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China's Offensive Missile Forces

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“Testimony before the U.S.-China Economic and Security Review Commission”

Following a period of only slow growth, Chinese nuclear posture modernization and buildup has been an important development over the past decade. Key deployments in both land and sea based forces provide Beijing with new capabilities. Although Beijing's declaratory policy has remained constant, there are some signs of more subtle shifts in the way China may be thinking about its force. It is important to understand the drivers—both internal and external—for this modernization, the implications for strategic stability in the Sino-American relationship, and the new challenges this poses for U.S. extended deterrence commitments in the region.

China's nuclear arsenal has generally grown rather slowly relative to other powers facing major security challenges. That said, the nature of recent developments have a certain dynamism to them that warrants the commission's attention. Core to these recent changes are a modest quantitative buildup and a significant enhancement of survivability and other qualitative improvements. In order to consider the near term trajectory of Chinese strategic modernization, it is first necessary to understand the rationale for such strategic systems in China's security policy.

The study of Chinese nuclear capabilities is mired in opacity. While all nations preserve some secrecy regarding such weapons, China is the most secretive among the P-5, and indeed is more secretive than some of four states possessing nuclear weapons beyond the NPT's P-5. This raises particular challenges in evaluating both contemporary and future Chinese nuclear weapons' programs and strategies. There are, however, a burgeoning range of Chinese language sources (some of which have been translated in their entirety) from authoritative military institutions in China that provide valuable materials. Some of these sources are “classified” within the Chinese system, but are nevertheless available at university libraries outside of China. The official Chinese Defense White Papers have also gradually included more discussion on such topics. Unclassified assessments are also frequently, if not routinely, included in the Pentagon's annual report “Military and Security Developments Involving the People's Republic of China,” and reports or congressional testimony from NASIC or similar agencies. Finally, this author has

¹ The views presented are those of the author and do not necessarily represent the views of the Naval Postgraduate School, the Department of the Navy, or the Department of Defense.

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helped to manage an unofficial set of meetings between academics, think tank analysts, government officials, and military officers (the latter two categories, attending in their personal capacity) from the two countries over the past decade. Generally meeting twice a year, these sessions provide additional context and nuance to the understanding from the written materials.

Capabilities, Today and in the Near Future

China generally describes its force posture planning as requiring a “lean and effective” force aimed to deter nuclear attack against itself and restrained by a rigid “no first use” policy. Chinese participants at track 1.5 dialogues (that is, those “unofficial” meetings with officials in the room) have described “lean and effective” as the primary analytic tool that guides China’s nuclear force building. The term was seen to capture not just quantitative warhead arsenal decisions, but also training, doctrine, command and control, and logistics support. The “lean” side of the term refers to the size of the nuclear force, while “effective” refers to safety, reliability, penetrability, and the qualitative effectiveness of weapons. The Chinese side in such meetings makes it clear that the particular variables used to determine the “lean” side of the equation should remain ambiguous, while making it clear that China possesses a nuclear force capable of retaliation. The “effectiveness” side of the equation is not intended to be ambiguous in the least. While there were few specifics, it was clear that “lean” is quite lean indeed. A few times Chinese military officers would refer to the ability to hit a “handful” or a “few” cities as being sufficient for this criterion.

This conception seems borne out by outside information. According to unofficial estimates, China has approximately 250 nuclear warheads.² Only a small portion of them can reach the United States. All are relevant for regional deterrence missions.

China is only just starting to deploy modern ICBMs. As an emerging missile capability, in 2006, China began deploying the road mobile, solid fueled DF-31 and (the next year) -31A.³ China has approximately 20-40 DF-31 series launchers.⁴ There is likely to be a continuation of the production of the DF-31A and its deployment to the Second Artillery. Such systems are not viewed by Beijing as sufficient, however. The next system, the DF-41 continues to undergo development. This heavier system will give China a road mobile (thus very survivable), solid fueled system that may have the throw weight to deploy MIRVs.⁵ When such a system comes

² Hans M. Kristensen and Robert S. Norris, “Chinese Nuclear Forces, 2013,” *Bulletin of the Atomic Scientists*, November 1, 2013, <http://bos.sagepub.com/content/69/6/79.full.pdf+html>.

³ Office of the Secretary of Defense, “*Military and Security Developments Involving the People's Republic of China: Annual Report to Congress*,” (Washington, DC: Department of Defense, April, 2009), p. 24. Unless otherwise noted, all data regarding the contemporary Chinese arsenal comes from this series of annual DOD reports.

⁴ National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat*, NASIC-1031-0985-13, Wright-Patterson AFB, Ohio, 2013, p. 21. Robert D. Walpole, ‘Statement for the Record to the Senate Subcommittee on International Security, Proliferation, and Federal Services on the Ballistic Missile Threat to the United States’, 9 Feb. 2000, www.cia.gov/news-information/speechestestimony/2000/nio_speech_020900.html4.

⁵ Office of the Secretary of Defense, “*Military and Security Developments Involving the People's Republic of China: Annual Report to Congress*,” (Washington, DC: Department of Defense, April, 2014), p. 7.

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online, China will have the opportunity to significantly increase the size of its arsenal, if it so chooses.

China has long possessed a few dozen DF-5 or DF-5As.⁶ (For both these land based systems, the DF-5 and DF-31, the “A” variant has sufficient range to target the entire United States, while the earlier variant can only target portions of the northwestern part of the continental United States and Alaska and Hawaii.⁷) These liquid fueled, silo based systems date from the early 1980s. Although such silos could be hardened and decoy silos built, these weapons would be highly vulnerable to attack by advanced conventional munitions or nuclear preemption. China is nevertheless “enhancing” these existing liquid fueled missiles (DF-5A).⁸ This belies the expectations that such missiles (vulnerable to first strike attack because of their long fueling time) might be retired as more modern missiles with similar range came online (DF-31A).

China is beginning to deploy more advanced warhead delivery systems as well: “China’s new generation of mobile missiles, ... [have] payloads consisting of Multiple Independently Targeted Reentry Vehicles (MIRVs) and penetration aids.”⁹ The MIRVed systems and “penetration aids” will enhance their ability to survive US missile defense systems. (The MIRV “bus” that carries the different warheads and manages their separation is a similar technology and engineering issue to deploying decoys and obscurants.) Similarly, the Chinese deployment of the anti-ship ballistic missile (DF-21D) suggests Chinese efforts in the area of maneuvering warheads are quite advanced. These will have utility against missile defense systems as well. Continued effort at ensuring penetrability is likely to be a key goal for China over the next decade.

A separate development is diversifying China's nuclear strategic force away from sole reliance on land based systems. The nascent deployment of Jin-class SSBNs is creating major change in China's nuclear force. (China’s previous SSBN, the Xia-class, conducted, at most, a single operational patrol.) While its JL-2 missile remains not yet operational, it has undergone testing in the past few years.¹⁰ It seems likely that it will be deployed in the handful of Jin class boats in the next few years. (That said, the annual report has repeatedly been overly optimistic regarding when a first deterrent patrol for those boats will occur.) China has, in contrast to its usual opacity, engaged in some public signaling of this nascent capability.¹¹

⁶ National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat*, NASIC-1031-0985-09, April 2009, p. 21.

⁷ “*Military and Security Developments Involving the People's Republic of China*,” (2014), p. 86

⁸ “*Military and Security Developments Involving the People's Republic of China*,” (2014), p. 7.

⁹ “*Military and Security Developments Involving the People's Republic of China*” (2014), p. 28.

¹⁰ See Bill Gertz, “PLA Navy to Begin First Strategic Missile Submarine Patrols Next Year,” *Washington Free Beacon*, July 23, 2013, available at <http://freebeacon.com/pla-navy-to-begin-first-strategic-missile-submarine-patrols-next-year/>

¹¹ Xu Shuangxi and Qian Xiaohu: “Forging the Underwater Shield of the Republic -- Officers and Troops of a Certain Navy Submarine Base Set Tens of Records During More Than 40 Years of Piloting 'Blue Whales' Across the Length and Breadth of the Vast Ocean,” *Jiefangjun Bao [PLA Daily]*, October 28, 2013 (OSC Record: CHL2013102831056207); Qian Xiaohu, Wei Bing, and others, “Heroic Nuclear Submarines, Sharpening Swords in Depth of Vast Oceans,” *Jiefangjun Bao [PLA Daily]*, October 29, 2013 (OSC Record: CHL2013102930668783).

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Furthermore, the Second Artillery is increasing the quality of its training and preparation, including such improvements as:

- fighting under conditions of “informationalization” (i.e., recognizing U.S. advances in intelligence, surveillance, and reconnaissance (ISR), and command and control;
- complex electromagnetic environments (recognizing the dangers of jamming and compromised communications systems); and
- using an opposition “blue force” in training (rather than a scripted opponent).¹²

Between these developments, it is already clear that some quantitative buildup will, and already has, occur(ed). A mere decade ago, China faced the US with only a few dozen nuclear warheads. Today, that number is at least 50.¹³ Given the continued development of delivery systems, and the limited instances of replacing old systems like the DF-5A, this quantitative increase will continue, heading well above 100 for the following reasons. It is likely that the submarine force will boast five or six boats, each with 12 missile tubes.¹⁴ (Of these 60 or 72 missiles, only a subset would be available to put to sea on short notice.) A MIRVed land based force would provide much greater potential for increasing the Chinese arsenal size. While many hundred would seem less likely, another 100 increase in the land-based arsenal seems plausible over a decade. Thus, a Chinese force of as many as 300 might be available (in contrast, the United States today has just under 5000 warheads¹⁵) in that timeframe. (Under “New Start” counting rules, the United States is limited to some 1500 of those to be operationally deployed. However, by those same counting rules, today, China has zero operational warheads.)

Rationale/Drivers

If one considers the utility for military force through the lenses that Robert Art suggests—defeat, deter, compel, and swagger—China generally seems to focus only on deterrence.¹⁶ Based on the preponderance of available evidence, there is not a well developed view in Beijing of the coercive utility of China's arsenal. Nuclear weapons do not “defend” in the traditional sense. Chi-

¹² Christopher P. Twomey, “The People’s Liberation Army’s Selective Learning: Lessons of the Iran-Iraq ‘War of the Cities’ Missile Duels and Uses of Missiles in Other Conflicts,” in Andrew Scobell, David Lai, and Roy Kamphausen, eds., *Chinese Lessons From Other Peoples’ Wars* (Carlisle, Penn: Strategic Studies Institute Book, 2011) and Michael S. Chase, Andrew S. Erickson, and Christopher Yeaw, “Chinese Theater and Strategic Missile Force Modernization and Its Implications for the United States,” *Journal of Strategic Studies* 32 (2009), pp. 67–114.

¹³ Lt. Gen. Ronald Burgess, Director, Defense Intelligence Agency, Statement before the Senate Armed Services Committee, 112th Cong., 2nd sess., Feb 16, 2012, p. 19, <www.dia.mil/public-affairs/testimonies/2012-02-16.html>.

¹⁴ Office of Naval Intelligence, *The People’s Liberation Army Navy – A Modern Navy with Chinese Characteristics*, Suitland, MD: Office of Naval Intelligence, 2009. That said, this may be a mid range estimate. The United Kingdom has been satisfied with 4 boats.

¹⁵ Department of Defense, “Fact Sheet: Transparency in the U.S. Nuclear Weapons Stockpile,” April 29, 2014, http://www.defense.gov/npr/docs/10-05-03_Fact_Sheet_US_Nuclear_Transparency_FINAL_w_Date.pdf

¹⁶ Art, Robert J. “To What Ends Military Power?” *International Security* 4, 4 (1980): 3-35.

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na's "no first use" declaratory policy makes it challenging to "swagger" with any effectiveness. However, after a history in the early Cold War of being subjected to numerous nuclear coercive threats, China has an acute desire to avoid being vulnerable to such again.¹⁷ Their deterrent posture to achieve this has typically required only a modest arsenal size with relatively relaxed postures (at least when compared to the U.S. and Soviet precedents).

Serving the strategic goal of presenting China with some form of assured retaliation against the United States is likely to continue to be the dominant goal of Chinese strategic policy.¹⁸ This is seen to be a task requiring some modernization and further expansion of the force, but it is not seen as an urgent priority. China has maintained a relaxed pace of development of its nuclear force over the past 50 years, and this is likely to continue.¹⁹ Nevertheless, Chinese leaders see themselves in a dynamic strategic environment that requires them, alone among the established nuclear powers under the Non Proliferation Treaty, to modernize and increase its forces.

The key drivers for such dynamism for China is U.S. modernization of missile defenses; other factors such as advanced conventional forces and lingering concerns regarding the modernization of US nuclear forces also play a role. China views U.S. missile defense systems as a potential shield rendering their limited arsenal impotent.²⁰ It is important to remember that Chinese leaders generally think of their force used only in response to an attack by an adversary. In such a scenario, an already attrited Chinese force that might be used to retaliate then would face a mix of land-based interceptors (the GBI system, based in Alaska) and sea-based (advanced variants of SM-3 interceptors based on Aegis warships). This puts some demands on their force sizing.

Most broadly, there is a sense in Beijing that U.S. missile defense undermines a relatively stabilizing phenomenon of mutual vulnerability between the U.S. and China. A former deputy commander from the SAF outlined these concerns.²¹ Other Chinese attack missile defense as a way to escape mutual vulnerability on the grounds that it is an attempt to achieve "absolute security" for the United States. By implication, this means absolute insecurity for others, China included.²²

¹⁷ On that history, see Gordon G. H. Chang, "To the Nuclear Brink: Eisenhower, Dulles, and the Quemoy-Matsu Crisis," *International Security* 12 (April 1988), pp. 96–123; Rosemary R. J. Foot, "Nuclear Coercion and the Ending of the Korean Conflict," *International Security* 13 (1988), pp. 92–112.

¹⁸ Fravel, MT and Medeiros, ES, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," *International Security* 35:2, 48-87 (2010)

¹⁹ We have recently passed the 50 year anniversary of China's first nuclear test, on October 16, 1964.

²⁰ The text here condenses a longer treatment of these issues that can be found in Christopher Twomey and Michael Chase, "Chinese Attitudes Toward Missile Defense Technology and Capabilities," in *Missile Defense: The Fourth Wave and Beyond*, and Catherine M. Kelleher and Peter J. Dombrowski, eds. (Stanford, Calif.: Stanford University Press, 2015).

²¹ 赵锡君 [Lt Gen Zhao Xijun], 慑战：导弹威慑纵横谈 [*Coercive Warfare: A Comprehensive Discussion on Missile Deterrence*] (Beijing: NDU Press, 2003).

²² Kang Yongsheng, "The US Military's Strategic Consideration Behind the Building of the Asia-Pacific Missile Defense System," *Beijing Qingnian Bao [China Youth Daily]*, June 28, 2013 (OSC Report: CPP20130628787003). 赵锡君 [Lt Gen Zhao Xijun], 慑战：导弹威慑纵横谈 [*Deterrence and Warfare: A Comprehensive Discussion on Missile Deterrence*] (Beijing: NDU Press, 2003), 91.

Beyond the national missile defense system, however, Chinese often express concerns about the future of sea-based missile defense. In particular, future variants of the Aegis system's SM-3 block IIa and the recently cancelled block IIb are viewed as threatening to China. Were those systems deployed either near Chinese shores or close to the United States, given their assessment of the high burnout speed of their missiles, Chinese analysts from the technical community conclude that they would have some capability against Chinese offensive nuclear forces. Thus, the potential for the future is not only for a depleted Chinese offensive force to have to face 44 (or more) GBI systems, but perhaps hundreds more SM-3 block II rounds.²³

More broadly, and to some extent also forward looking, are Chinese threat perceptions generated from the deeply integrated system of sensors, satellites, command and control systems, and interceptors that are required for missile defense to be effective. From a purely technical perspective, the steady expansion of U.S. deployed missile defense radars in Asia has garnered much concern.²⁴ The second X-band radar in Japan increases the scope of coverage toward Chinese launch points.²⁵ Many Chinese raise concerns about the PAVE PAWS phased array radar that the U.S. sold to Taiwan. Given the extended range that the PAVE PAWS system has, Chinese worry that its only rational explanation is as an integrated component of a region-wide U.S. sensor network.²⁶ Similarly, this same concern underlies Chinese opposition to a U.S. deployment of THAAD in South Korea. There is also an awareness that space-based cuing can be usefully integrated to enhance the effectiveness of this system.²⁷

These concerns work together to create substantial opportunities for "shoot-look-shoot" doctrines for the United States, as Chinese analysts see it.²⁸ Increasing the likelihood of a successful intercept and reducing the cost associated with alternate firing doctrines, such as shooting two interceptors at a time at each target. Third, depending on the nature of the sensors, there may be advantages in having integrated forward based sensors into the system.

²³ This concern has been raised a series of track 1.5 meetings in Beijing and HI that the authors have been involved in. More recently, they are aired in Riqiang Wu, "China's Anxiety About US Missile Defence: A Solution," *Survival* 55, no. 5 (October, 2013): 29-52. (Note the author of that piece worked in the nuclear weapons systems laboratory community in China prior to moving into academia.) U.S. technical analysis does not completely rebut those points although it questions some of the key assumptions in them.

²⁴ Lu Zhengtao and Zeng Shuai: "What is the Purpose of United States Strengthening Anti-Missile Deployment in Asia-Pacific," *Zhongguo Qingnian Bao [China Youth Daily]*, September 14, 2012 (OSC Report: CPP20120914787015).

²⁵ Wu, "China's Anxiety About US Missile Defence" (2013).

²⁶ *Ibid.*

²⁷ 李景涛, 贺正洪, 周晓光《天基信息支援下的反导 BM/C~3I 系统建模与仿真研究》现代防御技术 2010 年 04 期 [Li Jing-tao, He Zheng-hong, Zhou Xiao-guang, "Study on Modeling and Simulations of BM/C~3I System in Anti-TBM Combat Based on Spaceborne Information Supporting," *Modern Defense Technology*, No. 4 (2010)] (Available at <http://www.cnki.com.cn/Article/CJFDTOTAL-XDFJ201004019.htm>). T

²⁸ Wu, "China's Anxiety About US Missile Defence" (2013).

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A final set of Chinese concerns, alluded to above, center on the way missile defense cooperation with regional partners tightens and expands U.S. alliances in the region in what appears to many Chinese to be a network of institutions containing China. For instance, outspoken PLA Air Force colonel Xu Dai, aired this view: "China is in a crescent-shaped ring of encirclement. The ring begins in Japan, stretches through nations in the South China Sea to India, and ends in Afghanistan. Washington's deployment of anti-missile systems around China's periphery forms a crescent-shaped encirclement."²⁹ These concerns are aired widely.³⁰ Most emphasize the recent moves to deepen cooperation with Japan. Others raise the prospect of Philippines also being included in the sensor network in the future.³¹

Additionally, Chinese military officials express concerns regarding advanced conventional munitions, such as the conventional prompt global strike systems under consideration in the Pentagon.³² Such systems might be used to attack China's nuclear arsenal without the US crossing the nuclear threshold complicating (in some sense, anyhow) Beijing's retaliatory calculus.

Finally, the life extension programs for U.S. nuclear warhead and developments of new delivery systems in the next decade or so are also watched with much trepidation in Beijing. The oft heard phrase in U.S. strategic circles that "the United States is the only nuclear armed state not modernizing its forces" is met with derision in Beijing. To Chinese strategic analysts, U.S. programs to modernize the B61 (making it more accurate), spending more than \$10b over the next five years on Ohio-class SSBN replacements,³³ ALCM modernization,³⁴ development of a new strategic bomber, etc., all look like modernization of the U.S. nuclear arsenal.

Beijing has responded to these changes, and will likely continue to do so over the next decade, through qualitative enhancements to its arsenal, diversification of delivery mechanisms, and a modest (at least) quantitative buildup as described above.

Emerging Regional Drivers

While China avers that its nuclear force is aimed to deter U.S. coercion or aggression, there are also the early signs of concerns about both reducing the U.S. freedom of action in regional contexts and concerns about potential Russian threats. Both have led to a significant amount of at-

²⁹ Qin Jize and Li Xiaokun, "China Circled by Chain of US Anti-Missile Systems," *China Daily*, February 22, 2010.

³⁰ Zhang Lu, "Is the US Return to Asia-Pacific Aimed at Containing China?" *Zhongguo Qingnian Bao [China Youth Daily]*, September 14, 2012 (OSC Report: CPP20120720787008). Zhong Sheng: "Do Not Do Things that will Damage Security Environment of Asia (International Forum)," *Renmin Ribao [People's Daily]*, October 29, 2012, p. 3 (OSC Report: CPP20121029787003). Kang, "The US Military's Strategic Consideration," 2013.

³¹ Lu and Zeng, "What is the Purpose of United States Strengthening," 2012.

³² My co-panelists book was read with much interest in Beijing. James Acton, *Silver Bullet? Asking the Right Questions About Conventional Prompt Global Strike*, Carnegie, September 2013.

³³ <http://news.usni.org/2015/02/03/%ef%bb%bfnavy-budgeting-10-billion-ohio-replacement-program-next-five-years>

³⁴ The underlying warhead is being modified (to a W80-4 configuration) and the LRSO program will provide increased survivability for US standoff nuclear cruise missile. http://fas.org/blogs/security/2014/10/w80-1_lrso/

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tention on the modernization of theater systems. Older systems, like the DF-11 and -15, are upgrading their accuracy. Newer systems (like the DF-16) are also coming online. While most of these systems remain conventionally armed, it is unlikely that all do. Similarly, while there has been an apparent freeze in the conventional missile buildup that faces Taiwan,³⁵ other medium range systems continue to be built. Indeed, according to one U.S. official, deployments in the tactical or regional missile field is the most active part of Chinese modernization efforts today.³⁶

These suggest an increased focus on both Russia and to some extent India (as it finally approaches readiness of its long range Agni-V missile systems). The same systems also hold U.S. conventional forces in the region at greater risk: As an integral part of an anti-access/area denial capability,³⁷ these pose serious challenges for US strategists. These systems are likely to continue to increase in accuracy, penetrability, and quantity. While it seems unlikely that the pace of such buildup will approach that of the short range system buildup against Taiwan in the 1990s, the more modern and accurate systems will challenge U.S. deployments in the region, and raise questions about the reliability of U.S. extended deterrence commitments.

The implications are significant. China is increasing its conventional capabilities that might have some “strategic effect” and creating increasingly robust nuclear capabilities to deter any U.S. escalation. In particular, the likely effect of this is to raise the costs to the United States of deterring or defeating any Chinese conventional engagement in the region (such as the Senkakus). While assessing the likely outcome of any such conventional fight is beyond the scope of this testimony, suffice it to say that some conventional battles would be challenging for the United States. Given the increased robustness of China’s nuclear arsenal, the United States would have to engage in great caution in its offensive components of its conventional strategy against Chinese forces.³⁸ These are likely to raise the costs to the United States of such a conflict and delay eventual victory.

Shifting Doctrine and Related Operating Concepts

There is significant evidence that the Chinese, and the Second Artillery Force in particular, take the “no first use” policy very seriously. This puts a great premium on ensuring the survivability of its nuclear force in the face of a (hypothetical) large nuclear attack or even one conducted with conventional precision-guided munitions. One manifestation of this is the emphasis on new mobile weapons, at sea and on land, as discussed. Another is the concealment program that has led

³⁵ See comparisons as published in the DOD annual reports.

³⁶ Lt. Gen. Ronald Burgess, Director, Defense Intelligence Agency, Statement before the Senate Armed Services Committee, 112th Cong., 2nd sess., Feb 16, 2012, p. 19, <www.dia.mil/public-affairs/testimonies/2012-02-16.html>

³⁷ For a discussion on the difficulties of characterizing Chinese maritime strategy, see M. Taylor Fravel and Christopher P. Twomey, “Projecting Strategy: The Myth of Chinese Counter-intervention,” *The Washington Quarterly* (January 2015). https://twq.elliott.gwu.edu/sites/twq.elliott.gwu.edu/files/downloads/Fravel_Twomey.pdf

³⁸ For further discussion of these issues, see Christensen, Thomas J. “The Meaning of the Nuclear Evolution: China’s Strategic Modernization and US-China Security Relations,” *Journal of Strategic Studies* 35, no. 4 (2012): 447–87. doi:10.1080/01402390.2012.714710.

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to a large scale tunneling effort by the Chinese military.³⁹ (That said, extrapolations of such a tunneling effort to infer huge arsenal sizes have been rather thoroughly rebutted.⁴⁰) Mobile targets are hard to find, and buried targets are hard to destroy. Another is an emphasis on training to “fight in conditions of a complex electromagnetic environment.”⁴¹ This refers to a range of potential opposing force attacks: cyber attacks on command and control, electronic jamming, or even the electromagnetic pulses that would be generated as a result of nuclear detonations on Chinese soil.

That said, it is also rather clear that there have been “debates” in China about what circumstances might warrant shifting the no first use policy. Key challenges highlighted in this regard are typically centered on offensive conventional forces that might threaten China’s nuclear forces as well as shifting nuclear balances within Asia between China and some of its nuclear powers. That said, these debates do not seem to be particularly active today (in comparison to five years ago). This could change, but at this point, there is a strong emphasis at the highest level of strategy in adhering to no first use.

There are, additionally, discussions raising questions outside this NFU framework that raise questions for many analysts. First, there is some language in a few Chinese documents, such as the *Science of Second Artillery Campaigns*, regarding manipulating threat levels as a way that sounds remarkably similar to nuclear coercion. This raises questions about what might actually define “use”.

Second, in recent documents such as both Defense White Papers and the recent revision of the Academy of Military Science’s *Science of Military Strategy* (2013) there is relatively clear language suggesting China plans to have a “launch under attack” posture. Again, this suggests the issue of “use” might be somewhat broad in meaning. It also has grave implications for crisis stability given limited Chinese early warning, and potential C2 limitations.

Finally, there is some evidence in the new *Science of Military Strategy* as well as in the above mentioned track 1.5 dialogues that China is now considering trans-war nuclear deterrence. There

³⁹ Hui Zhang, “The Defensive Nature of China’s ‘Underground Great Wall,’” *Bulletin of the Atomic Scientists*, Jan 2012.

⁴⁰ Lt. Gen. Ronald Burgess, Director, Defense Intelligence Agency, Statement before the Senate Armed Services Committee, 112th Cong., 2nd sess., Feb 16, 2012, p. 19, <www.dia.mil/public-affairs/testimonies/2012-02-16.html> For more information on the debunking of such estimates, see James Acton, “The Underground Great Wall: An Alternative Explanation,” *Proliferation Analysis*, Carnegie Endowment for International Peace, October 26, 2011, <<http://carnegieendowment.org/2011/10/26/underground-great-wall-alternative-explanation>>, and Gregory Kulacki, “The Sources of Karber’s Sources,” *All Things Nuclear Blog*, Union of Concerned Scientists, December 7, 2011, <<http://allthingsnuclear.org/the-sources-of-karbers-sources/>>. Addressing this case and the broader dangers of such pseudo-intelligence work, see Joshua Rovner, “Intelligence in the Twitter Age,” *International Journal of Intelligence and CounterIntelligence* 26 (February, 2013), pp. 260–71.

⁴¹ Michael S. Chase et al., “Chinese Theater and Strategic Missile Force Modernization and Its Implications for the United States,” *Journal of Strategic Studies* 32, no. 1 (2009): 67-114; Christopher P. Twomey, “The People’s Liberation Army’s Selective Learning: Lessons of the Iran-Iraq ‘War of the Cities’ Missile Duels and Uses of Missiles in Other Conflicts,” in *Chinese Lessons From Other Peoples’ Wars*, ed. Andrew Scobell, David Lai and Roy Kamphausen (Carlisle, Penn: Strategic Studies Institute Book, 2011).

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is some new discussion of reestablishing nuclear deterrence in a war *after* a first nuclear use by China's potential adversary. Thus, China is going to need to consider not only the arsenal requirements for what two stages of nuclear exchanges requires, but also develop additional C2, ISR, and battle damage assessment capabilities.

Separate from NFU and related potential doctrinal shifts, the issue of SSBN deployments and its implications for strategic stability merits consideration. This certainly has implications for strategic balance as traditionally described. Chinese analysts highlight potential advantages for stability such as ensuring a high degree of survivability and reducing vulnerability of Chinese forces to U.S. missile defense forces (that are oriented for launching from specific locations). However, there are also discussions highlighting the challenges China will have both for command and control and for quieting.⁴² This development will pose great challenges to China's military leadership. Its land based force has been able to ensure secure command and control over its nuclear forces by separating the warhead from the missiles in peacetime. This creates an added layer of protection against inadvertent or mistaken launch. The sea-based force will not have this luxury. The PLA-Navy will have to find a way to manage this challenge prior to operational deployments of the force. It seems likely that this will delay this deployment, somewhat.

Reducing these Dangers

What steps can be taken to avoid a degenerating spiral, blurring of conventional and nuclear warfare, arms racing, and related problems? Much relies on China recognizing the horrific dangers posed by a nuclearized conflict (which only happened for the United States in the wake of the Cuban Missile Crisis), having greater degree of civilian oversight of nuclear programs (again a challenge for the United States throughout the CW), and shouldering the responsibilities as befits its increased stature in the global international system. But much can be done by the US, and by congress in particular.

The National Defense Authorization Act for FY2000 (NDAA2000) puts restrictions on the ability of elements of the U.S. government to engage with China on these strategic matters. While the need to protect American national security secrets must of course not be compromised, this greatly complicates Washington's ability to have a constructive dialogue with Beijing. In particular, the closing of the lab to lab channel no longer serves American interests, if it ever did. The laboratory community in China is an important contributor to national debates on nuclear policy, perhaps the dominant voice. We need to ensure its members understand our stated policy, and find ways to engage them to avoid worst case arms racing.

Aggressive development missile defense capabilities that might threaten to undermine Chinese retaliatory capabilities will only lead to further qualitative and quantitative buildups. This is a losing race for the United States, both financially and operationally. While there may be a role for limited capabilities in North Korean and potentially Iranian contexts, stated U.S. policy for decades has been that our missile defense program is not aimed at China. We need to ensure our

⁴² Wu Riqiang, "Survivability of China's Sea-Based Nuclear Forces," *Science & Global Security* 19, no. 2 (May, 2011): 91-120

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actions on missile defense align with our words. Chinese perceptions of mismatches here are large, and they matter. Again, congress has a role in creating these perceptions.

Finally, it is important to avoid exacerbating Chinese threat perceptions regarding how our advanced conventional weapons systems might be used to threaten Chinese retaliatory forces. Congressionally mandated studies on exactly that topic—assessing our ability to use conventional munitions against Chinese tunnels that might reasonably be expected to contain nuclear systems—send precisely the opposite signal. Again, China’s likely response would simply be more and better nuclear weapons; this is not in the U.S. national interest.

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These changes in China’s nuclear capabilities pose challenges, as do the interactions of them with other factors: Chinese threat perception, Chinese territorial claims all along its maritime rim, U.S. reactions to North Korean threats, replacements of aging or obsolescent weapons systems, and changing security threats in the aftermath of the rise of terrorism threat perceptions. I commend the commission for continuing to engage on these matters of national concern.

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