

# The Dynamics of an Entangled Security Dilemma

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## China's Changing Nuclear Posture

In summer 2021, it was revealed that China is constructing three silo fields as part of a significant expansion of its nuclear forces. In November 2021, the U.S. Defense Department projected that China will possess as many as 1,000 nuclear warheads by 2030, or an almost five-fold increase.<sup>1</sup> These developments indicate that China may be transforming its approach to nuclear weapons. Until recently, China has pursued a strategy of assured retaliation and has developed a relatively small but survivable force. Nuclear weapons have played only a limited role in China's overall military strategy, as Chinese leaders have viewed such weapons as useful only for deterring a nuclear attack or preventing nuclear blackmail and coercion.<sup>2</sup> China's past approach has been consistent with its declaratory no-first-use (NFU) policy, which is based on a retaliatory posture.

China's nuclear expansion raises concerns that China may be shifting toward a much less restrained and more offensive posture. In 2022, the U.S. Department of Defense assessed that China is "implementing a launch-on-warning [LOW]" posture.<sup>3</sup> U.S. Secretary of State Antony Blinken concludes that "Beijing has sharply deviated from its decades-old nuclear strategy based on minimum deterrence."<sup>4</sup> U.S. military leaders describe China's nuclear mod-

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1. Office of the Secretary of Defense, *Military and Security Developments Involving the People's Republic of China 2021* (Washington, DC: Department of Defense, 2021), 90. Hereafter referred to as *CMPR 2021*.

2. Fiona S. Cunningham and M. Taylor Fravel, "Assuring Assured Retaliation: China's Nuclear Posture and U.S.-China Strategic Stability," *International Security* 40, no. 2 (Fall 2015): 7–50, [https://doi.org/10.1162/ISEC\\_a\\_00215](https://doi.org/10.1162/ISEC_a_00215); M. Taylor Fravel and Evan S. Medeiros, "China's Search for Assured Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure," *International Security* 35, no. 2 (Fall 2010): 48–87, [https://doi.org/10.1162/ISEC\\_a\\_00016](https://doi.org/10.1162/ISEC_a_00016).

3. Office of the Secretary of Defense, *Military and Security Developments Involving the People's Republic of China 2022* (Washington, DC: Department of Defense, 2022), 97, 99. Hereafter referred to as *CMPR 2022*.

4. U.S. Department of State, "Secretary Blinken's Participation in the ASEAN Regional Forum For-

ernization as a “strategic breakout” that will provide Chinese leaders with “the capability to execute any plausible nuclear employment strategy.”<sup>5</sup> Likewise, analysts such as Austin Long suggest that, by 2030, China’s “force structure and posture will be similar to America’s and Russia’s in many ways.”<sup>6</sup>

Recent studies of China’s approach to nuclear weapons examine important questions, including the risks of inadvertent escalation, Chinese views of limited nuclear war, and the survivability of China’s arsenal.<sup>7</sup> Today, the expansion of China’s nuclear force warrants a reassessment of the drivers of China’s nuclear strategy and its future trajectory. To this end, we seek to answer two related questions in this article. First, how has China’s strategic community assessed their country’s external security environment, especially the U.S. nuclear posture, and the robustness of China’s deterrent? Second, based on these assessments, how is China considering changing its approach to nuclear weapons, including its strategy, potential employment, and force posture?

Answers to these questions are important for several reasons. Amid growing competition between the United States and China, nuclear weapons are poised to play a greater role than ever before in security ties between the two countries. Understanding the nuclear dynamics between the two, and China’s perceptions of the United States, has never been more pressing. Moreover, China’s significant expansion of its silo-based intercontinental ballistic missile (ICBM) force raises the question of whether China is on the cusp of a fundamental change in its nuclear strategy and the start of a new arms race. Finally, understanding the drivers and future direction of China’s nuclear strategy is critical to any effort at enhancing arms control or improving strategic stability.

For the past few decades, China’s approach to nuclear weapons was mostly influenced by assessments of U.S. nuclear posture and its impact on China’s

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eign Ministers’ Meeting,” August 6, 2021, <https://www.state.gov/secretary-blinkens-participation-in-the-asean-regional-forum-foreign-ministers-meeting/>.

5. U.S. Strategic Command, “Speech by Commander Charles Richard,” 2021 Space and Missile Defense Symposium, Huntsville, AL, August 12, 2021, <https://www.stratcom.mil/Media/Speeches/Article/2742875/2021-space-and-missile-defense-symposium/>.

6. Austin Long, “Myths or Moving Targets? Continuity and Change in China’s Nuclear Forces,” *War on the Rocks*, December 4, 2020, <https://warontherocks.com/2020/12/myths-or-moving-targets-continuity-and-change-in-chinas-nuclear-forces/>.

7. Caitlin Talmadge, “Would China Go Nuclear? Assessing the Risk of Chinese Nuclear Escalation in a Conventional War with the United States,” *International Security* 41, no. 4 (Spring 2017): 50–92, [https://doi.org/10.1162/ISEC\\_a\\_00274](https://doi.org/10.1162/ISEC_a_00274); Fiona S. Cunningham and M. Taylor Fravel, “Dangerous Confidence? Chinese Views on Nuclear Escalation,” *International Security* 44, no. 2 (Fall 2019): 61–109, [https://doi.org/10.1162/isec\\_a\\_00359](https://doi.org/10.1162/isec_a_00359); Wu Riqiang, “Living with Uncertainty: Modeling China’s Nuclear Survivability,” *International Security* 44, no. 4 (Spring 2020): 84–118, [https://doi.org/10.1162/isec\\_a\\_00376](https://doi.org/10.1162/isec_a_00376).

ability to develop and maintain a secure second strike. Today, however, security competition between the United States and China is increasing, as China continues to undergo an unprecedented peacetime modernization of its conventional forces that is shifting the balance of power in Asia. At the same time, the United States is pursuing a trillion-dollar modernization of its nuclear arsenal and reorienting its conventional posture in East Asia to address China as the “pacing threat.” As a result, nuclear and conventional capabilities and threats are increasingly intertwined and interacting with each other.

To explore these dynamics of entanglement and how they may be influencing China’s approach to nuclear weapons, we use the concept of the security dilemma. Specifically, we identify three pathways for how conventional and nuclear entanglement shapes threat perceptions.<sup>8</sup> First, adverse shifts in the conventional balance can create strong incentives for “nuclear compensation,” or a state’s increasing its reliance on nuclear weapons to compensate for a weakening conventional position. The opposing state, however, will likely view such an increased reliance on nuclear weapons as a threat to its own nuclear forces that requires increasing the role of nuclear weapons in its own strategy. The second pathway highlights how conventional weapons may weaken a state’s nuclear deterrent, creating perceptions of vulnerability. If a state perceives that its nuclear forces can be degraded by an adversary’s conventional capabilities, the state may respond by bolstering its nuclear deterrent. Third, a state may also develop conventional capabilities to enhance the survivability of its nuclear forces. For example, it may develop platforms that can target an adversary’s missile defenses to ensure its ability to retaliate after a strike. Its adversary, however, may regard these platforms as a threat to its conventional forces—or even its nuclear forces.

Our analysis of China’s approach to nuclear weapons amid the shifting balance of conventional capabilities yields several conclusions. First, Chinese experts believe that the United States seeks to lower the threshold for nuclear use, especially by emphasizing lower-yield weapons. They regard this development as part of an effort to counter China’s growing conventional strength

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8. On entanglement, see James M. Acton, “Escalation through Entanglement: How the Vulnerability of Command-and-Control Systems Raises the Risks of an Inadvertent Nuclear War,” *International Security* 43, no. 1 (Summer 2018): 56–99, [https://doi.org/10.1162/isec\\_a\\_00320](https://doi.org/10.1162/isec_a_00320); David C. Logan, “Are They Reading Schelling in Beijing? The Dimensions, Drivers, and Risks of Nuclear-Conventional Entanglement in China,” *Journal of Strategic Studies*, published ahead of print, November 12, 2020, 1–51, <https://doi.org/10.1080/01402390.2020.1844671>.

in East Asia and fear that the United States could rely on such weapons in a conflict over Taiwan and threaten limited first use.

Second, Chinese experts view U.S. conventional capabilities, in addition to U.S. nuclear counterforce capabilities, as posing a growing threat to China's nuclear deterrent. China's long-held concerns about U.S. missile defense and more recent concerns about U.S. conventional precision-strike capabilities have intensified in recent years. This apprehension is spurred by developments such as the 2016 Terminal High Altitude Area Defense (THAAD) and an associated X-band radar deployment in South Korea, the demise of the Intermediate-Range Nuclear Forces (INF) Treaty, the successful testing of an SM-3 interceptor against an ICBM, and the continued investments in the conventional prompt global strike (CPGS) program, as well as new capabilities to target nuclear forces such as "left of launch."<sup>9</sup>

Third, in response to concerns about conventional threats to its deterrent, China is not only expanding and modernizing its nuclear forces but also pursuing advanced conventional capabilities. China's construction of new missile silos suggests a desire to bolster its second-strike capability because the silos will be largely invulnerable to conventional counterforce attacks. To defeat U.S. missile defenses and ensure the penetrability of China's nuclear weapons, Chinese experts also argue that China should rely on conventional capabilities, such as anti-satellite (ASAT) weapons and conventionally armed missiles that can strike enabling capabilities such as satellites and ground-based radars.

Fourth, while the entangled security dilemma is contributing to significant shifts in China's strategic posture, most available sources indicate that China is not (yet) abandoning its strategy of assured retaliation. Nevertheless, China's assessment of the force levels required for deterrence appears to have changed. Moreover, although the evidence remains inconclusive, an increased role for silo-based ICBMs and the development of a space-based early warning system indicate that China could place parts of its forces on a LOW posture, a policy that some Chinese experts favor. Finally, even if China's nuclear strategy has not yet changed, the expansion of its arsenal and development of capabilities such as the dual-capable, highly precise DF-26 intermediate-range ballistic missile can enable future changes in strategy. Fears of U.S. nuclear compensation and limited nuclear use arguably increase the

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9. *Report to Congress: Declaratory Policy, Concept of Operations, and Employment Guidelines for Left-of-Launch Capability* (Washington, DC: Department of Defense, May 10, 2017), <https://fas.org/man/eprint/left.pdf>.

likelihood that China will adopt a strategy that incorporates limited nuclear use for retaliation.

Our findings are based on a diverse set of Chinese-language sources on military affairs and nuclear weapons published before China started to construct the silo fields in 2020. These sources include teaching texts, yearbooks, scholarly books, academic articles, and newspaper reporting published by organizations or institutes that are part of the PLA or China's defense industries. Authors include military officers from the PLA Rocket Forces (PLARF), military scholars affiliated with PLA research institutes, civilian nuclear experts, and scientists and engineers. Taken together, we refer to these experts as members of China's strategic community. Although these sources are incomplete because they do not include classified materials on strategy and operational doctrine, they allow us to identify areas of consensus and contestation within China's strategic community, which informs leadership decision-making regarding nuclear weapons. Access to new, additional sources might warrant reassessments of our conclusions.

The remainder of this article proceeds as follows. In the first section, we describe how conventional and nuclear modernization together create an entangled security dilemma between the United States and China, which shapes U.S.-China nuclear dynamics. Second, we analyze Chinese assessments of the United States' nuclear posture, including threats to China's deterrent springing from U.S. lower-yield nuclear weapons as well as U.S. missile defense and conventional counterforce capabilities. Third, we analyze debates about how China may respond in terms of its nuclear strategy. Fourth, we examine how China's nuclear posture is changing, and how conventional capabilities play an increasingly important role in Chinese nuclear strategy. The conclusion points to some of the lessons that the Chinese case may have for debates about arms control between the United States and China, the prospects for strategic stability, and broader debates about the security dilemma as well as the implications of increasing entanglement between conventional and nuclear weapons.

### *Nuclear-Conventional Entanglement in a Security Dilemma*

The security dilemma is an important driver of the intensifying rivalry and military competition between the United States and China.<sup>10</sup> The security di-

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10. Adam P. Liff and G. John Ikenberry, "Racing toward Tragedy? China's Rise, Military Competition in the Asia Pacific, and the Security Dilemma," *International Security* 39, no. 2 (Fall 2014):

lemma refers to actions that one state takes to enhance its security that another state perceives as offensive and threatening, thus increasing its own military capabilities in response. Even though both states may view themselves as pursuing defensive goals, the security dilemma is associated with increased instability and spirals of tensions.<sup>11</sup> In the current U.S.-China relationship, China's rapid military modernization, and its economic growth more generally, create apprehension and uncertainty in the United States about China's intentions.<sup>12</sup> Although China may view its military modernization as largely defensive, it has elicited a sharp U.S. response, with the United States bolstering its military presence in East Asia and preparing its forces for potential military conflict with China. Both states now view the other as harboring hostile intentions: The United States describes China as having "the intent to reshape the international order," whereas Chinese leaders point to "external attempts to blackmail, contain, blockade and exert maximum pressure on China."<sup>13</sup>

As we describe in more detail below, spiral dynamics sparked by China's conventional modernization and U.S. responses can shape perceptions of nuclear security and the robustness of deterrence for both states. In other

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52–91, [https://doi.org/10.1162/ISEC\\_a\\_00176](https://doi.org/10.1162/ISEC_a_00176); Thomas J. Christensen, "China, the U.S.-Japan Alliance, and the Security Dilemma in East Asia," *International Security* 23, no. 4 (Spring 1999): 49–80, <https://doi.org/10.1162/isec.23.4.49>; Adam Breuer and Alastair Iain Johnston, "Memes, Narratives and the Emergent US-China Security Dilemma," *Cambridge Review of International Affairs* 32, no. 4 (2019): 429–455, <https://doi.org/10.1080/09557571.2019.1622083>.

11. Robert Jervis, "Cooperation under the Security Dilemma," *World Politics* 30, no. 2 (1978): 167–214, <https://doi.org/10.2307/2009958>.

12. On how economic interdependence and China's domestic economic practices have contributed to U.S.-China security dilemma dynamics, see Margaret M. Pearson, Meg Rithmire, and Kellee S. Tsai, "China's Party-State Capitalism and International Backlash: From Interdependence to Insecurity," *International Security* 47, no. 2 (Fall 2022): 135–176, [https://doi.org/10.1162/isec\\_a\\_00447](https://doi.org/10.1162/isec_a_00447).

13. *National Security Strategy* (Washington, DC: White House, October 2022), 8, <https://www.whitehouse.gov/wp-content/uploads/2022/10/Biden-Harris-Administrations-National-Security-Strategy-10.2022.pdf>; Xi Jinping, "Hold High the Great Banner of Socialism with Chinese Characteristics and Strive in Unity to Build a Modern Socialist Country in All Respects," report to the 20th National Congress of the Communist Party of China, October 16, 2022, 3. Some observers claim that China's intentions are indeed revisionist, and therefore argue that the tensions between the United States and China are not the result of security dilemma dynamics. Such objections are overstated, however. China's long-term aims are unknowable and claims of full-fledged revisionism cannot be proven. Moreover, even if China is conditionally revisionist, security dilemma dynamics may apply. States that seek limited changes to the status quo may have broader security concerns and fear the intentions of others. See David James Gill in Ronan Tse-Min Fu; David James Gill; Eric Hundman; Adam P. Liff and G. John Ikenberry, "Correspondence: Looking for Asia's Security Dilemma," *International Security* 40, no. 2 (Fall 2015): 186–187, [https://doi.org/10.1162/ISEC\\_c\\_00220](https://doi.org/10.1162/ISEC_c_00220); Thomas J. Christensen, "The Contemporary Security Dilemma: Detering a Taiwan Conflict," *Washington Quarterly* 25, no. 4 (2002): 12, <https://doi.org/10.1162/016366002760252509>.

words, the effect of conventional military competition on nuclear threat perceptions exacerbates the security dilemma between the United States and China. Although recent literature on entanglement—or “how militaries’ nuclear and nonnuclear capabilities are becoming dangerously intertwined”—highlights how it affects crisis stability, the question of how entanglement may undermine arms race stability and affect the security dilemma has received less attention.<sup>14</sup>

Traditionally, most scholars do not view the conventional military balance as influencing nuclear threat perceptions. Scholars associated with the influential theory of the nuclear revolution argue that nuclear weapons dampen or may even eliminate the security dilemma when two states have a mutual second-strike capability.<sup>15</sup> When deterrence exists between two states, nuclear weapons generate a significant defensive advantage. One implication of this logic is that the conventional military balance should be unlikely to affect threat perceptions between nuclear-armed states, even when the gap in conventional capabilities is significant. According to Robert Jervis, “if nuclear weapons have had the influence that the nuclear-revolution theory indicates they should have . . . political outcomes will not be closely related to either the nuclear or the conventional balance.”<sup>16</sup>

Furthermore, to assess the nuclear balance and its effect on the security dilemma, nuclear revolution theorists emphasize that nuclear weapons or capabilities are intimately tied to nuclear operations, such as missile defenses and strategic anti-submarine warfare. When considering platforms that could create perceptions of insecurity and incentives for nuclear arms racing, they emphasize counterforce capabilities, such as ground-launched ICBMs carrying multiple independently targetable reentry vehicles (MIRVs) that could target

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14. James M. Acton, “Why Is Nuclear Entanglement So Dangerous?,” Q&A, Carnegie Endowment for International Peace, January 23, 2019, <https://carnegieendowment.org/2019/01/23/why-is-nuclear-entanglement-so-dangerous-pub-78136>; see also Talmadge, “Would China Go Nuclear?”; Acton, “Escalation through Entanglement”; Logan, “Are They Reading Schelling in Beijing?” Some analysts highlight how nonnuclear strategic weapons are likely to contribute to nuclear arms racing, but they have not identified the mechanisms through which this might occur. See Andrew Futter and Benjamin Zala, “Strategic Non-Nuclear Weapons and the Onset of a Third Nuclear Age,” *European Journal of International Security* 6, no. 3 (2021): 257–277, <https://doi.org/10.1017/eis.2021.2>.

15. See, for example, Jervis, “Cooperation under the Security Dilemma,” 198–199; Kenneth N. Waltz, “Nuclear Myths and Political Realities,” *American Political Science Review* 84, no. 3 (1990): 730–745, <https://doi.org/10.2307/1962764>.

16. Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, NY: Cornell University Press, 1989), 45; also, see Charles L. Glaser, “The Security Dilemma Revisited,” *World Politics* 50, no. 1 (1997): 189, <https://doi.org/10.1017/S0043887100014763>.

the opponent's nuclear forces and ballistic missile defenses (BMD).<sup>17</sup> Even counterforce capabilities, however, are often viewed as wasteful rather than harmful because of the defense dominance generated by nuclear weapons.<sup>18</sup> Most conventional weapons and conventional military operations are not seen as having much effect on the nuclear balance, and thus are not seen as part of the security dilemma between nuclear-armed states.<sup>19</sup> This is unsurprising, given that the theory of the nuclear revolution was developed during the Cold War, when platforms such as conventional precision-strike were far less mature and had limited counterforce utility, particularly in the U.S.-Soviet nuclear relationship.

Although nuclear weapons may dampen the security dilemma, broadly speaking, conventional military competition may affect nuclear threat perceptions and exacerbate the security dilemma. We identify three pathways through which such dynamics may occur. These three pathways are not mutually exclusive and may be mutually reinforcing.

First, in a pathway that was identified during the Cold War, shifts in the conventional balance of forces can produce incentives for "nuclear compensation," or threatening nuclear use or even employing nuclear weapons to offset conventional weakness.<sup>20</sup> If a state fears that its conventional inferiority will leave it vulnerable to aggression or unable to protect its allies at an acceptable cost, it may seek to develop limited nuclear options in order to make threats of limited nuclear employment more credible. It may rely on such options to bolster deterrence, control escalation, or possess a warfighting option to secure a favorable military outcome if a conflict occurs.<sup>21</sup> Several conventionally inferior nuclear-armed states have pursued compensation strategies. Prominent examples include the United States' Cold War "flexible response" strategy in Europe and Pakistan's nuclear strategy.<sup>22</sup>

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17. Barry R. Posen and Stephen Van Evera, "Defense Policy and the Reagan Administration: Departure from Containment," *International Security* 8, no. 1 (Summer 1983): 24–28, <https://doi.org/10.2307/2538484>; Jervis, "Cooperation under the Security Dilemma," 206–210.

18. Charles L. Glaser, *Analyzing Strategic Nuclear Policy* (Princeton, NJ: Princeton University Press, 1990), 95–97.

19. One exception is Barry R. Posen, *Inadvertent Escalation: Conventional War and Nuclear Risks* (Ithaca, NY: Cornell University Press, 1992). But Posen's work emphasizes the potential for inadvertent escalation in a crisis or conflict, not arms race instability.

20. Kristin Ven Bruusgaard, "Russian Nuclear Strategy and Conventional Inferiority," *Journal of Strategic Studies* 44, no. 1 (2021): 9, <https://doi.org/10.1080/01402390.2020.1818070>; Vipin Narang, *Nuclear Strategy in the Modern Era* (Princeton, NJ: Princeton University Press, 2014).

21. Ven Bruusgaard, "Russian Nuclear Strategy and Conventional Inferiority."

22. *Ibid.*; Narang, *Nuclear Strategy in the Modern Era*.

Nuclear compensation can exacerbate the security dilemma by increasing the perceived threat to the conventionally superior state. If the state believes that its adversary is developing or deploying nuclear weapons tailored for limited use, it may conclude that the adversary is lowering the threshold for nuclear first use, and that it could use them for coercion. Moreover, the state may worry that it lacks credible options to counter threats of limited nuclear strikes. For example, India has faced a dilemma regarding how to respond to Pakistan's development of tactical nuclear weapons during the last decade. Should it shift from massive retaliation to more proportional retaliation, or should it develop counterforce capabilities? Both a tit-for-tat retaliatory approach and a counterforce approach would constitute a significant shift in India's nuclear strategy and would potentially require it to develop new nuclear weapons capabilities.<sup>23</sup>

In a second pathway, which we call "conventionally created vulnerability," conventional military modernization may affect nuclear threat perceptions if an adversary uses conventional forces to degrade or even destroy a state's nuclear capabilities. Such vulnerabilities are a key implication of growing entanglement, with nuclear weapons and nuclear command, control, communication, and intelligence (C3I) networks facing increasing threats from conventional capabilities. Recent technological advances (e.g., the advent of advanced long-range precision-strike weapons that increase the vulnerability of nuclear assets to conventional attacks) have made such threats more salient. Similarly, advanced cyber weapons or counterspace weapons principally intended for conventional operations now constitute potentially serious threats to C3I networks of even advanced nuclear weapons states.<sup>24</sup>

A likely consequence of conventionally created vulnerability is to exacerbate the security dilemma by creating strong pressure for states to modernize or expand their nuclear forces. Because of entanglement, a state's conventional modernization (not intended to alter the nuclear balance) can nevertheless influence another state's perceptions about the robustness of its deterrent. For example, if one state deploys conventional high-precision strike platforms to counter a perceived conventional threat from another state, the target state may view such capabilities as a potential counterforce threat to its nuclear ar-

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23. Christopher Clary and Vipin Narang, "India's Counterforce Temptations: Strategic Dilemmas, Doctrine, and Capabilities," *International Security* 43, no. 3 (Winter 2018/19): 14–15, [https://doi.org/10.1162/isec\\_a\\_00340](https://doi.org/10.1162/isec_a_00340).

24. Acton, "Escalation through Entanglement."

senal. Such concerns about conventional counterforce could lead the target state to bolster its nuclear arsenal in response, creating incentives for the other state to strengthen its own nuclear forces.

In a third pathway, which we call “conventional bolstering,” one state’s efforts to use conventional weapons to defend its nuclear arsenal may threaten another state. Advanced conventional capabilities can cause states to strengthen their nuclear deterrent in new ways, including by threatening their adversary’s counterforce capabilities, although this is less frequently discussed than their potential to threaten nuclear platforms. Concerns about missile defenses may prompt states to develop both kinetic and non-kinetic conventional capabilities to target early-warning satellites and other assets that enable missile defense. States may use such capabilities to counter counterforce, but they may also direct them against assets that are critical to the operation of conventional forces or potentially even nuclear forces. Thus, it may lead the target state to bolster its conventional forces or to rely more strongly on nuclear compensation in response, setting off another action-reaction dynamic.

In sum, if conventional military competition is influencing nuclear threat perceptions, creating an entangled security dilemma between two nuclear powers, then at least one of the following indicators should exist: (1) greater concern about nuclear compensation, or that an adversary will rely on threats of limited nuclear use to compensate for conventional relative weakness; (2) debates about how to respond to this nuclear compensation, including discussions about or actual development of tit-for-tat capabilities (i.e., limited nuclear options); (3) concerns over how conventional weapons threaten a state’s nuclear second-strike capability; and (4) debates about and deployment of conventional capabilities that are intended to bolster a state’s second-strike forces.

### *How China Views U.S. Nuclear Strategy and Capabilities*

Since the end of the Cold War, China’s perceptions of its own nuclear security have been dominated by concerns about the United States. In the past few years, China’s strategic community has viewed two shifts in U.S. military posture with growing alarm. The first, which reflects concern about nuclear compensation, is a shift in U.S. nuclear doctrine toward greater emphasis on the limited use of nuclear weapons, which many in Beijing believe is driven by fear of China’s growing conventional military capabilities. The second shift, which reflects conventionally created vulnerability, is the development of a

suite of primarily conventional counterforce capabilities—including missile defenses and conventional precision-strike platforms—that together would degrade or even eliminate China’s secure second strike. In sum, Chinese observers are increasingly pessimistic about both the risk of nuclear escalation and the robustness of China’s deterrent.

#### SHIFTS IN U.S. STRATEGY AND THREATS OF LIMITED NUCLEAR USE

China’s strategic community viewed the 2018 U.S. *Nuclear Posture Review* (NPR) as reflecting an alarming shift in U.S. nuclear policy. The NPR reiterates key points of the 2017 *National Security Strategy*, describing China and Russia as seeking to “substantially revise the post–Cold War international order and norms of behavior.”<sup>25</sup> In response, China’s 2019 defense White Paper states that the United States had “provoked and intensified competition among major countries” and undermined strategic stability by pushing “for additional capacity in nuclear, outer space, cyber and missile defense.”<sup>26</sup> According to Chinese experts, the NPR demonstrates that the United States is again wielding nuclear weapons as a “hegemonistic tool” to maintain its dominant position rather than as weapons of last resort, and that nuclear weapons are an essential component of great power competition with China.<sup>27</sup>

Concerns about U.S. nuclear compensation appear frequently in Chinese sources. The 2018 NPR and the development of new lower-yield nuclear weapons signal to China that the U.S. military strategy is increasingly emphasizing nuclear weapons and nuclear war-fighting. For example, two scholars from the National University of Defense Technology believe that the NPR indicates that the United States has “lowered the threshold for nuclear first use.”<sup>28</sup> Likewise, other experts view the NPR as reviving the “theory of limited nuclear war” and thus “laying the groundwork for the development of low-yield

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25. *Nuclear Posture Review* (NPR) (Washington, DC: Office of the Secretary of Defense, February 2018), 6, <https://media.defense.gov/2018/Feb/02/2001872886/-1/-1/1/2018-NUCLEAR-POSTURE-REVIEW-FINAL-REPORT.PDF>.

26. People’s Republic of China (PRC) State Council, *Xin shidai de Zhongguo guofang* [China’s national defense in a new era], December 2019, [http://www.gov.cn/zhengce/2019-07/24/content\\_5414325.htm](http://www.gov.cn/zhengce/2019-07/24/content_5414325.htm).

27. Li Bin, “Will US Nuclear Posture Review See a Return to Hegemony?,” Carnegie Endowment for International Peace, January 26, 2018, <https://carnegieendowment.org/2018/01/26/will-us-nuclear-posture-review-see-return-to-hegemony-pub-75359>.

28. Lu Xiao and Zeng Huafeng, “Quanjie he wuqi anquan xianzhuang ji weilai zouxiang” [Current state and future trend of global nuclear weapons security], *Zhongguo junshi kexue*, no. 5 (2018): 88.

nuclear weapons.”<sup>29</sup> The 2018 NPR suggests that the primary justification for developing and deploying new lower-yield capabilities is to counter Russia’s “escalate to de-escalate” strategy—a claim that Chinese experts reject.<sup>30</sup> Instead, Chinese experts see U.S. efforts as at least partly a response to China’s growing conventional capabilities. The NPR’s focus on China as a strategic competitor has convinced Chinese experts that the United States now views lower-yield weapons as a way to maintain its military dominance in East Asia. With the conventional balance of forces in the region gradually but steadily tilting in China’s favor, especially regarding Taiwan and other areas close to China, Chinese experts believe that the United States will rely on such capabilities to compensate for its conventional inferiority.<sup>31</sup> In the words of Chinese arms control expert Li Bin, the NPR indicates “that the United States would use its nuclear weapons to respond to nonnuclear Chinese aggressions.”<sup>32</sup> Chinese observers have also noted arguments such as that of former Defense Department official Elbridge Colby, who claims that because of China’s increasing conventional power, rather than “excluding the possibility of American nuclear first use, Washington should be emphasizing it.”<sup>33</sup> Chinese observers believe that such comments reflect a shift in U.S. thinking about nuclear weapons.<sup>34</sup> Moreover, Chinese officials argue that the Joe Biden administration has largely maintained the Donald Trump–era nuclear policies by continuing to place “even more importance

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29. Meng Erlong et al., “‘Zhongdao tiaoyue’ feizhi hou zhongcheng daodan fazhan fenxi” [Analysis on the development of medium-range missiles after the demise of the Intermediate-Range Nuclear Forces Treaty], *Feihang daodan*, no. 8 (2021): 71.

30. On whether Russia indeed has an “escalate to de-escalate” strategy, see Olga Oliker and Andrey Baklitskiy, “The Nuclear Posture Review and Russian ‘De-Escalation’: A Dangerous Solution to a Nonexistent Problem,” *War on the Rocks*, February 20, 2018, <https://warontherocks.com/2018/02/nuclear-posture-review-russian-de-escalation-dangerous-solution-nonexistent-problem/>.

31. Henrik Stålhane Hiim’s communication with Chinese arms control experts, Beijing, May 2019. See also Li Jie, “Di dangliang hewu huo jiang dakai ‘Panduola mohe’” [Will low-yield nuclear weapons open a Pandora’s box?], *Huanqiu shibao*, March 24, 2020; Luo Xi, “Meiguo zhanlüe weishe tixi de tiaozheng yu Zhong-Mei zhanlüe wendingxing” [Shifts in U.S. strategic deterrence and U.S.-China strategic stability], *Guoji guanxi yanjiu*, no. 6 (2017): 49; David Santoro and Robert Gromoll, “On the Value of Nuclear Dialogue with China,” *Pacific Forum—Issues & Insights* 20, no. 1 (2020): 8, [https://pacforum.org/wp-content/uploads/2020/11/issuesinsights\\_Vol20No1.pdf](https://pacforum.org/wp-content/uploads/2020/11/issuesinsights_Vol20No1.pdf).

32. Li Bin, “Will US Nuclear Posture Review See a Return to Hegemony?”; see also Li Jie, “Di dangliang hewu huo jiang dakai ‘Panduola mohe.’”

33. Elbridge Colby, “Nuclear Weapons Aren’t Just for the Worst Case Scenario,” *Foreign Policy*, August 4, 2016, <https://foreignpolicy.com/2016/08/04/nuclear-weapons-arent-just-worst-case-scenario-first-use-china-obama-trump/>.

34. Li Bin and Hu Gaochen, “Meiguo shi yu zhong de Zhongguo he weishe youxiaoxing” [The effectiveness of China’s nuclear deterrence from the U.S. perspective], *Waijiao pinglun*, no. 5 (2018): 31.

on the role of nuclear weapons in its national security policy” and lowering “the threshold for using nuclear weapons.”<sup>35</sup>

These developments have generated concerns in China about U.S. nuclear first use in a conflict. According to arms control expert Luo Xi from the PLA’s Academy of Military Sciences (AMS), the shifts in U.S. nuclear policy mean that “China cannot refrain from being concerned about the possibility of U.S. nuclear first use in a regional crisis.”<sup>36</sup> She further notes that the risk of an incident escalating to conventional or even nuclear use is rising, given the tensions in the South China Sea and the Taiwan Strait.<sup>37</sup> Similarly, retired PLA Major General Pan Zhenqiang claims that changes in U.S. policy have contributed to a strategic shift with “enormous” consequences for China, and that “China must contemplate a war scenario in which the US may launch a nuclear attack, perhaps in a conflict over the Taiwan Straits.”<sup>38</sup> Indeed, the U.S. Department of Defense has recognized these Chinese worries, noting that “by late 2018, PRC [People’s Republic of China] concerns began to emerge that the United States would use low-yield weapons against a Taiwan invasion fleet.”<sup>39</sup> Likewise, the U.S. intelligence community’s 2023 annual threat assessment states that: “Beijing worries that bilateral tension, U.S. nuclear modernization, and the PLA’s advancing conventional capabilities have increased the likelihood of a U.S. first strike.”<sup>40</sup>

Consequently, Chinese thinking about the risk of nuclear escalation and U.S. limited first use is shifting. Fiona Cunningham and M. Taylor Fravel highlight that Chinese leaders and strategists have traditionally believed that nuclear es-

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35. Permanent Mission of the PRC to the United Nations (UN), “Remarks by H.E. Amb. Li Song on the 2022 Nuclear Posture Review of the United States at the 77th Session of the UNGA First Committee,” October 28, 2022, [http://un.china-mission.gov.cn/eng/chinaandun/disarmament\\_armscontrol/unga/202210/t20221029\\_10793966.htm](http://un.china-mission.gov.cn/eng/chinaandun/disarmament_armscontrol/unga/202210/t20221029_10793966.htm). See also Guo Xiaobing, “Meiguo guzao suwei ‘Zhongguo he weixie’ chun shu zehanzhuozai” [America’s “China nuclear threat” clamor resembles thief crying “stop thief”], *China Military Online*, May 12, 2022, [http://www.china.com.cn/opinion2020/2022-12/05/content\\_78551075.shtml](http://www.china.com.cn/opinion2020/2022-12/05/content_78551075.shtml).

36. Luo Xi, “Baideng de hezhengce zhuzhang nengfou wei chongsu Zhong Mei zhanlüe wending tigong qiji” [Can Biden’s nuclear policy provide an opportunity to reshape China-U.S. strategic stability?], *Shijie taishi*, no. 1 (2021): 35–36.

37. Ibid; see also Zhu Yu et al., “Daodan fazhan lichen, xianzhuang ji weilai zuozhan tedian fenxi” [Analysis of missile development history, current situation and future combat characteristics], *Feihang daodan*, no. 12 (2019): 31.

38. Pan Zhenqiang, “A Study of China’s No-First-Use Policy on Nuclear Weapons,” *Journal for Peace and Nuclear Disarmament* 1, no. 1 (2018): 129, <https://doi.org/10.1080/25751654.2018.1458415>.

39. CMPR 2021, 93.

40. *Annual Threat Assessment of the U.S. Intelligence Community* (Washington, DC: Office of the Director of National Intelligence, February 6, 2023), 7–8.

calation could not be controlled, and that leaders therefore would be highly cautious about employing nuclear weapons.<sup>41</sup> But with the U.S. fielding new lower-yield weapons, this confidence is weakening. A scholar from the AMS, for example, argues that the U.S. lowering of the nuclear threshold may “promote the escalation of low-intensity conflicts to nuclear war.”<sup>42</sup> Chinese experts have also highlighted that a limited nuclear strike could be misinterpreted as a high-yield countervalue attack, and thus lead to major retaliation. According to analysts from a research institute under the China National Nuclear Corporation, if the United States launches missiles carrying W76-2 warheads, “it is almost impossible for opponents to distinguish whether the warheads they carry are strategic or low-yield nuclear warheads. Therefore, [the opponent] may use strategic nuclear weapons in response, turning a nuclear conflict into a full-scale nuclear war.”<sup>43</sup>

#### CONVENTIONAL THREATS TO CHINA’S NUCLEAR DETERRENT

Amid these changes in U.S. nuclear posture, China’s strategic community remains concerned that the United States seeks to undermine China’s secure second-strike capability and thus negate its deterrent. China still has a small arsenal compared with the United States. The Defense Department estimated in 2021 that China’s arsenal comprises warheads in the “low 200s,” but upgraded that figure to having “surpassed 400” in 2022. China has been sensitive to both offensive capabilities that could destroy most of its weapons and defenses that could limit its ability to threaten retaliation.<sup>44</sup> Chinese strategists have long believed that the United States seeks nuclear superiority and “absolute security” at China’s expense, and that U.S. strategic capabilities are increasingly directed at China.<sup>45</sup> Moreover, with the intensifying strategic rivalry, they are more concerned that the United States could employ its nuclear advantage for “opportunistic” purposes.<sup>46</sup> Luo Xi from AMS, for example,

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41. Cunningham and Fravel, “Dangerous Confidence?,” 75.

42. Zhao Xiaozhuo, “Meiguo xin he zhanlüe gushou lengzhan siwei” [The new U.S. nuclear strategy sticks to the Cold War mentality], *Jiefangjun bao*, March 1, 2018, 11; see also Fang Xiaozhi, “Mei bushu zhanshu he wuqi anfang zhuduo yinhuan” [Hidden dangers in the U.S. deploying tactical nuclear weapons], *Jiefangjun bao*, February 20, 2020, 11.

43. Wu Haosong and Wang Shu, “Mei wancheng xinxing di dangliang he dantou shouge bujian de shengchan” [The U.S. completes production of the first component of a new, low-yield nuclear warhead], *Guowai he xinwen*, no. 3 (2019): 29.

44. *CMPR* 2021, 92; *CMPR* 2022, 94.

45. See, for example, Fang Ming, “Shijie junshi fazhan xingshi zongshu” [Summary of world military developments], in Yue Chen, ed., *Shijie junshi fazhan niandu baogao (2017 nian ban)* [Annual report on world military developments 2017] (Beijing: Junshi kexue chubanshe, 2017), 3–14.

46. Hu Gaochen, “Zhong Mei bu duichen he wending yu meiguo zhanlüe jihui zhuyi lunxi” [An

casts the United States as seeking to “deprive” other states of their retaliatory capability, using BMD to “destroy China’s second-strike capability.”<sup>47</sup>

Reflecting the pathway of conventionally created vulnerability, U.S. conventional capabilities are a major concern for China. As described by PLA Air Force experts, the United States could use its “global rapid strike system” in an attack on China’s nuclear forces and then intercept the surviving missiles with missile defense systems so that the “combined use of strategic offensive and strategic defensive systems will give the United States a monopolistic strategic advantage.”<sup>48</sup> Another prominent Chinese nuclear expert notes that the development of conventional technologies such as conventional precision strike and advanced intelligence, surveillance, and reconnaissance “have improved the United States’ ability to conduct damage-limitation strikes against China,” a tendency that may exacerbate U.S. “risk-taking” in a crisis.<sup>49</sup> Although Chinese concerns about missile defenses and long-range precision-strike capabilities are not new, they have been reinforced by the combination of new deployments in East Asia, the U.S. pursuit of new capabilities such as medium- and intermediate-range missiles, the left-of-launch concept, and the intensifying strategic rivalry.

MISSILE DEFENSES. For Chinese experts, U.S. missile defenses remain the most important threat to China’s retaliatory capability.<sup>50</sup> China remains unpersuaded that the United States only directs its missile defenses against “rogue actors” and only relies on nuclear deterrence to prevent Chinese nuclear attacks. North Korea is seen as a convenient excuse for a program that may also limit Chinese capabilities.<sup>51</sup> Instead, Chinese experts claim that the United States is “focusing on developing defenses against high-performance cruise and ballistic missiles from China and Russia.”<sup>52</sup>

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analysis of China-U.S. asymmetric nuclear stability and U.S. strategic opportunism], *Guoji anquan yanjiu*, no. 2 (2021): 72.

47. Luo Xi, “Meiguo zhanlüe weishe tixi de tiaozheng yu Zhong-Mei zhanlüe wendingxing,” 48.

48. Hu Xiaolei, Yin Dahu, and Chen Yuzhong, “Linjin kongjian gao chaoshengsu wuqi dui kongtian anquan de yingxiang” [The impact on aerospace security from near-space hypersonic weaponry], *Zhongguo junshi kexue*, no. 3 (2019): 71. See also Wu Riqiang, “Living with Uncertainty”; Fang Ming, “Shijie junshi fazhan xingshi zongshu.”

49. Hu Gaochen, “Zhong Mei bu duichen he wending yu meiguo zhanlüe jihui zhuyi lunxi,” 75. See also Chen Xi and Ge Tengfei, “Meiguo dui Hua juzhixing weixie zhanlüe lunxi” [An analysis of the U.S. strategy of deterrence by denial against China], *Guoji anquan yanjiu* 1, no. 40, no. 5 (2022): 104.

50. Wu Riqiang, “Dim Hope for Disarmament and Approaching Risk of Build-Up,” in Bård Nikolas Vik Steen and Olav Njølstad, eds., *Nuclear Disarmament: A Critical Assessment* (New York: Routledge, 2019), 236.

51. Zhou Zemin and Chen Cheng, “Meiguo zai Yatai diqu bushu ‘Sade’ xitong de jiben qingkuang ji zhanlüe yitü” [The basic situation and strategic intentions of the U.S. deployment of THAAD in the Asia-Pacific], *Waiguo junshi xueshu*, no. 4 (2016): 80.

52. Gao Yanling, “Meiguo daodan fangyu weilai fazhan zouxiang” [The future development path

U.S. deployments in recent years have strengthened Chinese concerns about the United States' intentions. The 2020 edition of *The Science of Military Strategy*, for example, describes the United States as "vigorously developing national and theater missile defense systems and starting actual combat deployments."<sup>53</sup> In response to the 2016 deployment of the THAAD missile defense system in South Korea, for example, Foreign Minister Wang Yi argued that the system went "far beyond the defense needs of the Korean peninsula."<sup>54</sup> Chinese observers claimed that the deployed AN/TPY-2 X-band radar would improve the United States' ability to identify, track, and potentially intercept Chinese ICBMs.<sup>55</sup> Moreover, they viewed the deployment as part of a broader effort in the region, including sending more Aegis destroyers and SM-3 interceptor missiles as well as two TPY-2 radars to Japan that can improve its regional early warning and detection capabilities.<sup>56</sup> Through such deployments and closer cooperation with allies that are also investing in BMD capabilities, two Chinese military analysts view the United States as creating an integrated network of radars and interceptors that can target China's nuclear forces.<sup>57</sup>

The Trump administration's 2019 *Missile Defense Review* (MDR) affirmed long-held convictions that U.S. missile defenses target China.<sup>58</sup> Although maintaining that missile defenses are designed to defend against ICBM attacks

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of U.S. missile defense], in Wu Qin, ed., *Xianjin fangyu lingyu keji fazhan baogao (2017 nian)* [Developments in advanced defense technology (2017)] (Beijing: Guofang gongye chubanshe, 2018), 61.

53. Xiao Tianliang, ed., *Zhanlüe xue* [The science of military strategy] (Beijing: Guofang daxue chubanshe, 2020).

54. "Wang Yi Comments on Plan of the U.S. to Deploy THAAD System in ROK," PRC Ministry of Foreign Affairs, July 9, 2016, [https://www.fmprc.gov.cn/mfa\\_eng/gjhdq\\_665435/2675\\_665437/2767\\_663538/2769\\_663542/201607/t20160712\\_522668.html](https://www.fmprc.gov.cn/mfa_eng/gjhdq_665435/2675_665437/2767_663538/2769_663542/201607/t20160712_522668.html).

55. According to Chinese arms control specialist Li Bin, the radar's position could enable the United States to gather information about Chinese warheads and potentially to distinguish decoys from actual warheads. See Li Bin, "The Security Dilemma and THAAD Deployment in the ROK," Carnegie Endowment for International Peace, August 3, 2016, <https://carnegieendowment.org/2016/08/03/security-dilemma-and-thaad-deployment-in-rok-pub-64279>.

56. Yu Haikuan, ed., *Shijie junshi nianjian 2015 nian* [World military yearbook 2015] (Beijing: Jiefangjun chubanshe, 2017), 509; Chen Yue, "2017 nian Hanguo junshi fazhan qingkuang" [The state of South Korea's military development in 2017], *Dangdai hanguo*, no. 1 (2018): 40; Jia Zhanyang, "Meiguo haiji moduan dandao daodan fangyu xitong fazhan fenxi" [Analysis of developments in U.S. sea-based terminal-phase ballistic missile defense systems], in Wu Qin, *Xianjin fangyu lingyu keji fazhan baogao (2017 nian)*, 85–92.

57. Wang Xin and Chen Yue, "Mei-Han tuidong 'Sade' ru Han de dongyin fenxi ji dui diqu zhanlüe geju de yingxiang" [Analysis of drivers in the U.S. and South Korea deploying THAAD to South Korea, and its impact on the regional strategic situation], *Waiguo junshi xueshu*, no. 10 (2016): 32.

58. Henrik Stålhane Hiim's communication with Chinese arms control experts, May 2019. See also Gao Yanling, "Meiguo daodan fangyu weilai fazhan zouxiang."

from “rogue states” rather than to target China’s strategic nuclear forces, the report also states that “in the event of conflict, it would be used to defend, to the extent feasible, against a ballistic missile attack upon the U.S. homeland from any source.”<sup>59</sup> The MDR also called for a comprehensive approach against “regional missile threats,” including those from Russia and China.<sup>60</sup> For China’s strategic community, this differentiation between regional and national missile defense makes little sense, as they see regional deployments as components of an effective, integrated, and global system.<sup>61</sup> The successful 2020 test of an SM-3 interceptor against an ICBM was likely seen by Chinese observers as yet another example of the United States’ expanding BMD ambitions.<sup>62</sup>

Chinese arms control experts were also concerned about the MDR’s calls for exploring several types of cutting-edge technologies, such as advanced boost-phase interceptors on drones and placing interceptors in space. According to an expert from AMS, being able to use space-based interceptors to target missiles in the boost phase would fill a gap in U.S. capabilities and “promote a leap from a limited to robust missile defense.”<sup>63</sup> Although later dropped by the Biden administration, the 2019 MDR’s calls for “studying” how to develop and field such capacities were met with strong skepticism in China.<sup>64</sup> Chinese experts further argued that interceptors placed in low-earth orbits to protect against strikes from North Korea could potentially intercept Chinese missiles and threaten China’s space assets.<sup>65</sup>

Most Chinese writings still view current U.S. BMD capabilities as limited.

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59. 2019 *Missile Defense Review* (Washington, DC: Office of the Secretary of Defense, 2019), 41, <https://media.defense.gov/2019/Jan/17/2002080666/-1/-1/1/2019-MISSILE-DEFENSE-REVIEW.PDF>.

60. *Ibid.*, 5–6.

61. See Lora Saalman, “China’s Calculus on Hypersonic Glide,” Stockholm International Peace Research Institute, August 15, 2017, <https://www.sipri.org/commentary/topical-background/2017/chinas-calculus-hypersonic-glide>.

62. “U.S. Successfully Conducts SM-3 Block IIA Intercept Test against an Intercontinental Ballistic Missile Target,” U.S. Department of Defense, November 17, 2020, <https://www.defense.gov/News/Releases/Release/Article/2417334/us-successfully-conducts-sm-3-block-ii-a-intercept-test-against-an-intercontinent/>.

63. Fang Yong, “Meiguo jiji tuidong tianji fandao xitong fazhan” [The United States invests in developing space-based missile defense systems], in Wu Qin, ed., *Xianjin fangyu lingyu keji fazhan baogao (2016 nian)* [Developments in advanced defense technology (2016)] (Beijing: Guofang gongye chubanshe, 2017), 183.

64. Henrik Stålhane Hiim’s communication, Beijing, May 2019; 2019 *Missile Defense Review*, 6.

65. Luo Xi, “Meiguo daodan fangyu zhutuiduan lanjie jishu ji qi zhanlüe yingxiang” [U.S. missile defense boost-phase intercept technologies and their strategic implications], *Zhongguo guoji zhanlüe pinglun*, no. 1 (2019): 204–221.

For example, Jia Zhanyang, a senior engineer from the China Aerospace Science and Industry Corporation, has emphasized that technical deficiencies and test failures have hampered development. He also notes that the system “still cannot effectively deal with targets with countermeasures,” complicating missile defense against sophisticated opponents.<sup>66</sup> Moreover, Chinese experts recognize that boost-phase interceptors remain in the conceptual stage and cannot yet be deployed.<sup>67</sup>

Nevertheless, the Chinese strategic community believes that missile defenses pose a major challenge that may weaken China’s deterrent because “the actual combat capabilities of the system will continue to improve.”<sup>68</sup> A senior colonel from the PLA’s National Defense University argued in 2017 that “if the United States persists in developing and expanding its missile defense deployments, especially in the Asia-Pacific region, the challenges facing China’s strategic deterrence capabilities are obvious.”<sup>69</sup> Moreover, Chinese observers see U.S. missile defense deployments as a signal of a broader U.S. intent to encircle China.<sup>70</sup>

CONVENTIONAL COUNTERFORCE THREATS. China’s strategic community views U.S. conventional precision-strike capabilities as a second major threat to China’s retaliatory capability. Most analysts focus on threats to China’s land-based missiles, as its nuclear-powered ballistic missile submarines (SSBNs) remain vulnerable to U.S. anti-submarine warfare capabilities.<sup>71</sup> Although Chinese observers closely follow the long-range precision-strike programs and associated efforts to develop hypersonic weapons systems, the U.S. withdrawal from the INF Treaty and the increased emphasis of the “left of launch”

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66. Jia Zhanyang, “Meiguo daodan fangyu xianjin jishu jiqi fazhan silu fenxi” [Analysis of U.S. advanced missile defense technology and its development philosophy], in Wu Qin, *Xianjin fangyu lingyu keji fazhan baogao (2016 nian)*, 72.

67. Lü Binbin and Li Yi, “Meiguo wurenji zai jiguang fandao jishu fazhan fenxi” [Analysis of developments in U.S. unmanned aerial vehicle-based missile defense laser technology], in Wu Qin, *Xianjin fangyu lingyu keji fazhan baogao (2016 nian)*, 78; Fang Yong, “Meiguo jiji tuidong tianji fandao xitong fazhan,” 182–183.

68. Deng Sijia and Zhu Jianguo, “Meiguo fandao xitong de fazhan dongxiang” [Trends in U.S. missile defense system development], *Waiguo junshi xueshu*, no. 9 (2016): 67.

69. Lu Yin, “Zhong-Mei zhanlüe wending guanxi de yanjin” [The evolution of Sino-U.S. strategic stability], *Dangdai Meiguo pinglun*, no. 2 (2017): 36; see also Fang Ming, “Shijie junshi fazhan xingshi zongshu,” 12.

70. Tong Zhao, *Narrowing the U.S.-China Gap on Missile Defense: How to Help Forestall a Nuclear Arms Race* (Washington, DC: Carnegie Endowment for International Peace, 2020), 26–29, [https://carnegieendowment.org/files/Zhao\\_USChina\\_MissileDefense.pdf](https://carnegieendowment.org/files/Zhao_USChina_MissileDefense.pdf).

71. See Wu Riqiang, “Zhong-Mei ruhe bimian he junbei jingsai” [How to avoid a China-U.S. nuclear arms race], *Dangdai Meiguo pinglun*, no. 2 (2017): 59.

concept—which refers to defeating ballistic missiles prior to launch through non-kinetic capabilities such as cyber weapons and electronic warfare—have intensified concerns about conventional counterforce. Thus, reflecting worries about conventionally created vulnerability, China’s strategic community believes that its nuclear arsenal faces a more diverse set of conventional threats than in the past.

To be sure, Chinese experts highlight increasing threats emanating from U.S. nuclear weapons. Two PLARF researchers, for example, describe the new B61-12 “dial-a-yield” warhead as a “typical first strike weapon” and highlight that it “may destroy reinforced ICBM silos.”<sup>72</sup> Several scholars have also argued that the U.S. W76-2 lower-yield warhead, which was recently deployed on a few U.S. Trident submarine-launched ballistic missiles, gives the United States more options and highlight that it is mainly used “against missile silos or other fixed targets.”<sup>73</sup>

Nevertheless, Chinese strategists are even more concerned about conventional counterforce because they believe that it lowers the threshold for conducting such strikes when compared to a nuclear first strike. As former PLARF officer Zhang Yan argues, few countries fear a U.S. nuclear strike, but “nuclear-armed states are primarily concerned about the United States’ increasing conventional precision-guided long-range combat capabilities.”<sup>74</sup> As another analyst puts it, such weapons may further “encourage the attacker to launch a first strike in situations where nuclear weapons are not used, undermining strategic stability.”<sup>75</sup> Moreover, Chinese analysts note that long-range precision-strike weapons—including new systems such as hypersonic glide vehicles (HGVs)—could “increase the risk of nuclear miscalculation by other major powers.”<sup>76</sup> Others highlight that one of the purposes of these weapons is

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72. Ge Aidong and Li Yi, “Mei-E xinxing he daodan fazhan dongtai” [The state of U.S.-Russian development of new nuclear missiles], *Waiguo junshi xueshu*, no. 4 (2016): 77; see also Li Xianrong and Yang Min, “Meiguo jiang jin yibu qianghua he shizhan nengli” [The U.S. will further enhance nuclear warfighting capability], *Jiefangjun bao*, March 1, 2018, 11.

73. Teng Jianqun, “Mei-E tuichu ‘Zhongdao tiaoyue’ de yuanyin ji yingxiang” [The reasons and impact of the U.S. and Russian withdrawal from the INF Treaty], *Heping yu fazhan*, no. 3 (2019): 22; see also Wu Haosong and Wang Shu, “Mei wancheng xinxing di dangliang he dantou shouge bujian de shengchan,” 27–29.

74. Zhang Yan, *Zhanlüe weishe lun* [Strategic deterrence theory] (Beijing: Shehui kexue wenxian chubanshe, 2018), 224.

75. Lu Yin, “Zhong-Mei zhanlüe wending guanxi de yanjin,” 35.

76. Feng Xiaoran, *Bu zhan er zhi bing: Lun youxiao weishe* [Preclude the enemy without fighting: On the effectiveness of deterrence] (Beijing: Zhongyang bianyi chubanshe, 2019), 233; Lu Yin, “Zhong-Mei zhanlüe wending guanxi de yanjin,” 35.

to “reduce reliance on nuclear weapons and to optimize the structure of the strategic strike forces” by creating conventional options.<sup>77</sup>

The increasing U.S. focus on developing new capabilities such as HGVs for long-range precision-strike missions exacerbates Chinese worries.<sup>78</sup> Chinese experts such as Lu Binbin from the PLARF argue that it will take years before the United States can deploy its long-range systems, given that they all suffer from various limitations and drawbacks.<sup>79</sup> Nevertheless, Chinese military observers consider weapons such as HGVs to be potential game changers because they provide little if any warning time, and because they can defeat current air defense systems or missile defense systems. They further note how the development of hypersonic weapons is “very likely to trigger a new arms race.”<sup>80</sup>

Although Chinese military experts think that U.S. long-range conventional precision-strike capabilities are still limited, the demise of the INF Treaty has exacerbated Chinese concerns about conventional counterforce.<sup>81</sup> The United States seeks to develop new land-based cruise missiles and ballistic missiles and to deploy them in East Asia in order to offset China’s large conventional missile force. Chinese analysts recognize that most U.S. allies are reluctant to host these systems, but they claim that the United States will pressure Japan and possibly South Korea to do so.<sup>82</sup> Moreover, a senior Chinese diplomat asserts that U.S. intermediate-range missiles “are actually posing severe threats to Chinese security, and also to the survivability of China’s nuclear forces.”<sup>83</sup> Most Chinese experts agree with this assertion, arguing that U.S. missiles—nuclear or conventional—could be used against strategic targets in China. For example, two experts from the Chinese National University of Defense

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77. Lü Binbin, “Meijun changgui quanqiu kuaisu daji xitong jishu jinzhhan” [Progress in U.S. conventional prompt global strike system technology], in Pan Qilong, ed., *Zhanlie weishe yu daji lingyu keji fazhan baogao (2016 nian)* [Developments in strategic deterrence and strike technology (2016)] (Beijing: Guofang gongye chubanshe, 2017), 91.

78. Tong Zhao and Li Bin, “The Underappreciated Risks of Entanglement: A Chinese Perspective,” in James Acton, ed., *Entanglement: Russian and Chinese Perspectives on Non-Nuclear Weapons and Nuclear Risks* (Washington, DC: Carnegie Endowment for International Peace, 2017), 55.

79. Lü Binbin, “Meijun changgui quanqiu kuaisu daji xitong jishu jinzhhan,” 92.

80. Hu Xiaolei, Yin Dahu, and Chen Yuzhong, “Linjin kongjian gao chaoshengsu wuqi dui kongtian anquan de yingxiang,” 70.

81. Tong Zhao, “Conventional Long-Range Strike Weapons of U.S. Allies and China’s Concerns of Strategic Instability,” *Nonproliferation Review*, September 14, 2020, 3, <https://doi.org/10.1080/10736700.2020.1795368>.

82. Teng Jianqun, “Mei-E tuichu ‘Zhongdao tiaoyue’ de yuanyin ji yingxiang,” 21.

83. “Director-General FU Cong’s Interview with *Kommersant*,” PRC Ministry of Foreign Affairs, October 16, 2020, [https://www.fmprc.gov.cn/mfa\\_eng/wjb\\_663304/zjjg\\_663340/jks\\_665232/jkxw\\_665234/202010/t20201016\\_599378.html](https://www.fmprc.gov.cn/mfa_eng/wjb_663304/zjjg_663340/jks_665232/jkxw_665234/202010/t20201016_599378.html).

Technology argue that forward-deployed missiles would be a “huge threat” to Chinese mobile missiles, which they claim are vulnerable when in a fixed position during the launch phase.<sup>84</sup> For this reason, Guo Xiaobing from the China Institute of Contemporary International Relations has warned that U.S. deployment of intermediate-range missiles may cause great tension with China, even spurring an “Asian Cuban Missile Crisis.”<sup>85</sup>

In addition to conventional precision-strike capabilities, Chinese experts note that the United States is placing greater emphasis on non-kinetic capabilities such as cyber weapons and electronic warfare through its “left of launch” concept. Such non-kinetic tools, they argue, could “profoundly change the strategic meaning of U.S. missile defense.”<sup>86</sup> Although lack of information about U.S. capabilities likely hampers Chinese debate, some analysts argue that the United States has superior cyber capabilities, and that this may enable the United States to launch attacks against key network nodes and communication links.<sup>87</sup> Although not addressing its nuclear forces explicitly, Chinese military analysts highlight how the increasing “informatization” (*xinxihua*) of its forces, or the application of information technology to all aspects of war-fighting, make them more vulnerable to adversaries’ cyberattacks.<sup>88</sup> China is likely to have installed air-gapped systems and other protective measures for its nuclear forces, but Chinese experts are well aware that vulnerabilities may remain.<sup>89</sup>

In sum, conventional-nuclear entanglement is affecting China’s nuclear threat perceptions. In response to concerns about the shifting conventional balance of power in Asia, Chinese experts believe that the United States is chang-

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84. Chen Xi and Ge Tengfei, “Meiguo dui Hua juzhixing weixie zhanlüe lunxi,” 103–104.

85. Guo Xiaobing, “Meiguo tuichu ‘Zhongdao tiaoyue’ de dongyin yu yingxiang qianxi” [Analysis of drivers and implications of the U.S. withdrawal from the INF treaty], *Zhongguo guoji zhanlüe pinglun*, no. 1 (2019): 202; see also Ji Zhiye, “Zhong-E buxie nuli, wei hu quanqiu zhanlüe wending” [China and Russia make ceaseless efforts to protect global strategic stability], *Huanqiu shibao*, June 6, 2019, 14. For a dissenting opinion, see Wu Riqiang, “Zhongguo buying jiaru Zhongdao tiaoyue de liyou” [The reasons why China will not join the INF treaty], *Huanqiu shibao*, November 7, 2018, 14.

86. Deng Sijia, “Mei yanfa fandao xin jishu: Wurenji fashe jiguang di fashe qian daji” [U.S. develops new anti-missile technologies: UAV-borne laser and left of launch], *Jiefangjun bao*, October 28, 2016; see also Deng Sijia and Zhu Jianguo, “Meiguo fandao xitong de fazhan dongxiang,” 67.

87. Cui Jianshu, “Meiguo he Liliang xiandaihua yu wangluo kongjian zhanlüe wending” [Modernization of U.S. nuclear forces and strategic stability in cyberspace], *Zhongguo xinxi anquan*, no. 8 (2019): 43.

88. Liu Aiming and Wang Fan, “Jiaqiang junshi xinxi anquan zhuangbei jianshe guanli de duice cuoshi” [Measures to strengthen development of equipment for military information security], *Wangluo anquan jishu yu yingyong*, no. 8 (2020): 141–142.

89. Tong Zhao and Li Bin, “The Underappreciated Risks of Entanglement,” 62.

ing its approach to nuclear weapons (including nuclear compensation) by lowering the threshold for nuclear use and emphasizing lower-yield weapons. In addition, the United States continues to develop and deploy conventional counterforce systems such as missile defense and long-range precision-strike missiles that Chinese observers believe could be used to weaken or negate China's nuclear deterrent, creating conventional vulnerabilities.

### *China's Reconsiders Its Nuclear Strategy*

Chinese experts debate how China might alter its nuclear strategy in response to concerns about U.S. nuclear compensation, limited first use, and conventionally created vulnerabilities. Despite growing speculation among outside observers that China is moving toward a strategy that includes escalation management or even limited nuclear first use, we find little evidence to suggest that China is abandoning its current strategy of assured retaliation. Yet, there is greater debate about the posture that China may need to implement this strategy.

Recent official Chinese statements and publications point to continuity in China's nuclear strategy but also hint at nuclear expansion. In its 2019 defense White Paper, China pledged to keep its "nuclear capabilities at the minimum level required for national security" and refrain from engaging in arms races.<sup>90</sup> Even if the conditions under which NFU would apply have long been debated in China—such as in cases of conventional precision-strikes against Chinese nuclear forces—China has reiterated its unqualified commitment to no first use.<sup>91</sup> Despite the continuity in declaratory policy, Chinese leader Xi Jinping called for the PLA to "establish a strong system of strategic deterrence" in his report to the 20th Party Congress in October 2022.<sup>92</sup> Unlike previous leaders, Xi has also further tied China's nuclear forces to its great power status.<sup>93</sup> At the same time, top PLA leaders such as the outgoing vice chair of the Central Military Commission, Xu Qiliang, emphasize "asymmetric balancing" in

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90. PRC State Council, *Xin shidai de Zhongguo guofang*.

91. On China's no-first-use (NFU) policy, see Tong Zhao, "China and the International Debate on No First Use of Nuclear Weapons," *Asian Security* 18, no. 3 (2022): 205–213, <https://doi.org/10.1080/14799855.2021.2015654>.

92. Xi Jinping, "Hold High the Great Banner of Socialism with Chinese Characteristics," 48.

93. "Xi Jinping: Jianshe qiangda de xinxihua zhanlüe daodan budui" [Xi Jinping: Building a powerful information-based strategic missile force], *Xinhua*, December 5, 2012, <http://cpc.people.com.cn/n/2012/1205/c64094-19804598.html>.

China's approach to deterrence and have not in any way indicated that China seeks parity with the United States and Russia.<sup>94</sup>

China's nuclear posture is also under increasing public debate. Breaking with past taboos about not openly discussing nuclear issues, the size of the Chinese arsenal has become a topic of debate beyond the community of nuclear experts. In May 2020, Hu Xijin, the editor of the tabloid newspaper *Huanqiu Shibao* (Global Times), argued that China should build "1000 warheads, including 100 DF-41s" to counter the increasing challenge from the United States.<sup>95</sup> The Chinese Ministry of Foreign Affairs later claimed that Hu's views reflected the concern of the "Chinese public and the wider international public" about U.S. hostility and threats, but underscored that these suggestions were inconsistent with China's policy.<sup>96</sup> In response, several nuclear experts, including former PLARF officers, criticized Hu, stating that it was inappropriate to "hype nuclear issues online" and arguing that China's current arsenal ensures credible deterrence.<sup>97</sup> In contrast to Hu's statements, Chinese strategists have continued to highlight the importance of quality over quantity, stressing the need "not to compare the number and types of nuclear weapons," and to ensure that China "does not fall behind" in developing military technologies.<sup>98</sup> But the comments by the Ministry of Foreign Affairs—and the fact that Hu was not censored when he called for a major expansion—highlight that a once off-limits topic may now be open to greater debate, and that the arsenal size required for assured retaliation is under discussion.

Although they publicly refrain from calling for a major quantitative expansion, prominent Chinese experts have argued that China needs to improve

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94. Xu Qiliang, "Ru qishi xianjian jun yi bai nian fendou mubiao" [Achieving the 100-year army building goal as scheduled], *Renmin ribao*, November 7, 2022, <http://politics.people.com.cn/n1/2022/1107/c1001-32559984.html>.

95. For an overview of the initial post and Hu's response to his critics, see "Hu Xijin: Wo xiangxin Zhongguo hui zengjia he dantou, yinwei yi bie wu xuanze" [Hu Xijin: I believe China will increase its nuclear warheads because it now has a choice], May 12, 2020, <https://mil.news.sina.com.cn/china/2020-05-12/doc-iircuyvi2615458.shtml>.

96. Permanent Mission of the PRC to the UN, "Zhong-Mei caijun dashi zai caitanhui gekong jiaofeng" [The U.S. and Chinese disarmament ambassadors exchange verbal blows at the disarmament conference], July 1, 2020, <http://www.china-un.ch/chn/dbtzyhd/t1793814.htm>.

97. Yang Chengjun, "He zhanlüe zhuanjia Yang Chengjun: Bu yi zai wangluo shang chaozuo she he wenti" [Nuclear strategy expert Yang Chengjun: Don't hype nuclear issues online], *Zuguo*, May 12, 2020, <http://baijiahao.baidu.com/s?id=1666466797148249711>.

98. Lu Yin, "Mian dui meiguo xin he taishi shenyi zhongguo geng ying baochi zhengce yu liliang zixin" [Facing new U.S. Nuclear Posture Review, China should maintain its policy and self-confidence in its power], *Xinhua*, February 7, 2018, [http://www.xinhuanet.com/world/2018-02/07/c\\_129806828.htm](http://www.xinhuanet.com/world/2018-02/07/c_129806828.htm).

its nuclear deterrent to address the increasing threats from the United States. They have long noted that the “minimum level required for national security”—as the 2019 defense White Paper states—is a relative figure, based on the requirements of assured retaliation.<sup>99</sup> In other words, China may need to expand its arsenal to maintain an assured retaliation capability. In 2018, two leading scholars argued that China should bolster its deterrent because it lacks “redundancy in the current international environment,” which could “induce opportunistic behavior by adversaries” and create “incentives to carry out nuclear threats.”<sup>100</sup> They link these risks directly to shifts in U.S. doctrine and the development of new lower-yield nuclear weapons.<sup>101</sup> Moreover, prominent Chinese experts have pointed to the limited survivability of China’s nuclear deterrent before the recent expansion started.<sup>102</sup>

China’s strategic community also debates whether China should move to a LOW posture. Several PLA officers have suggested a shift toward LOW, claiming that it would enhance assured retaliation amid concerns about missile defense and conventional precision-strike capabilities. The officers further indicate that such a shift would be consistent with China’s NFU policy.<sup>103</sup> Although China currently is not believed to have an adequate early warning system, Yang Chengjun, a retired PLARF senior colonel, suggests that China has a LOW capability. Yang claims that China’s reaction time is currently “minutes,” and that China is able to carry out a nuclear counterattack “before the enemy’s nuclear weapons land.”<sup>104</sup>

Nevertheless, while numerous Chinese sources advocate for bolstering readiness and a rapid response capability, this should not be equated with advocating for a wholesale move to a LOW posture. In 2019, the director general of the Arms Control Department of the Ministry of Foreign Affairs, Fu Cong,

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99. Sun Xiangli, “Zhongguo he zhanlüe xingzhi yu tedian fenxi” [An analysis of the nature and characteristics of China’s nuclear strategy], *Shijie jingji yu zhengzhi*, no. 9 (2006): 23–28.

100. Li Bin and Hu Gaochen, “Meiguo shi yu zhong de Zhongguo he weishe youxiaoxing,” 40–41; see also Hu Gaochen, “Zhong Mei bu duichen he wending yu Meiguo zhanlüe jihui zhuyi lunxi.”

101. Li Bin and Hu Gaochen, “Meiguo shi yu Zhong de Zhongguo he weishe youxiaoxing,” 40–41; see also Zuo Yixing, “Meiguo dui changgui weixie zhanlüe de tiaozheng” [Adjustment of U.S. conventional deterrence strategy against China], *Guoji anquan yanjiu*, no. 5 (2022): 53–80. Li and Hu further argue that many U.S. nuclear policy experts do not believe in the credibility of China’s nuclear deterrent, which may undermine deterrence and U.S.-China strategic stability.

102. Wu Riqiang, “Living with Uncertainty.”

103. Gregory Kulacki, *China’s Military Calls for Putting Its Nuclear Forces on Alert* (Cambridge, MA: Union of Concerned Scientists, January 2016), <https://www.ucsusa.org/sites/default/files/attach/2016/02/China-Hair-Trigger-full-report.pdf>.

104. Yang Chengjun, “He zhanlüe zhuanjia Yang Chengjun.”

called on all states to abandon LOW, and further confirmed that such a policy would violate China's NFU pledge.<sup>105</sup> The National Defense University's 2020 *Science of Military Strategy* highlights the importance of improving China's rapid response capabilities, stating that China "must increase the alert level" for its missile forces as the "prerequisite" of its assured retaliation or "striking after the enemy has struck [*hou fa zhi ren*]." <sup>106</sup> Thus, it is unclear from Chinese sources whether China will indeed adopt LOW, or whether it would do so with only a portion of its forces, even if it develops the ability to implement such a posture.

In the 2018 NPR, the United States indicated that China could seek to engage in limited nuclear first use in a conventional conflict.<sup>107</sup> Yet Chinese sources contain little evidence of a shift to limited first use. For example, the 2020 *Science of Military Strategy* highlights the limitations of nuclear deterrence, arguing that nuclear weapons are "difficult to use in war" because they are so destructive, whereas conventional deterrence is easier to control.<sup>108</sup> Chinese arms control officials note that nuclear weapons are only useful for deterrence and "not something that can be used in the battlefield."<sup>109</sup> To be clear, China's nuclear strategy leaves open the option of limited retaliation, which should be distinguished from a limited first-use strategy. Retired Major General Peng Guangqian from AMS, for example, noted that although China would have no choice but to respond to a nuclear attack, "the size, yield, type, and kind of retaliation would not be dictated by the enemy, but based on an overall consideration of the war situation and operational necessities. It would not necessarily be a 'proportional' response."<sup>110</sup> Peng's position is consistent with previous PLA writings on how it would conduct a nuclear counterattack. It is also meant to signal that China seeks to maintain a certain flexibility in its stance that nuclear weapons are only for retaliation.<sup>111</sup>

Although the U.S. Defense Department claims that "PRC strategists

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105. Gregory Kulacki, "China Rejects Policy of Nuclear Launch on Warning of an Incoming Attack," *Equation* (blog), Union of Concerned Scientists, October 28, 2019, <https://blog.ucsusa.org/gregory-kulacki/china-rejects-policy-of-nuclear-launch-on-warning-of-an-incoming-attack/>.

106. Xiao Tianliang, *Zhanlie xue*, 383.

107. *Nuclear Posture Review*, 32.

108. Xiao Tianliang, *Zhanlie xue*, 129.

109. "Director-General Fu Cong's Interview with *Kommersant*."

110. Peng Guangqian, "Peng Guangqian: Zhongguo 'bu shouxian shiyong hewu' de diqi zai na" [Why is China confident about no first use of nuclear weapons?], *Huanqiu shibao*, February 28, 2018, <https://opinion.huanqiu.com/article/9CaKrnK6MYJ>.

111. Cunningham and Fravel, "Assuring Assured Retaliation," 26; Cunningham and Fravel, "Dangerous Confidence?," 83–88.

have highlighted the need for lower-yield nuclear weapons in order to increase the deterrent value of China's nuclear force, though they have not defined specific nuclear yield values,"<sup>112</sup> we found few references to such calls in our reading of Chinese materials. One possible exception is retired senior colonel Yang Chengjun, who claimed in a 2017 interview that China will develop such warheads for the DF-41.<sup>113</sup> Most other Chinese experts explicitly reject the idea that China should develop lower-yield weapons. For example, when the *Global Times* published an interview with a "military expert" calling for China to develop lower-yield warheads, several Chinese arms control experts rebuked the article, arguing that such arguments "do not hold water" [*zhan buzhu qiao*], and that China should "have confidence in its nuclear strategy," refrain from being "led by the nose" by the United States, and reject the logic of nuclear warfighting.<sup>114</sup>

Other observers have argued that China's increasing concerns about U.S. limited first use—or nuclear compensation—could lead it to adopt an approach that includes options for limited retaliation. According to Tong Zhao, while a shift toward a first-use strategy is unlikely—particularly because of China's increasing conventional advantage within the first island chain—China could seek to deter U.S. coercive escalation by relying on theater-range systems to respond symmetrically and proportionally to U.S. limited nuclear use.<sup>115</sup> If the United States further escalates by conducting limited nuclear strikes against military targets in China, China could respond by using a larger, more survivable and sophisticated ICBM force—and capabilities such as an intercontinental-range HGV—to conduct strikes against U.S. homeland military targets.

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112. *CMPR* 2022, 98.

113. Zhang Qiang, "Dongfeng-41 bufen jishu chaoguo Mei E" [Some technologies of the Dongfeng-41 surpass the United States and Russia], *Keji Ribao*, November 24, 2017, [http://digitalpaper.stdaily.com/http\\_www.kjrb.com/kjrb/html/2017-11/24/content\\_382667.htm?div=-1](http://digitalpaper.stdaily.com/http_www.kjrb.com/kjrb/html/2017-11/24/content_382667.htm?div=-1).

114. Cui Maodong, "Meiguo xin ban 'He taishi pinggu' baogao chutai—Zhongguo ying ruhe huiying" [The latest U.S. *Nuclear Posture Review* is out—How should China respond?], *Zhongguo qingnianbao*, February 14, 2018, 6; see also Lu Yin, "Miandai Meiguo xin he taishi shenyi, Zhongguo geng ying baochi zhengce yu liliang zixin." For the interview advocating for low-yield weapons, see "Meiguo weilai keneng yong he wuqi duifu wangluo gongji" [In the future, the U.S. may use nuclear weapons in response to a cyberattack], *Huanqiu shibao*, February 5, 2018, <https://tech.huanqiu.com/article/9CaKrnK6AWq>.

115. Tong Zhao, "China's Silence on Nuclear Arms Buildup Fuels Speculation on Motives," *Bulletin of the Atomic Scientists*, November 12, 2021, <https://thebulletin.org/2021/11/chinas-silence-on-nuclear-arms-buildup-fuels-speculation-on-motives/>.

To date, there is little evidence that China has adopted a strategy of tit-for-tat retaliation and escalation management. Zhao's account, as he readily admits, is speculative.<sup>116</sup> Yet, some Chinese observers argue that greater U.S. nuclear compensation through reliance on non-strategic nuclear weapons represents a challenge for China's nuclear strategy. If the United States were to launch a limited nuclear strike, China's lack of a credible response option to U.S. first use constitutes a dilemma for China.<sup>117</sup> Therefore, Pan Zhenqiang has argued that China may wish to design "more options for responding to a nuclear attack," which could "entail certain modifications of China's nuclear posture by adding new types of nuclear (non-strategic) weapons to its arsenal."<sup>118</sup> Moreover, as we highlight below, China's nuclear modernization will increasingly enable it to adopt a strategy that incorporates limited use for retaliation.

### *China's Force Modernization and the Dangers of Entanglement*

Even though little evidence exists to suggest that China is changing its nuclear strategy, China is altering how it strengthens its retaliatory capability, including by expanding its silo-based ICBM force. This expansion is driven in large part by the conventionally created vulnerability and concerns about U.S. non-nuclear capabilities. Furthermore, if China chooses to change its nuclear strategy in response to U.S. nuclear compensation, China's new, highly precise and dual-capable systems will enable it to do so. Finally—reflecting the third pathway of entanglement, conventional bolstering—China is emphasizing the development of conventional weapons to strengthen its deterrent, especially by developing the ability to attack missile defense systems. All these factors will likely further increase arms race instability and exacerbate the security dilemma between the United States and China.

#### NUCLEAR FORCE MODERNIZATION AND EXPANSION

Starting around 2015, China has been accelerating the modernization of its nuclear arsenal, including expanding its forces. The U.S. Defense Department projects that China will have about 1,000 warheads by 2030. Even though still

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116. Ibid.

117. Henrik Stålhane Hiim's communication with Chinese arms control experts, Beijing, May 2019.

118. Pan Zhenqiang, "A Study of China's No-First-Use Policy on Nuclear Weapons," 129.

only a fraction of the current U.S. stockpile of 3,750 nuclear warheads, this would represent an almost five-fold increase in China's warhead stockpile in roughly a decade.<sup>119</sup> Although China is on the cusp of developing the components of a nuclear triad, its sea- and air-based legs remain weak. China currently operates six Type 094 (Jin-class) SSBNs, and the U.S. Defense Department reported in 2022 that they "likely began near-continuous at-sea deterrent patrols."<sup>120</sup> China is developing a more advanced Type 096 SSBN. China has started fielding its next-generation submarine-launched ballistic missiles, the JL-3, on at least some of its SSBNs, and the JL-3 has the range to strike the continental United States from Chinese littoral waters.<sup>121</sup> Even if the 096 submarines are quieter, the Jin-class reportedly struggles with noise levels and remains vulnerable to U.S. anti-submarine warfare. For this reason, Chinese nuclear expert Wu Riqiang even recommends that China should refrain from undertaking deterrence patrols because of their limited survivability and should use the Type 094 SSBNs as training platforms instead.<sup>122</sup> In addition, the PLA Air Force has been reassigned a nuclear mission. China has operationally fielded the H-6N bomber and is developing an air-launched ballistic missile that could be effective to counter U.S. missile defenses.<sup>123</sup> Because the bombers would have to venture far into the Eastern Pacific before they can reach the continental United States—and be highly vulnerable in transit—their contribution to the survivability of the Chinese nuclear arsenal against the United States will arguably be limited (though they could be used to strike regional targets such as Guam).

These weaknesses indicate that land-based missiles will remain the backbone of China's deterrent for years to come. Chinese experts have long argued that the most crucial step in China's nuclear modernization effort is to bolster the survivability and penetrability of its land-based ICBMs.<sup>124</sup> China is continuing to retire older ICBM systems, especially liquid-fueled ones such as the

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119. *CMPR* 2022, 97.

120. *Ibid.*, 96.

121. *Ibid.* See also Antony Capaccio, "China Has Put Longer-Range ICBMs on Its Nuclear Subs, U.S. Says," *Bloomberg*, November 18, 2022, <https://www.bloomberg.com/news/articles/2022-11-18/us-says-china-s-subs-armed-with-longer-range-ballistic-missiles>.

122. Wu Riqiang, "Zhong-Mei ruhe bimian he junbei jingsai," 59.

123. *CMPR* 2021, 91–92.

124. Teng Jianqun, Wu Jun, and Sun Xiangli, "He, laidao Zhongguo 50 nian" [50 years of a nuclear China], *Shijie zhishi*, no. 20 (2014): 21; Dong Fang, "Zengjia zhanlüe he wuqi shuliang jiaqiang he liliang bu fuhe shijie chaoliu" [Strengthening nuclear forces by increasing the number of strategic nuclear weapons is not in line with global trends], *Zhongguo qingnianbao*, August 1, 2018, 6.

DF-4, and replacing them with solid-fuelled road-mobile systems, such as the DF-31AG with transporter erector launchers that allow off-road mobility.<sup>125</sup> China is reportedly considering road- and rail-mobile deployment as well as silo-basing for the DF-41, and at least two brigades have been formed.<sup>126</sup> China also maintains a robust system of underground facilities to protect its missiles forces as well as command and control networks.<sup>127</sup> Just like the United States is concerned that Russia is developing a nuclear-powered cruise missile and a nuclear-powered torpedo, U.S. officials also allege that China may be working on new nuclear-powered capabilities.<sup>128</sup> Little is known, however, about China's development of such capabilities, which are likely years away from deployment.

To increase penetrability, China is developing and has begun equipping several missiles with penetration aids, and some Chinese missiles, including the DF-41, are capable of carrying multiple independently targeted reentry vehicles (MIRVs).<sup>129</sup> In July 2021, China reportedly tested a fractional orbital bombardment system that carried an HGV—and that fired a separate missile in flight.<sup>130</sup> Although many questions remain about the test, the most likely rationale for developing a fractional orbital bombardment system capability is to evade the United States' missile defense radars and maintain a hedge against future missile defense capabilities.<sup>131</sup>

The revelations that China is building over three hundred silos in three different areas raise crucial questions about the future of its ICBM force.<sup>132</sup> How

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125. Richard D. Fisher, "DF-31AG ICBM Can Carry Multiple Warheads, Claims China's State Media," *Jane's Defence Weekly*, August 16, 2017, 9.

126. Hans M. Kristensen, Matt Korda, and Eliana Reynolds, "Nuclear Notebook: Chinese Nuclear Weapons, 2023," *Bulletin of the Atomic Scientists* 79, no. 2 (2023): 123, <https://doi.org/10.1080/00963402.2023.2178713>.

127. *CMPR* 2021, 91.

128. "Under Secretary Bonnie Jenkins' Remarks: Nuclear Arms Control—A New Era?," U.S. Department of State, September 6, 2021, <https://www.state.gov/under-secretary-bonnie-jenkins-remarks-nuclear-arms-control-a-new-era/>.

129. Hans M. Kristensen and Matt Korda, "Nuclear Notebook: Chinese Nuclear Forces, 2021," *Bulletin of the Atomic Scientists*, November 15, 2021, <https://thebulletin.org/premium/2021-11/nuclear-notebook-chinese-nuclear-forces-2021/>.

130. Demetri Sevastopulo, "Chinese Hypersonic Weapon Fired a Missile over the South China Sea," *Financial Times*, November 21, 2021.

131. *CMPR* 2022, 98.

132. Jeffrey Lewis and Decker Eveleth, "Chinese ICBM Silos," *Arms Control Wonk*, July 2, 2021, <https://www.armscontrolwonk.com/archive/1212340/chinese-icbm-silos/>; Matt Korda and Hans M. Kristensen, "China Is Building a Second Nuclear Missile Silo Field," *Strategic Security* (blog), Federation of American Scientists, July 26, 2021, <https://fas.org/blogs/security/2021/07/china-is-building-a-second-nuclear-missile-silo-field/>; Rod Lee, "PLA Likely Begins Construction

China would operate these silos remains uncertain, including whether it would deploy missiles in all of them, and how many warheads each missile would carry. Even if the United States' prediction that China will have about 1,000 warheads by 2030 is an overestimate, the new silo fields constitute a major nuclear expansion.<sup>133</sup>

Before constructing the silo fields, Chinese experts debated both the merits of missile silos and different missile basing modes. In articles published in *Feihang Daodan* (Aerodynamic Missile Journal), researchers affiliated mainly with the PLARF University of Engineering explored different ways to reduce threats to the survivability of land-based missiles.<sup>134</sup> Some researchers stressed the survivability benefits of mobile missiles, the potential vulnerability of silos, and the importance of improving both concealment and the ability to strike rapidly.<sup>135</sup> Several other experts pointed to the benefits of diversifying the deployment modes of land-based missiles and possessing a mix of road-mobile, rail-mobile, and silo-based forces.<sup>136</sup> Although stressing the importance of avoiding an arms race, some analysts proposed that the "development and construction [of the silo-based force] must be stepped up to ensure effective deterrence," calling silo-based forces an "important cornerstone of national security."<sup>137</sup> The 2020 *Science of Military Strategy* stresses the need for diversification, noting that whereas mobile missiles offer greater survivability and "will be the most important direction" for the PLARF, mobile and silo-based missiles "can complement each other's advantages and increase the flexibility of strategic options."<sup>138</sup> One potential purpose of expanded silo-

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of an Intercontinental Ballistic Missile Silo Site near Hanggin Banner," China Aerospace Studies Institute, August 12, 2021, <https://www.airuniversity.af.edu/CASI/Display/Article/2729781/pla-likely-begins-construction-of-an-intercontinental-ballistic-missile-silo-si/>.

133. Hans Kristensen, "DIA Estimates for Chinese Nuclear Warheads," *Strategic Security* (blog), Federation of American Scientists, May 31, 2019, <https://fas.org/blogs/security/2019/05/chinese-nuclear-stockpile/>.

134. Whereas some of the articles from *Feihang Daodan* debating missile basing modes discuss general lessons, others point directly to implications for China's nuclear forces.

135. Deng Biao et al., "Eluosi fashe jinggai de fazhan licheng" [The development history of Russian silo covers], *Feihang daodan*, no. 2 (2019): 73. See also Yang Mingying et al., "Daodan zhuyao fashe pingtai, jishu tedian ji weilai qushi" [Main launch platforms, technical characteristics and future trends of missiles], *Feihang daodan*, no. 6. (2020): 39–40.

136. Dai Haifeng et al., "Mei E luji heliliang duoyuan xingtai fazhan tanxi" [Analysis on the development of diversified forms of U.S. and Russian land-based nuclear forces], *Feihang daodan*, no. 10 (2018): 45–50, 55.

137. Zhang Shutao, Bi Yiming, and Qi Changxing, "Mei E jingji he liliang shencun fanghu jianshe tanjiu ji qishi" [Explorations and implications of US and Russian development of survivability and protection of silo-based forces], *Feihang daodan*, no. 7 (2019): 62.

138. Xiao Tianliang, *Zhanlüe xue*, 383.

based ICBMs, for example, would be to improve the survivability of China's mobile missiles by serving as a warhead "sink."

Some outside observers have hypothesized that China may adopt a so-called shell game strategy, whereby not all the silos would contain missiles, and missiles would be moved around between silos. They have further highlighted that Chinese strategists were interested in such ideas during the 1980s, but that China decided to build decoy silos instead.<sup>139</sup> This interest in decoys appears to have been renewed in recent years, as several PLARF experts point to decoy silos as an option to reduce vulnerability. In a 2018 article that examines land-based missiles in Russia and the United States, researchers note that "each launch silo may not be equipped with missiles, which can confuse opponents to a certain extent."<sup>140</sup> Similarly, in a 2021 article about the threat from U.S. advanced intelligence, surveillance, and reconnaissance, a group of PLARF experts highlight that China can improve the survivability of its missiles by placing many missile silos in a large area, including some fake silos. "In this way," they argue, "even if the reconnaissance and monitoring system can find the silos, it cannot distinguish between true and false silos."<sup>141</sup> Although these writings by no means demonstrate that China will indeed adopt a shell game approach, they highlight the PLARF's exploration of deceptive basing modes.

The silo debate among Chinese experts illustrates that survivability concerns are likely a crucial driver of the construction of the new silo fields. Thus, the expansion of China's ICBMs is consistent with an effort to bolster its assured retaliation posture and is likely at least partly influenced by concern over conventionally created vulnerability. Unlike mobile missiles, missile silos will be largely invulnerable to conventional counterforce strikes. In addition, silo-based forces placed on higher alert status may provide continuity of communication and facilitate command and control much more easily than mobile forces. More broadly, the rapid construction of silos may indicate a sense of urgency to enhance China's deterrent in response to the perceived threats from the United States and the limitations of the air- and sea-based legs of its nuclear triad, which will take years to overcome. The silos will enhance the sur-

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139. Jeffrey Lewis, "China Is Radically Expanding Its Nuclear Missile Silos," *Foreign Policy*, June 30, 2021, <https://foreignpolicy.com/2021/06/30/china-nuclear-weapons-silos-arms-control/>.

140. Dai Haifeng et al., "Mei E luji heliliang duoyuan xingtai fazhan tanxi," 47.

141. Zheng Wanli et al., "Meijun zhencha jianzhi tixi fazhan xianzhuang ji dui daodan xitong weixie fenxi" [An analysis of the development status of U.S. military reconnaissance and surveillance system and the threat to missile systems], *Feihang daodan*, no. 4 (2021): 88.

vivability of China's nuclear forces by increasing the number of targets for the United States to attack, thereby reducing the number of missiles that could target China's mobile missile forces.

China is also investing in early warning systems and missile defenses to bolster the survivability of its arsenal, including against conventional counterforce threats. Chinese analysts highlight that improved early warning could enable China to "buy time for defense and retaliation."<sup>142</sup> They have further argued that "strategic early warning is one of the most critical links for nuclear counterattack."<sup>143</sup> Although few details have emerged, President Vladimir Putin announced in 2019 that Russia will help China develop a system that will likely be able to identify the launch of longer-range ballistic missiles. Early warning and tracking are also key for missile defense, which China could deploy in the future to protect strategic targets. Chinese analysts argued in 2019 that "China will be forced to build expensive missile defense systems in response" to the U.S. deployment of intermediate-range missiles.<sup>144</sup> China has conducted several missile defense tests, but it has not yet tested or deployed any systems that can intercept long-range missiles.

Improved early warning could enable China to shift toward a LOW posture. The U.S. Defense Department cites the space-based early warning system and the new missile silos (which may be highly vulnerable to nuclear strikes unless missiles are launched prior to impact) as evidence that China is moving in this direction.<sup>145</sup> Moreover, it claims that while China "almost certainly keeps the majority of its nuclear force . . . with separated launchers, missiles, and warheads," parts of the force are placed on "high alert duty," whereby missile battalions are kept ready to launch.<sup>146</sup> Although China does not ap-

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142. Yang Yucai, "China-Russia Missile Defense Cooperation Needed," *Global Times*, October 15, 2019, <http://en.people.cn/n3/2019/1015/c90000-9623099.html>. The author is affiliated with the National Defense University. Similarly, the 2020 *Zhanlie xue* points to the importance of developing an early warning capability to face "threats and challenges" such as the United States strengthening its ICBM force. Xiao Tianliang, *Zhanlie xue*, 388.

143. Zhang Shutao, Bi Yiming, and Qi Changxing, "Mei E jingji he lilian shencun fanghu jianshe tanjiu ji qishi," 62.

144. Zhao Weibin, "Potential Impact of U.S. Deployment of Intermediate-Range Missiles in Asia," *China-US Focus*, August 23, 2019, <https://www.chinausfocus.com/peace-security/potential-impact-of-us-deployment-of-intermediate-range-missiles-in-asia>. See also Li Bin, "What China's Missile Intercept Test Means," Carnegie Endowment for International Peace, February 4, 2013, <https://carnegieendowment.org/2013/02/04/what-china-s-missile-intercept-test-means/fa45>. Li Bin does not directly call on China to deploy missile defenses but argues that point defense (i.e., defending specific areas) of strategic assets may make sense for China.

145. *CMPR* 2021, 94.

146. *Ibid.*, 91.

pear to have moved the bulk of its force to a LOW posture—and it is not yet clear if it will—it seems to be adjusting its traditional policy of keeping all nuclear weapons in a state of low alert. Even without adopting LOW, improved readiness and early warning capability could give China significant survivability benefits.

Many Western observers discuss whether China is developing or has already developed non-strategic nuclear weapons. Some observers highlight that the dual-capable, intermediate-range DF-26 missile—which is highly precise and reportedly “hot-swappable” (i.e., nuclear and conventional warheads can be rapidly swapped in the field)—should potentially be regarded as a non-strategic weapon.<sup>147</sup> China has deployed 250 launchers and possibly more missiles, but most of them are armed with conventional warheads.<sup>148</sup> Moreover, the primary motivation for deploying nuclear-armed DF-26 missiles could be to bolster regional nuclear deterrence rather than to create a limited nuclear strike option.<sup>149</sup> As David Logan argues, the DF-26 may have been developed as a dual-capable missile for cost-saving purposes and operational convenience.<sup>150</sup> Despite speculation by outside observers, no evidence exists in available Chinese sources to suggest that China is considering an “escalate to de-escalate” strategy.

Nevertheless, the DF-26 does provide China with a precision theater-range nuclear strike capability. As discussed earlier, Chinese strategists are increasingly concerned about U.S. nuclear compensation and limited first use, with some highlighting that China has lacked a credible response option. The DF-26 could fill this perceived gap. If China were to deploy many of these missiles with nuclear warheads, the DF-26 could enable a shift toward an approach that includes options for limited retaliation. If Chinese concerns about U.S. limited first use increase, the temptation to shift its strategy is likely to grow.

If China were to develop a lower-yield nuclear warhead—most likely for the DF-26—it would constitute a major shift in Chinese strategy. So far, there is little evidence of such a shift. Although the U.S. Defense Department’s China military power report states that a 2017 Chinese publication claimed that low-

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147. Long, “Myths or Moving Targets?”

148. *CMPR* 2022, 167; Kristensen and Korda, “Nuclear Notebook.”

149. Cunningham and Fravel, “Dangerous Confidence?,” 91–92. Similarly, new nuclear-capable air-launched cruise missiles and ballistic missiles will enhance China’s ability to conduct nuclear precision strikes at the theater level. But there is currently little evidence to suggest that China is developing such capabilities for limited strikes or for tailoring deterrence.

150. Logan, “Are They Reading Schelling in Beijing?,” 36.

yield warheads had been developed “for use against campaign and tactical targets that would reduce collateral damage,”<sup>151</sup> the source appears to be the interview with former senior colonel Yang Chengjun cited previously. In that interview, Yang claimed that such warheads *will be* developed for the DF-41—not that they *have been* developed.<sup>152</sup> Although Yang’s comments are noteworthy, we have not uncovered any other evidence to suggest that China has developed lower-yield weapons and, as discussed earlier, many prominent members of the Chinese arms control community strongly opposes such a development.<sup>153</sup> Hans Kristensen, Matt Korda, and Eliana Reynolds also highlight that there is still no evidence of China developing such warheads, noting that “although a ‘lower-yield’ warhead may be less powerful than a higher-yield warhead, it is not necessarily the same as an explicitly ‘low-yield warhead.’”<sup>154</sup> But the availability of new sources on this point might produce revised assessments.

In sum, China’s nuclear posture is undergoing important shifts, which are consistent with an effort to bolster its capability for assured retaliation in response to enhanced perceptions of vulnerability driven by security dilemma dynamics. But possible shifts such as the adoption of a LOW posture could undermine stability and would mark a turning point in how China implements its assured retaliation strategy. Moreover, its evolving posture may allow China to shift its strategy relatively quickly to include limited retaliation, potentially in response to concerns over increased U.S. reliance on nuclear weapons to compensate for adverse shifts in the conventional balance of forces. The future trajectory of China’s nuclear posture thus remains uncertain.

#### DEVELOPING CONVENTIONAL AND POTENTIALLY OFFENSIVE CAPABILITIES

China’s primary response to the U.S. pursuit of nuclear primacy and concerns about the viability of its secure second strike has historically been to modernize and enhance the survivability of its forces.<sup>155</sup> Although nuclear modernization remains the foundation of China’s efforts to maintain its deterrent, China’s strategic community increasingly highlights the importance of securing its retaliatory capability by investing in conventional capabilities such as ASAT weapons, electronic warfare, conventionally armed cruise missiles and

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151. *CMPR 2021*, 93.

152. Zhang Qiang, “Dongfeng-41 bufen jishu chaoguo Mei E.”

153. See also Kristensen, Korda, and Reynolds “Nuclear Notebook,” 124.

154. *Ibid.*

155. Cunningham and Fravel, “Assuring Assured Retaliation,” 26.

ballistic missiles, and cyber weapons. Through such capabilities, China may ensure the penetrability of its missiles by targeting all components of the U.S. missile defense system. Furthermore, Chinese strategists see dual-capable delivery systems such as HGVs as a potent tool. This development reflects the mechanism of conventional bolstering, in which one state uses conventional capabilities to improve its nuclear security in ways that may undermine its adversary's conventional or potentially even nuclear security.

To be sure, China's rationale for developing capabilities such as ASAT weapons has long been its desire to counter missile defenses. As early as 2002, Chinese leader Jiang Zemin pointed to the need to penetrate missile defenses as one of the major reasons behind China's counterspace investments.<sup>156</sup> In recent years, however, members of the Chinese strategic community have called for China to develop a wide suite of technologies to target U.S. missile defense systems rather than to narrowly focus on improving its own missiles' penetrability.<sup>157</sup> As Tong Zhao highlights, some experts have labeled this approach "system penetration" or "system confrontation," whereby China could exploit vulnerabilities and potentially target interceptors, space-based sensors, ground-based radars, and command, control, and communication (C3) networks.<sup>158</sup> Although it is uncertain whether China has adopted this approach, Zhao suggests that prominent Chinese strategists' support for such views indicates it has some policy influence.

Chinese experts stress how U.S. space-based assets that support missile defenses may be vulnerable. Most notably, they highlight the key role played by early warning satellites and the U.S. Space-Based Infrared System (SBIRS) constellation.<sup>159</sup> SBIRS consists of satellites and hosted payloads in geosynchronous earth orbit and highly elliptical orbit as well as hardware and software on the ground. The SBIRS constellation provides the United States with missile warning that would cue interceptors in the missile defense system. Chinese analysts have discussed how to increase missile penetration, including by in-

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156. Fiona S. Cunningham, "Maximizing Leverage: Explaining China's Strategic Force Postures in Limited Wars" (PhD diss., Massachusetts Institute of Technology, 2018), 371.

157. Xiao Tianliang, *Zhanlüe xue*, 389. See also Liang Lei and Dai Yao, "Zhouji dandao daodan tufang jishu fazhan licheng" [The process of ICBM penetration technology development], *Feihang daodan*, no. 8 (2017): 56–60.

158. Zhao, *Narrowing the U.S.-China Gap on Missile Defense*, 47–50.

159. Wang Chunli, Xie Yamei, and Jiao Shenghai, "Zhendui meiguo daodan fangyu xitong de dandao daodan tu fang tongdao yanjiu" [Research on ballistic missile penetration channels aimed at U.S. missile defense system], *Dianzi shijie*, no. 6 (2016): 171–173. See also Luo Xi, "Meiguo daodan fangyu zhutuiduan lanjie jishu ji qi zhanlüe yingxiang," 210.

terfering with SBIRS satellites to reduce warning time and decrease the interceptors' precision. For example, although China's current directed-energy weapons have limitations, PLA-affiliated researchers argue that lasers' rapid transmission, precision, and potential for repeated use can be of critical importance in targeting SBIRS.<sup>160</sup> China is also actively pursuing more advanced directed-energy weapons.<sup>161</sup> They further discuss how a variety of electronic interference techniques can be used against satellites, including interfering with satellite-to-ground communications.<sup>162</sup> Some Chinese analysts also discuss how to use cyber capabilities against satellites, especially because they may be less politically risky than more easily attributable kinetic methods.<sup>163</sup> Furthermore, China is developing several other capabilities that it could potentially use to target or interfere with satellites in geosynchronous earth orbits, including satellites that may perform rendezvous and proximity operations.<sup>164</sup> Beyond targeting early warning and C3 assets, Chinese analysts have also noted how counterspace capabilities may help China defeat any future spaced-based missile defense interceptors. Luo Xi, for example, highlights that China has launched satellites equipped with robotic arms, suggesting that China could in the future rely on such capabilities to "engage in an accurate 'capture'" of U.S. satellites carrying interceptors.<sup>165</sup>

In addition to space-based U.S. assets, Chinese strategists suggest that China can use anti-radiation missiles, anti-radiation unmanned aerial vehicles, and microwave weapons to target forward-deployed radars that enable missile defenses. They further note that China may target interceptors and supporting facilities with high-precision ballistic and cruise missiles.<sup>166</sup> China has de-

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160. Wang Xiao, Zhang Yuling, and Li Yuncheng, "Jiguang ganrao hongwai yujing weixing de youxiao yazhi qu yanjiu" [Effective suppression zone of laser interference to infrared early warning satellites], *Jiguang yu hongwai* 50, no. 5 (2020): 609.

161. See *Annual Threat Assessment of the U.S. Intelligence Community* (Washington DC: Office of the Director of National Intelligence, April 9, 2021), 8, <https://www.dni.gov/files/ODNI/documents/assessments/ATA-2021-Unclassified-Report.pdf>.

162. Cheng Qiang and You Jingyun, "Dui dandao daodan fangyu xitong de dianzi dui kang jishu fenxi" [Analysis of electronic countermeasures for ballistic missile defense systems], *Jianchuan dianzi dui kang* 40, no. 2 (2017): 6–9; see also Bai Xinyou, Wang Xiao, and Chu Fanxing, "Yanhu dandao daodan tufang zhiyuan ganro cuoshi yanjiu" [Research on support jamming measures for covering ballistic missile penetration], *Zhanshu daodan jishu*, no. 3 (2021): 126–132.

163. Shi Fei and Guo Shujun, "Ruhe guanbi duishou touding de 'tiandeng'" [How to switch off the 'sky lantern' above the enemy's head], *Jiefangjun bao*, June 19, 2020, 11.

164. Mark Stokes et al., *China's Space and Counterspace Capabilities and Activities* (Washington, DC: U.S.-China Economic and Security Review Commission, March 30, 2020), 40, [https://www.uscc.gov/sites/default/files/2020-05/China\\_Space\\_and\\_Counterspace\\_Activities.pdf](https://www.uscc.gov/sites/default/files/2020-05/China_Space_and_Counterspace_Activities.pdf).

165. Luo Xi, "Meiguo daodan fangyu zhutuiduan lanjie jishu ji qi zhanlue yingxiang," 221.

166. Cheng Qiang and You Jingyun, "Dui dandao daodan fangyu xitong de dianzi dui kang jishu fenxi," 9. See also Zhao, *Narrowing the U.S.-China Gap on Missile Defense*, 48.

ployed a burgeoning arsenal of shorter-range, conventionally armed missiles, and can thus target any forward-deployed U.S. capabilities in East Asia, including ground-based X-band radars in South Korea and Japan. In addition, it has a large arsenal of anti-ship missiles, and may therefore target capabilities such as the U.S. sea-based X-band radar, and potentially also forward-deployed Aegis destroyers.

To counter the threat of U.S. missile defenses, the Chinese strategic community also view HGVs as a key capability.<sup>167</sup> In a survey of hundreds of Chinese technical articles on hypersonic systems, Lora Saalman shows that a quarter of them focus on U.S. missile defenses.<sup>168</sup> China is developing several systems, and the medium-range (1,800–2,500 kilometers) DF-17, which is equipped with an HGV, was fielded in 2019.<sup>169</sup> Although U.S. officials have indicated that the DF-17 may play a nuclear role, Chinese sources argue that the DF-17 has a purely conventional mission, and its range limits its utility for strategic deterrence.<sup>170</sup> China is reportedly also testing an intercontinental-range HGV similar to the Russian Avangard system.<sup>171</sup> The recent fractional orbital bombardment system test may indicate that China is making significant progress on developing HGVs.

China likely views its investments in many of these capabilities as defensive and necessary to protect its retaliatory capability. To be sure, capabilities such as ASAT weapons and HGVs would be attractive to the PLA in any event. Nevertheless, securing its second-strike capability at the very least provides China with a strong additional incentive to invest in such nonnuclear or dual-use capabilities. AMS scholar Luo Xi, for example, argues that the U.S. interest

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167. See, for example, Hu Xiaolei, “Guowai fan gaochaoshengsu mubiao daodan fangyu jishu fazhan dongxiang fenxi” [Analysis of trends in the development of foreign hypersonic missile defense technology], in Wu Qin, *Xianjin fangyu lingyu keji fazhan baogao (2016 nian)*, 65–71.

168. Saalman, “China’s Calculus on Hypersonic Glide.”

169. Ankit Panda, “Questions about China’s DF-17 and a Nuclear Capability,” *Diplomat*, February 16, 2020, <https://thediplomat.com/2020/02/questions-about-chinas-df-17-and-a-nuclear-capability/>.

170. Zhang Qiang, “Dongfeng-17: Gao chaoshengsu rang fandao xitong xingtong xushe” [DF-17: Hypersonic speed makes missile defense systems useless], *Keji ribao*, January 15, 2018, 3; Ian Williams and Masao Dahlgren, “More Than Missiles: China Previews Its New Way of War,” CSIS Brief (Washington, DC: Center for Strategic and International Studies, October 2019), 2, [https://missilethreat.csis.org/wp-content/uploads/2019/11/191023\\_MoreThanMissilesChinaPreviewsits\\_update.pdf](https://missilethreat.csis.org/wp-content/uploads/2019/11/191023_MoreThanMissilesChinaPreviewsits_update.pdf).

171. Statement of Terrence J. O’Shaughnessy, United States Air Force Commander, United States Northern Command and North American Aerospace Command, before the U.S. Senate Armed Services Committee, 118th Cong., 1st sess., February 13, 2020, 6, [https://www.armed-services.senate.gov/imo/media/doc/OShaughnessy\\_02-13-20.pdf](https://www.armed-services.senate.gov/imo/media/doc/OShaughnessy_02-13-20.pdf).

in boost-phase interceptors underscores why China should “continue to develop anti-satellite capabilities.”<sup>172</sup> Chinese analysts thus perceive investments in advanced conventional capabilities as one way to secure its retaliatory capability, and as a hedge against possible future threats.

The United States, on the other hand, is likely to view such capabilities as potentially offensive and threatening, including to its ability to wage conventional war. For example, the United States is highly dependent on space-based assets for military operations and would assume that the PLA could use any of its counterspace capabilities in a conventional military conflict, even if the likelihood of China employing such capabilities arguably depends on the scenario in question.<sup>173</sup> Similarly, China can use conventional precision-strike capabilities to target not only forward-deployed missile defense capabilities but also other U.S. targets.

Complicating matters further, several of the targets that China may seek to hold at risk to ensure its retaliatory capability are dual use. The SBIRS constellation provides early warning against ballistic missiles, but it also plays a central role in U.S. intelligence collection and battlespace awareness. James Acton highlights that this could create risks of inadvertent escalation if the United States believed that Chinese attacks against the SBIRS constellation in a conventional conflict would degrade the United States’ nuclear arsenal.<sup>174</sup> Conversely, China’s efforts to hold the SBIRS constellation at risk to strengthen its own nuclear deterrent would also be viewed as a threat to the United States’ ability to wage conventional war against China.

Relatedly, some of the advanced capabilities that China is developing to defeat missile defenses, such as HGVs, are also dual use. The United States perceives the program to be potentially offensive, and has signaled that it will develop BMD systems that may target HGVs.<sup>175</sup> Even if the primary driver for developing these BMD efforts is to defend U.S. forces against attacks by Chinese conventionally armed, medium-range HGVs such as the DF-17, Chinese leaders may perceive that these BMD systems threaten China’s deterrent, and thus respond by developing more advanced weapons themselves.

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172. Luo Xi “Meiguo daodan fangyu zhutuiduan lanjie jishu ji qi zhanlue yingxiang,” 221.

173. For an analysis of U.S. and Chinese counterspace use during Taiwan Strait and Spratly Islands scenarios, see Eric Heginbotham et al., *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996–2017* (Santa Monica, CA: RAND Corporation, 2015), 227–257.

174. Acton, “Escalation through Entanglement.”

175. 2019 *Missile Defense Review*, 20.

Moreover, if China deploys dual-capable intercontinental-range HGVs, it may lead to destabilizing conventional-nuclear entanglement at the strategic level in U.S.-China relations.<sup>176</sup>

In sum, China's investment in advanced nonnuclear and dual-use capabilities may affect both conventional and nuclear threat perceptions in the United States and reinforce the security dilemma between the United States and China.

### *Conclusion*

China's strategic community is increasingly alarmed by its external security environment, which presents new challenges to the robustness of China's nuclear deterrent. These perceptions reflect the dynamics of an entangled security dilemma and the ways in which changes in conventional and nuclear capabilities dangerously interact. The entangled security dilemma between the United States and China is unfolding through three pathways. First, China is concerned about U.S. "nuclear compensation," and it perceives that the United States is lowering the threshold for using nuclear weapons to compensate for its conventional weakness in East Asia. Second, China worries about "conventionally created vulnerability" and believes that continued U.S. development of advanced conventional capabilities, such as missile defense, long-range and forward-deployed conventional precision-strike weapons, are undermining China's secure second-strike capability. Third, in addition to expanding its nuclear arsenal, and reflecting "conventional bolstering," China increasingly seeks to use advanced conventional weapons and capabilities to defeat U.S. missile defenses. Chinese concerns about the survivability of its arsenal are an important driver of its efforts to develop advanced counterspace capabilities as well as HGVs.

Although the entangled security dilemma dynamics are creating incentives for China's nuclear expansion, there is little evidence that China has shifted its nuclear strategy away from assured retaliation. The construction of three silo fields makes a shift to a LOW posture more likely, but whether China will indeed adopt such a posture is still uncertain. The simplest explanation for the silos is that China seeks to thwart the ability of the United States to diminish or

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176. Joshua H. Pollack, "Boost-Glide Weapons and U.S.-China Strategic Stability," *Nonproliferation Review* 22, no. 2 (2015): 155-164, <https://doi.org/10.1080/10736700.2015.1119422>; Logan, "Are They Reading Schelling in Beijing?," 32.

negate China's retaliatory capability, potentially by relying on conventional counterforce strikes. Similarly, even if the DF-26 missile provides China with a theater-range nuclear precision-strike capability, so far little concrete evidence exists to suggest that China is considering giving the missile a role in a nuclear strategy that incorporates limited nuclear retaliation, much less limited first use. Thus, speculation of a significant shift in Chinese nuclear strategy away from assured retaliation remains premature. Nevertheless, China is broadening its approach to securing its deterrent and implementing its strategy of assured retaliation. Over time, these changes may provide China with the tools to deploy its nuclear weapons in new ways, which in turn could prompt a change in strategy. Fears of increased U.S. reliance on nuclear weapons to compensate for conventional weakness in East Asia and threats of first use in a crisis arguably make such shifts more likely.

These developments suggest that the conventional military competition between the United States and China is influencing nuclear threat perceptions and exacerbating the security dilemma. Military deployments that both sides regard as at least partly defensive are viewed as offensive by the other side. In China's case, capabilities of concern include U.S. missile defenses, conventional precision-strike weapons, and lower-yield nuclear weapons. In the U.S. case, these capabilities include Chinese systems to defeat BMD, such as counterspace capabilities. Thus, our findings lend further support to arguments that security dilemma dynamics are influencing the trajectory of U.S.-China relations.

More broadly, our findings contribute to the literature on security dilemmas. Scholars tend to argue that nuclear weapons dampen the security dilemma and that the conventional military balance has limited influence on nuclear threat perceptions. We have highlighted that this is not necessarily the case, and we have identified several pathways through which conventional military competition—specifically technological shifts and the advent of advanced conventional weapons—can increase nuclear insecurity and exacerbate the security dilemma.

Our findings further contribute to the emerging literature on the impact of nuclear-conventional entanglement. So far, most of the work in this area examines the implications of entanglement on crisis stability. But entanglement may also reinforce security dilemma dynamics and potentially create arms race pressures. In fact, China's effort to build several silo fields likely reflects its most significant response to lingering concerns about how conventional precision-strike and missile defenses could negate its deterrent. The number of

silos and their location deep inside China suggest a desire to shield them from current U.S. conventional precision-strike capabilities. Although China likely believes that expanding its ground-based ICBM force will enhance its deterrent and remove any doubt about its capacity to conduct a retaliatory strike, U.S. officials view China as engaging in arms racing.

Finally, the dynamics of an entangled security dilemma underscore why it will be challenging for the United States to engage China in nuclear arms control. Chinese concerns about U.S. capabilities such as missile defenses and long-range precision-strike, coupled with the continuing asymmetry in arsenal size, make it unlikely that China will agree to any arms control measures focused purely on nuclear capabilities. But including conventional capabilities will complicate any negotiations. U.S. policymakers have so far shown no interest in discussing limitations on missile defenses, for example. In addition to the strong suspicions that China's strategic community harbor toward arms control, an entangled security dilemma thus makes it difficult to be sanguine about the prospects for progress.<sup>177</sup> At least for the time being, an arms race between the United States and China—fueled by the entangled security dilemma and the shifting conventional balance of force in the region, and encompassing both advanced conventional weapons and nuclear weapons—appears more likely.

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177. Henrik Stålhane Hiim and Magnus Langset Trøan, "Hardening Chinese Realpolitik in the 21st Century: The Evolution of Beijing's Thinking About Arms Control," *Journal of Contemporary China* 31, no. 133 (2022): 86–100, <https://doi.org/10.1080/10670564.2021.1926095>.