Chinese nuclear weapons is very low, there might be some warheads

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[151] Yang Guoliang, "Kuaisu fazhan erpao zuozhan liliang jianshe de lishixing kuayue" [The historical leap of the rapid development of the Second Artillery's combat capability build-up], in Di'er paobing zhengzhibu ed., *Huihuang niandai: Huigu zai gaige kaifang zhong fazhan qianjin de di'er paobing* [Glorious era: Reviewing the Second Artillery's development and advances during reform and opening] (Beijing: Zhongyang wenxian chubanshe, 2008), pp. 215-223.
[152] Xu Jian, *Niaokan diqiu: Zhongguo zhanlue daodan zhendi gongcheng jishi* [A bird's eye view of the earth: A description of the site engineering of China's strategic missiles] (Beijing: Zuojia chubanshe, 1997), pp.495-500. Zhang Xuanjie et al., "Duanzao gongheguo heping dunpai: Jiang Zemin zhuxi guanxin di'er paobing jianshe jishi" [Casting the peaceful shield of the Republic: Real record of Chairman Jiang Zemin's caring on the Second Artillery's build-up], *Renmin ribao*, March 20, 2002, p. 1. Li, *Cong hongxiaogui dao huojianbing siling*, p. 517.
[153] William Wan, "Georgetown students shed light on China's tunnel system for nuclear weapons," *Washington Post*, November 30, 2011, http://www.washingtonpost.com/world/national-security/georgetown-students-shed-light-on-chinas-tunnel-system-for-nuclear-weapons/2011/11/16/gIQA6AmKAO_story.html.
[154] "Junshi jishi" [Military record], CCTV, March 24, 2008.

that would survive after absorbing an adversary's first strike and employed in retaliation. This uncertainty is enough to deter an adversary's first strike and make Chinese leaders confident.

But the presence of U.S. BMD system will change this strategic analysis process. The number of Chinese nuclear warheads that would survive after an adversary's first strike would be small possibly zero. So in the absence of missile defense, the uncertainty that some might survive would be high enough to deter the United States. However, once the United States possesses an operational BMD system, the situation will become problematic. Even a small scale BMD system could have enough interceptors to engage the small number of survivable warheads. Then the first strike uncertainty would be eliminated and the United States would have a disarming capability against China.

The analysis in last paragraph assumes that the efficiency of BMD is perfect, which is impossible in reality. In the history of BMD development, its efficiency has been a focus of debate. The mainstream standpoint in academia is that BMD system cannot discriminate between real warheads and decoys, so BMD could be easily defeated by countermeasures.[155] For example, professor Ted Postol has argued:

> "Exo-atmospheric missile defenses will never be reliable if confronted with countermeasures. The countermeasures could be very simple, like balloons, which could readily be deployed by *any* country capable of building long-range ballistic missiles."[156]

Another view is that discrimination between real warheads and decoys is difficult, but not impossible. The higher the sensors performance, the higher would be BMD's discrimination capability. Dr. Dean Wilkening has argued the following:

> The following two statements are *both* true:
>
> 1) There is no missile defense architecture against which an effective countermeasure cannot be developed to defeat, and,
>
> 2) There is no offensive countermeasure against which a defensive

[155] Andrew M. Sessler, et. al., *Countermeasures: A Technical Evaluation of the Operational Effectiveness of the Planned US National Missile Defense System* (Union of Concerned Scientists & MIT Security Studies Program, 2000).
[156] Emphasis in the original. Ted Postol, private communication.

counter-countermeasure cannot be developed to defeat.[157]

This article is not intended to judge which argument is correct. From China's perspective, a worst-case scenario would judge that although BMD efficiency is debatable, China would nonetheless have to take it seriously and overestimate its efficiency. Just as Chinese nuclear forces create uncertainty in the minds of U.S. leaders, reducing U.S. confidence in its ability to conduct a successful first strike. U.S. BMD also creates uncertainty in Chinese leaders' mind, reducing Chinese confidence in nuclear retaliatory capability. Chinese leaders' specific evaluation on U.S. BMD efficiency is not available. So we can only know the relative comparison of efficiency of different U.S. BMD structures. As a result, this article will discuss the relative impacts of different BMD structures.

Three BMD structures will be discussed in this article. The first is the ground-base midcourse defense (GMD), which has already been deployed. The system is composed of forty ground-base interceptors (GBI) deployed in California and Alaska, DSP early warning system, several land-based early warning radars, one sea-based X-band fire control radar, as well as a command and control system. The engagement mode of this structure is to launch four to five interceptors simultaneously or with very short intervals to engage one offensive missile. This structure cannot carry out "shoot-look-shoot" approach. The critics believe that the efficiency of this structure is very low.

The United States is trying to decrease the susceptibility of BMD to countermeasures. One approach is to deploy interceptors close to the launch point of the target missile, so that interceptors could engage the target missile in its early ascent phase. This structure's efficiency would be much higher than the former structure. On one hand, this structure can apply a "shoot-look-shoot" approach. On the other hand, engagement might occur just after the target missile's release of decoys or even before that, increasing the ability to discriminate.[158] This structure is likely to be deployed in the future. The efficiency of this structure depends on the burnout velocity and deployment position of interceptors.

Boost-phase intercept could eliminate the susceptibility of BMD to countermeasures completely, because all countermeasures are not yet deployed during boost phase. Boost-phase intercept programs include now-cancelled Kinetic Energy Interceptor (KEI) and Airborne Laser

[157] Emphasis in the original. Dean Wilkening, private communication.
[158] Wu Riqiang, "Global Missile Defense Cooperation and China," *Asian Perspective*, Vol. 35, No. 4, October-December 2011, pp. 595-615.

(ABL). Airborne interceptor boost-phase BMD has also been discussed.[159] But land-based and airborne systems possess only a limited range and can only be deployed outside other countries' territory. For big countries like China and Russia, it is very easy to move their offensive missiles deep inland, out of the reach of boost-phase defense systems. So the United States is unlikely to build a comprehensive land-based or airborne boost-phase BMD system against China or Russia. Space-based boost-phase defense, such as the "Star Wars" project in the Reagan administration, is not constrained by territory. However, it requires very complicated technology and high financial expenditure. The "Star Wars" project had suffered extensive domestic debate.[160] Presently, there are still some people advocating space-based BMD, but it is unlikely that the United States would deploy it in the future.[161]

In sum, among the three BMD structures considered in this article, now-deployed GMD system has limited efficiency. Thus, its impact on Chinese leaders' confidence should not be high. By contrast, the efficiency of boost phase BMD system would be very high. If deployed, Chinese leaders' confidence would be eliminated completely. However, it is unlikely to be deployed. The most likely system to be deployed is the forward-deployed ascent-phase BMD system. With higher efficiency than GMD, this system's impact on Chinese leaders' confidence depends on its specific performance. The higher the interceptor's burnout velocity and the closer U.S. BMD systems are deployed to China, the lower Chinese leaders' confidence in Chinese nuclear retaliatory capability and the less stable Sino-U.S. strategic relations.

U.S. BMD will reduce the first strike uncertainty created and enhanced by China's nuclear forces. We have identified uncertainty threshold for effective deterrence in this article, with the absence of BMD. With the presence of BMD, the uncertainty threshold would become two-dimensional, representing offensive side and defensive side respectively. Up to now, we do not have enough historical evidence to determine a clear two-dimension threshold. Neither China nor U.S. leaders know what this threshold would be. Therefore, U.S. BMD will make Sino-US interactions more complicated, even dangerous. U.S. BMD is a potential destabilizing factor in Sino-U.S. strategic relations. China and the United States should work together to maintain strategic stability.

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[159] Dean Wilkening, "Airborne Boost-Phase Ballistic Missile Defense," *Science and Global Security*, Vol. 12, No. 1, 2004, pp. 1–67.

[160] Sidney D. Drell, Philip J. Farley, and David Holloway, *The Reagan Strategic Defense Initiative: A Technical, Political and Arms Control Assessment*, A Special Report of the Center for International Security and Arms Control, Stanford University, July 1984.

[161] Henry F. Cooper, "Making Missile Defense Matter," *The Journal of International Security Affairs*, Spring 2007, No. 12.

Conclusions

The reliance of China's nuclear strategy on first strike uncertainty reflects China's special nuclear philosophy. Because of the nuclear taboo, nuclear weapons are unlikely to be physically employed against China. Instead, the most probable nuclear threat China faces is nuclear coercion. China focuses on the deterrent effects of nuclear weapons and believes that nuclear deterrence is unlikely to fail. So the question of how to deal with the failure of deterrence should not be the determining factor within the development of nuclear arsenal. The United States' nuclear philosophy is different from that of China. U.S. nuclear posture has two objectives: nuclear retaliation (to deter), as well as damage limitation (if deterrence fails). Faced with the uncertainty of nuclear war, the U.S. principle maintains that U.S. nuclear forces should be able to deal with all uncertainties. China's principle is that China can take advantage of the uncertainties in order to reduce the requirements for China's nuclear arsenal. In other words, the United States has been actually doing what China has been pretending to do.

The fact that China detonated an atomic device in 1964 does not mean that China automatically had nuclear retaliatory capability. In the early phase of the development of China's nuclear weapons, the number of deployed weapons was very low, with poor survivability and inadequate project capability. Neither China nor the U.S. and USSR believed that China had nuclear retaliatory capability, so in 1969 the Soviet Union dared to blackmail China. Only after China deployed the DF-3 IRBMs in mid-1970s, the United States and the USSR began to believe China had nuclear retaliatory capability. Chinese leaders were not confident until China's strategic missile forces gained independent launch capability in mid-1980s.

The perception gap between China and the United States/the Soviet Union is rooted in the worst-case assumption adopted by those two countries in evaluating China's military capabilities. Because of the existence of intelligence uncertainty, decision-makers prefer to overestimate the opposite side's capabilities. It is relatively easy to find evidence for missile deployment, but it is hard to find evidence for its operability. Therefore, a natural method is to assume that all deployed missiles are operational. This perception gap is favorable to strategic stability.

The off-alert status of China's nuclear forces in peacetime can avoid accidental or unauthorized launch, but it also has a potential for crisis escalation. In crisis, if China perceives nuclear threat, China will put its nuclear forces on alert, the original objective for China is to improve the survivability of its nuclear forces and signal China's resolution to retaliate. However, after detecting it, the opposing side might believe mistakenly that China is preparing to launch a nuclear war, and react to that with a preemptive strike. But this escalatory potential should not be overestimated, because China's nuclear forces are very weak. Even if China puts them on alert, China does not have a disarming capability against any country and other countries know that, so "preempt-the-other's-preemption" is unlikely to happen. Despite this fact, China and the United States need to enhance bilateral dialogue on potential crises in order to avoid any misperception.

Just as Chinese nuclear forces create uncertainty in U.S. leaders' minds, reducing U.S. confidence of a successful first strike, U.S. BMD also creates uncertainty in Chinese leaders' minds, reducing Chinese confidence of nuclear retaliatory capability. The higher the interceptor's burnout velocity and the closer it is deployed to China, the lower Chinese leaders' confidence in China's nuclear retaliatory capability and the less stable Sino-U.S. strategic relations. In order to avoid negative security interaction, the United States should promote effective Sino-U.S. strategic nuclear dialogue and improve transparency within its future BMD development plan, particularly the performance and deployment modes of interceptors and sensors.

China's special nuclear philosophy and nuclear posture of self-restraint is a great contribution to international security. In order to deter nuclear attack, a capability of "assured destruction" is not necessary, nor is "assured retaliation" capability. A small nuclear force that would create "first strike uncertainty," making the other unconfident of completely disarming strike, is adequate. All that this posture would require would be maintenance of a very small nuclear arsenal that would be de-alerted in peacetime, combined with a declaration that the sole use of nuclear weapons is to retaliate. Unfortunately, China's nuclear philosophy is too special to be well understood by the security community dominated by western discourse. This fact has led to confusion and discord in strategic dialogues.[162] This situation may be attributed to western

[162] Li Bin, "China's Potential to Contribute to Multilateral Nuclear Disarmament," *Arms Control Today*, March 2011, http://www.armscontrol.org/act/2011_03/LiBin. Gregory Kulacki, "Chickens Talking With Ducks: The U.S.-Chinese Nuclear Dialogue," *Arms Control Today*, October 2011, http://www.armscontrol.org/act/2011_10/U.S._Chinese_Nuclear_Dialogue.

countries' arrogance. They prefer to criticize China's nuclear policy as fake and unfeasible, instead of paying close attention to China's special nuclear philosophy. As demonstrated by Cold War history, China's unique nuclear posture has been much smarter than that of the United States and the Soviet Union. Nuclear weapons are dangerous and expensive, so Chinese model should be acknowledged and followed in order to build a more secure and prosperous world.