

Report 43

Potential Chinese Responses to US Ballistic Missile Defense

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INTRODUCTION

This essay will build on the groundwork prepared by Dr. Finkelstein's opening paper for this working-group meeting.¹ Dr. Finkelstein concluded that China's opposition to the US national missile defense (NMD) program is founded on three essential judgments:

- US NMD will undermine the viability and credibility of China's strategic nuclear deterrent.
- US assurances that its NMD program is not directed at China do not mitigate Beijing's distrust of American long-term intentions.
- When missile defenses are joined with US strategic nuclear offensive capabilities, the "shield and sword" created will vastly complicate Beijing's objective of reunifying Taiwan with the mainland.

This paper will therefore not assess Beijing's longstanding political-diplomatic opposition to US missile defense programs, but will concentrate on the potential consequences for China's strategic nuclear force posture. Before entering into an analysis of China's probable responses to USUS ballistic missile defenses, however, five factors effecting this assessment have to be recognized.

First, there is no official public statement from China laying out the doctrine and strategy for its strategic nuclear forces. Beijing's public pronouncements are limited three declarations: China will not be the first to use nuclear weapons; will not use nuclear weapons against non-nuclear states; and has deployed a small number weapons sufficient for a credible retaliatory force after absorbing a first strike. Whereas there are numerous unofficial discussions in Chinese sources about nuclear doctrine and strategy, there is no formal statement for an analysis to build on. Nevertheless, there is consensus among most observers that Beijing's deterrence logic is based on the principle that enough of its strategic forces must survive a first strike to inflict unacceptable damage on the adversary in a retaliatory strike. This logic is referred to as a "minimum deterrence" strategy.

Second, Chinese nuclear strategists appear to have rejected the "mutual assured destruction" war-fighting doctrine adopted by the United States and the former USSR during their 45-year nuclear confrontation. The investment required to develop and deploy thousands of warheads on ground-based missiles, submarines and aircraft is simply staggering and far beyond China's means. Furthermore, Beijing does not consider such a doctrine necessary because an all-out nuclear war is inconceivable, not the least because both Russia and the United States are reducing their nuclear stockpiles. Parity with either the United States or Russia is therefore not a Chinese objective.

Third, I have found no Chinese assessment of the Bush Administration's change in missile defense research and development (R&D) programs. With this revision, the Ballistic Missile Defense Organization's (BMDO) programs now blur the distinction between theater missile defense (TMD) and NMD, and approach missile defense as a single integrated system.² The objective is now a layered defense capable of providing multiple engagement opportunities along the entire path of ballistic missiles at all ranges. These opportunities occur in the boost, mid-course and terminal phases. How China will react to R&D programs intended to integrate TMD and NMD into a single, integrated multi-layered ballistic missile defense system designed to complicate an adversary's strategy is not yet known. It can be safely assumed, however, that General Kadish's congressional testimony will lead Beijing to anticipate a much more robust missile defenses than was envisioned by the previous administration.

Fourth, although it cannot be confirmed, this paper will assume that for planning purposes Beijing's security community sees at least some form of US nation-wide terminal missile defense as inevitable. Further, especially given the direction now taken by the BMDO, that a very robust system will probably be deployed in the decades ahead as the various technologies the United States is pursuing come to fruition.

¹ David M. Finkelstein, "National Missile Defense and China's Current Security Perceptions," prepared for the Stimson Center/CNA NMD-China Project, draft 11/7/2001.

² Lt. Gen. Ronald T. Kadish, USAF, Director, Ballistic Missile Defense Organization, testimony before the House Armed Services Committee, July 19, 2001.

Finally, although China has a significant number of intermediate-range ballistic missiles (IRBM) capable of targeting US bases in the West Pacific, this assessment will be limited to Beijing's potential responses to a US national missile defense system.

CHINA'S NUCLEAR FORCE STRUCTURE AND MODERNIZATION PROGRAMS

China confronts US ballistic missile defenses as it is in the midst of transitioning from a very uncertain nuclear deterrent to a more competent and reliable force structure. Consequently, Beijing's response to US missile defenses will influence the force structure that emerges over the next several decades.

The mainstay of the current strategic deterrent is the silo-based *Dong Feng-5* (East Wind --DF) intercontinental ballistic missile (ICBM), which achieved initial operational capability (IOC) in 1981. Around 20 are now deployed. Because these weapons are liquid-fueled, they cannot be kept at a high level of readiness. They are normally based unfueled in their silos with their warheads stored separately. Fueling the launchers and installing the warheads can take two to four hours. The second long-range weapon in China's inventory is the DF-4 deployed since 1980. There are perhaps 20 of these 3,000-mile range liquid-fueled systems incorporating the same limitations as the DF-5. China's single nuclear-powered ballistic missile submarine (SSBN) with its twelve 1,000-mile range *Ju Lang -1* (Big Wave --JL) missiles entered service in the late 1980s. This ship has been so troublesome over the years it was likely never operational and is a doubtful component of China's strategic forces.

These strategic forces are complemented by perhaps 90 warheads deployed on intermediate-range ballistic missiles (IRBM). There are some 40 DF-3A liquid-fueled mobile missiles with ranges of 1,700 miles. With an IOC of 1971, these are Beijing's oldest weapons. China's newest IRBMs are the 48 solid-fueled mobile DF-21As with a range of more than 1,000 miles that achieved IOC in the mid-1980s. American bases in the West Pacific are within the effective range of both weapons. These missiles are joined by approximately 100 H-6 (Tu-16) and 30 Q-5 (J-6/MiG-19 derived) nuclear-capable aircraft. Although updated in some respects, these aircraft are based on 1950s Soviet technologies and would have great difficulty penetrating modern air defenses.

China's modernization programs were initiated in the early 1980s and designed to replace its inaccurate, unreliable, slow responding, liquid-fueled weapons with tactically mobile, more accurate, quicker responding solid-fueled systems. In particular, mobility was sought to reduce the vulnerability of

China's forces to a disarming first strike, which is a major deficiency in the current force structure. Because solid fuel contains less thrust than liquid fuel, shifting to solid fuels also required China to develop smaller, lighter warheads with much better yield-to-weight ratios than its older weapons.

Four new weapons form the heart of China's modernization programs. The 7,500-mile range DF-41 was to replace the DF-5, but may have been cancelled or delayed by development problems. The DF-4 is to be replaced by the 5,000-mile range DF-31. The DF-31 also serves as the basis for the 5,000-mile range JL-2 submarine-launched ballistic missile (SLBM) for the new SSBN class (the 09-4 program), should this project come to fruition. The fourth weapon is the 1,000-mile range DF-25, which will replace the DF-3. This system employs the first two stages of the DF-31 three-stage launcher.

Because these weapons have yet to become operational, although the DF-31 has had at least one successful flight test, we may assume that the future deployments will reflect a response to US missile defenses. There is one reservation about this judgment. India weaponized its nuclear program in 1998, and has been testing missile launchers for many years. Accordingly, some aspect of future deployments could reflect China's response to whatever force structure India puts in place. Nevertheless, the United States is the preeminent focus of China's security strategists.

RESPONDING TO US BMD

With so much already invested in the sunk costs associated with the development of a new family of nuclear weapons and a new SSBN class, China can select from a number of feasible options.³ The investments already committed suggest China will not be totally constrained by the incremental costs of a larger force structure. Although cost will play a role, the size and composition of China's strategic forces will be determined primarily by the doctrine and strategy Beijing selects in response to missile defenses.

The threat BMD presents to China's current doctrine is quite straightforward.⁴ In China's use, minimum deterrence relies upon an adversary's uncertainty about the number of weapons that may have survived a first strike to be launched in retaliation. With an ICBM force of around 20 silo-based weapons, even a "thin" deployment of 100 interceptors in a terminal defense mode could easily capture what few weapons remained for China to use in a retaliatory strike. Should the United States become confident that its missile defenses will defeat whatever retaliatory force remains after conducting a disarming first strike, China believes it would be exposed to the threat of nuclear coercion—which

³ The following discussion draws extensively from Robert A. Manning, Ronald Montaperto, and Brad Roberts, *China, Nuclear Weapons, and Arms Control* (New York: Council on Foreign Relations, 2000).

Beijing refers to as “nuclear blackmail.” As Beijing states China’s nuclear doctrine after repeating its longstanding NFU pledge:

China maintains a small but effective nuclear counterattacking force in order to deter possible nuclear attacks by other countries. Any such attack will inevitably result in a retaliatory nuclear counterstrike by China. China has always kept the number of its nuclear weapons at a low level. The scale, composition and development of China’s nuclear force are in line with China’s military strategy of active defense.⁵

It is important to note that part of China’s strategy is to neither confirm nor deny estimates of the size and composition of its nuclear forces—the *force structure*. The estimated size of the force and its deployment has a direct effect on the targeting and size of any disarming first strike conducted by an adversary. Beijing’s “neither confirm nor deny” strategy is designed to increase uncertainty in the mind of an adversary. Not only must the attacker worry about the strike’s effectiveness, but also whether his estimate of the force structure and its deployment is accurate. China’s present minimum deterrence strategy is thus built on uncertainty and not on the absolute number of weapons in its inventory.

“SMALL BUT MODERN”⁶

The question that arises is whether US BMD will lead to Beijing rejecting the uncertainty principle that is at the heart of its doctrine and strategy for nuclear deterrence. If Beijing is primarily worried that uncertainty will be dissipated by missile defenses, the tactical mobility provided by the new family of weapons and an operationally successful SSBN could well satisfy the uncertainty principle. In a small but modern force structure, China’s deterrent forces would no longer be based in silos, which become the missiles’ tombs in a disarming first strike. Tactical mobility together with dispersal and deception provide the survivability so central to the uncertainty principle underlying China’s current doctrine. If Beijing is confident that mobility, dispersion and deception will restore uncertainty, the size of the force need not necessarily be significantly increased.

Furthermore, China has various technological hedges available to ensure that some warheads will penetrate defenses. Missiles could be mounted with multiple re-entry vehicles (MRV), with some of them dedicated to decoys. It is also plausible for Beijing to consider mounting multiple independently targetable re-entry vehicles (MIRV). The warheads themselves could be designed with reduced radar and infrared reflection, thereby limiting the effectiveness of kinetic kill vehicles. One or more of the

⁴ This discussion draws on Li Bin, “The Effects of US NMD on Chinese Strategy,” *Jane’s Intelligence Review*, 7 March 2001.

⁵ *China’s National Defense in 2000* (Beijing: Information Office of the State Council), p. 6.

⁶ This concept modifies a response outlined in Manning, Montaperto and Roberts, *China, Nuclear Weapons*, p. 55.

warheads could dispense chaff to confuse the interceptors' sensors. In short, there are number of technologies China could apply to ensure that its warheads penetrate missile defenses.

Thus, one feasible approach to counteracting missile defenses without significantly increasing force size is to sustain the uncertainty principle with a mix of mobile land-based missiles and SLBMs mounting MRV/MIRV warheads with penetration aids. To be effective in creating this uncertainty, the United States and all other potentially threatening nuclear states must be made aware that mobile and/or submarine-launched ICBMs are being deployed, and that various modes of penetration aids are being employed. Therefore, the small but modern response would require Beijing to be more transparent about its nuclear weapons and their capabilities than it has been thus far.

This choice, however, responds only to a missile defense system configured to engage warheads in their terminal path. China also has to contemplate responding to the boost and mid-course phase engagements anticipated by BMDO's development programs. The capability to engage the retaliatory weapons several times places great weight on increasing the number of missiles forming the strategic deterrent.

“ASSURED MINIMUM DETERRENCE”⁷

Beijing would almost certainly conclude that the multi-layered defense system sought by the United States requires a more robust response than China's current minimum deterrence stance provides, even if transformed by the small but modern mode. In anticipation of boost and mid-course defenses, the number of mobile ICBMs and/or SLBMs deployed would be increased. The requirement for a credible deterrent in the face of more sophisticated defenses would also provide an additional incentive to mount multiple warheads allowing the employment of various penetration aids. This force structure can be classified as assured minimum deterrence.

Although the impetus to increase both missiles and warheads is evident, it is uncertain what number of mobile and/or SLBMs together with their MRV/MIRV warheads Beijing's strategists would accept as providing assured deterrence. An assessment undertaken by Robert Manning, Ron Montaperto and Brad Roberts suggest that China would want to be confident that roughly 20 warheads could penetrate any defenses the United States prepared.⁸ Li Bin argues that the number of surviving warheads must be greater than the number of interceptors used in a terminal defense mode. If there are 100

⁷ This discussion draws from Manning, Montaperto and Roberts, *China, Nuclear Weapons and Arms Control*, p. 55; and Li, “The Effects of NMD.”

interceptors and two interceptors are directed at each retaliatory warhead, then more than 50 warheads must survive a US first strike.⁹ Both assessments agree their numbers are notional, but also that some significant increase in the number ICBMs and the ability of their warheads to penetrate missile defenses is probable. That is, the numbers may change but the argument for increasing the number of missiles and warheads remains the same. Because these assessments are based on a thin terminal defense mode, an American capability to also engage missiles in the boost and mid-course and stages of their path serves as an incentive to deploy an even greater number of missiles.

As with the small but modern force structure, assured minimum deterrence requires China to be more transparent about its forces. The United States must be made aware that an increasing number of strategic weapons exist armed with MRV/MIRV warheads. Further, that their mobility, dispersion and deception together with a number of weapons deployed on SSBNs, if the decision is made to proceed with 09-4 program, makes confidence in a disarming first strike improbable. Assured minimum deterrence therefore constitutes a distinct change in China's nuclear posture. No longer relying on the uncertainty principle alone, Beijing would be required to declare that the number of missiles is no longer small. That is, quantity is joined with uncertainty to ensure the credibility of its deterrent.

DOCTRINE CHANGE: "LIMITED NUCLEAR DETERRENCE"¹⁰

A no first use (NFU) commitment joined with minimum deterrence using the threat of a single counter value punitive strike to deter is seen by some Chinese strategists as passive and incompatible with what they perceive as a future requirement for more flexible nuclear posture. As used by Chinese analysts, limited nuclear deterrence (*you xian he wei she*) differs from minimum deterrence in that it contains a nuclear war-fighting capability. In brief, limited deterrence is seen as requiring a range of weapons from tactical to strategic sufficient to deter the escalation of conventional or nuclear war. The significantly larger number and variety of weapons required by a doctrine of limited deterrence would provide China the ability to respond to any level of attack from tactical to strategic. Given sufficient numbers of weapons, there could be intra-war escalation control because China would retain forces necessary to respond at a higher level should the aggressor choose to escalate a nuclear exchange. Targeting in such a strategy goes beyond counter value "city busting" to counterforce strikes on military targets, including hardened missile silos.

⁸ Manning, Montaperto and Roberts, *China, Nuclear Weapons, and Arms Control*, p. 55.

⁹ Li, "The Effects of NMD," Table 2.

¹⁰ Chinese assessments of minimum and limited deterrence are discussed in detail by Alastair Iain Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security*, Vol. 20 No. 3 (Winter 1995-96), pp. 5-42.

The purpose behind this doctrinal change would be to present both a credible deterrent and prevent the United States from using its offensive superiority to threaten or use nuclear weapons while protected with a defensive missile shield. It would be seen as the next step beyond assured minimum deterrence without approaching parity.

If implemented with an appropriate force structure, a doctrine of limited deterrence could provide China greater confidence in its nuclear deterrent. Nonetheless, Beijing has to consider several liabilities inherent in the doctrine. First, the major build-up of weapons required to implement a limited deterrence doctrine would do more than alarm the United States. It is doubtful Asian states would view such a build-up as solely a response to US BMD. It is more likely that such an increase would be viewed as indicating a major change in China's defense policy to a more aggressive stance, suggesting Beijing's intent to supplant the United States and militarily dominate the region. It would certainly be difficult for Beijing to argue as in the past that its nuclear forces were strictly defensive.

Second, Chinese analyses of limited deterrence requirements have recognized the complexity and cost of the technologies required to implement the strategy.¹¹ China does not have the space-based reconnaissance and early warning systems required to determine in near real-time the size and origin of an attack. Thus, it would be difficult to determine what kind and level of response would be required. Chinese analysts are aware of these and numerous other deficiencies constraining the implementation of a limited deterrence doctrine. It is distinctly possible that China's research centers are conducting R&D programs to overcome these difficulties, but their cost and complexity indicate that it will be some years before they are resolved.

Third, China's commitment to the Comprehensive Test Ban Treaty (CTBT) does not allow Beijing to test any new warheads that may well be required. Beijing could withdraw from the CTBT, but withdrawal would be seen in Asia and the United States yet another indication that China had shifted to a more aggressive nuclear posture.

These combined political, technological and cost constraints may dissuade China from committing itself to a fully-fledged limited deterrence posture. Nonetheless, this option cannot be totally eliminated.

¹¹ *Ibid.* pp. 31-33.

BALLISTIC MISSILE DEFENSES

No matter what nuclear deterrence doctrine and strategy Beijing chooses to pursue, BMD would contribute to the survival of China's retaliatory force. In the mid-1980s, Chinese assessments of the Reagan administration's Strategic Defense Initiative (SDI) generated considerable interest in ground and space-based missile defense.¹² China's continuing interest in BMD can be seen in R&D programs seeking defenses against both cruise and ballistic missiles, including space-based early warning satellites.¹³ Passive counter-space technologies and anti-satellite weapons are an integral component of these R&D programs, including ground-based high-intensity lasers.

As with many advanced technology military programs, initial research programs are relatively inexpensive, especially when compared to developing and testing prototypes. Consequently, although China's interest in an extensive range of technologies is evident, even if only for point defense of missile bases and command control (C2) facilities, whether and when these research programs can be translated into operational systems is questionable. If US missile defense programs are any measure, it will be many years before China can deploy effective missile defenses and then only after considerable investment.

“LAUNCH ON WARNING”¹⁴

With its new family of weapons capable of being maintained on high alert, China could consider changing its nuclear posture from one of absorbing a first strike to launch on warning. This option would be especially attractive if the SSBN program was unsuccessful or was cancelled because of costs. Beijing would argue that LOW is not a violation of its NFU principle because it would be a defensive response to a confirmed attack. LOW also has a distinct doctrinal attraction for Chinese analysts who closely follow Mao's tenets in that it eliminates the “passive” connotations of a doctrinal commitment to absorbing a first strike before retaliating. LOW could be defined as an “active defense” (*jiji fangyu*) measure taken only after the adversary has attacked but before his weapons have wreaked destruction on China and particularly on its retaliatory forces. LOW would complement a BMD capability by providing a swift retaliatory salvo even as some of China's weapons and C2 were protected by missile defenses for follow-on responses.

¹² See Johnston, “China's New ‘Old Thinking,’” pp. 25-26; and Bonnie S. Glaser and Banning N. Garrett, “Chinese Perspectives on the Strategic Defense Initiative,” *Problems of Communism*, Vol. 35, No. 2 (March/April 1986), pp. 28-44.

¹³ See Mark A. Stokes, *China's Strategic Modernization: Implications for the United States* (Carlisle, PA: Strategic Studies Institute, US Army War College, September 1999), pp. 114-123.

¹⁴ This discussion draws on Johnston, “China's New ‘Old Thinking,’” pp. 21-23.

No matter how Chinese strategists strive to incorporate LOW into their nuclear posture as necessary and/or conforming to Mao's doctrinal tenets, it does require early warning of an attack. This in turn requires space-based reconnaissance systems to identify the source and dimensions of a nuclear attack in near-real time in order to provide sufficient warning to launch a retaliatory strike. Again, China's interest in and research programs dedicated to space-based reconnaissance satellites are known.¹⁵ When they will mature into operational systems is not known.

CONCLUSIONS AND SPECULATIONS

Since the mid-1980s, Chinese analysts conducting inquiries into China's nuclear posture have demonstrated concern that a doctrine of minimum deterrence implemented by a small number of strategic weapons will not provide sufficient security in the future. US missile defenses, even if limited to a "thin" terminal defense mode, provide an additional and significant incentive to change this doctrine.

Changing China's nuclear force posture presents Beijing with a dilemma. In part, of course, this dilemma is created by the lack of mature technologies in critical areas such as space systems and perhaps in the strategic weapons program itself. The future of China's DF-41 may be in doubt and the new class of SSBN may well be facing difficulties. Nonetheless, in my judgment, the core problem is doctrinal. A doctrinal decision would permit Beijing to focus resources on those technologies central to implementing the doctrine.

Doctrinal choices, however, have political consequences, and this may be where Beijing is facing its most troublesome problems. Moving beyond minimum deterrence to some form of limited deterrence with its war-fighting implications will enhance US and regional apprehension that China is adopting a more aggressive security policy. Given the increased number and variety of weapons such a doctrine requires, China's assertion that its nuclear forces were for defensive purposes only would be difficult to sustain. Moreover, the expansion of China's nuclear arsenal would occur just as the United States and Russia were agreeing to significant reductions in their own strategic forces, serving to underscore China's build-up. It could also lead to precisely the more capable US BMD Beijing's political strategy seeks to prevent. Consequently, whereas limited deterrence may be attractive to analysts engaged in abstract assessments of nuclear doctrine and strategy, the potential political costs could be viewed as outweighing whatever increases in confidence this nuclear posture may provide.

¹⁵ Stokes, *China's Strategic Modernization*, p. 15.

Assuring the viability of China's retaliatory forces has fewer liabilities and does not rule out the opportunity to shift to some form of limited deterrence in the future. Accordingly, Beijing could choose the small but modern option as its first step toward a revised nuclear posture. Deployments to fulfill this choice would also serve of the basis for building an assured minimum deterrence force structure, should the United States demonstrate the capability to deploy a multi-layered BMD system.

Indeed, small but modern could well be selected as a "wait and see" alternative to a nuclear posture change. It will be at least a decade or more before the US begins deploying an operational multi-layered defense capable of engaging weapons at their boost, mid-course and terminal phases of flight. Thus, Beijing has the opportunity to pace its deployments and delay any major nuclear posture change until it believes this transformation is essential for China's security. This window also grants Beijing the opportunity to focus its resources on whatever R&D programs it believes central to any probable future nuclear posture revision.

Nonetheless, it is certain that US BMD programs will result in Beijing deploying a more robust nuclear deterrent and preparing for an even more capable force structure. The family of new strategic weapons coming on line was designed to ensure that China's minimum deterrence posture remained viable. BMD has enhanced concern among Chinese strategists that this posture built around a small number of strategic weapons is no longer adequate. Future force structures will add penetrating defenses to the survivability criterion initially sought. Thus, it is reasonable to anticipate a significantly larger force of more sophisticated weapons than Beijing had originally planned