China's Low-Yield Battlefield Nuclear Weapons: A Threat Assessment

A Monograph

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The People's Republic of China (PRC) possesses the world's third largest nuclear arsenal and sustains the most aggressive missile development program on the planet. While discussions of strategic nuclear capabilities are not infrequent in Western analysis of the People's Liberation Army (PLA), assessments of its non-strategic nuclear weapons are extremely limited. Is the US accurately assessing the threat to American ground forces in the Indo-Pacific posed by China's nuclear arsenal—specifically, its low-yield battlefield nuclear weapons (LYBNW)? To answer the question, this paper explores Beijing's intent and capability to employ LYBNWs. Regarding the former, emerging domestic political and geostrategic factors, when interpreted through the lens of behavioral psychology, exert pressure on Chinese leaders that may increase the appeal of tactical nuclear capabilities. Furthermore, LYBNWs align neatly with likely PLA operational objectives in a war with the US. China's evolving non-strategic nuclear capabilities corroborate the growing appeal of these weapons. Today, the PLA is reinvigorating its LYBNW arsenal, which is rapidly growing in number and diversity. In sum, an analysis of the strategic, operational, and psychological factors incident to possible US-PRC military conflict reveals that Beijing's use of LYBNWs is more plausible than existing literature suggests. Although the overall likelihood of theater nuclear war is low, the consequences of US ground forces being caught unprepared are catastrophic.

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Abstract

China’s Low-Yield Battlefield Nuclear Weapons: A Threat Assessment, by Maj Daniel G. Beck, 66 pages.

The People’s Republic of China (PRC) possesses the world’s third largest nuclear arsenal and sustains the most aggressive missile development program on the planet. While discussions of strategic nuclear capabilities are not infrequent in Western analysis of the People’s Liberation Army (PLA), assessments of its non-strategic nuclear weapons are extremely limited. Is the US accurately assessing the threat posed by China’s nuclear arsenal—specifically, its low-yield battlefield nuclear weapons (LYBNW)? To answer the question, this paper explores Beijing’s intent and capability to employ LYBNWs against US ground forces in the Indo-Pacific region. Regarding the former, emerging domestic political and geostrategic factors, when interpreted through the lens of behavioral psychology, exert pressure on Chinese leaders that may increase the appeal of tactical nuclear capabilities. Furthermore, LYBNWs align neatly with likely PLA operational objectives in a war against the US. China’s evolving non-strategic nuclear capabilities corroborate the growing appeal of these weapons. Today, the PLA is reinvigorating its LYBNW arsenal, which is rapidly increasing in number and diversity. In sum, an analysis of the strategic, operational, and psychological factors incident to possible US-PRC military conflict reveals that Beijing’s use of LYBNWs is more plausible than existing literature suggests. Although the overall likelihood of theater nuclear war is low, the consequences of US ground forces being caught unprepared are catastrophic.

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Abbreviations

ALBM	Air Launched Ballistic Missile
ALCM	Air Launched Cruise Missile
AOR	Area of Responsibility
C2	Command and Control
CCP	Communist Party of China
CMC	Central Military Commission
CNI	Conventional and Nuclear Integration
DoD	Department of Defense
ERW	Enhanced Radiation Weapon
EW	Electronic Warfare
HEMP	High-Altitude Electromagnetic Pulse
HGV	Hypersonic Glide Vehicle
INDOPACOM	US Indo-Pacific Command
IRBM	Intermediate Range Ballistic Missile
LYBNW	Low-Yield Battlefield Nuclear Weapon
MRBM	Medium Range Ballistic Missile
NFU	No First Use
PLA	People’s Liberation Army
PLAAF	People’s Liberation Army Air Force
PLAN	People’s Liberation Army Navy
PLARF	People’s Liberation Army Rocket Force
PLASAF	People’s Liberation Army Second Artillery Force
PRC	People’s Republic of China
SLCM	Submarine Launched Cruise Missile
SRBM	Short Range Ballistic Missile

TC	Theater Command
TCW	Target-Centric Warfare

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Introduction

> Risk is in the future, not in the past.
>
> —Nassim Nicholas Taleb, *Antifragile: Things That Gain from Disorder*

Excessive reliance on history can limit one's ability to anticipate future possibilities. For military professionals, deterministic thinking can distort risk assessments and, ultimately, lead to surprise. Today, Nassim Nicholas Taleb's warning is particularly prescient as US leaders assess the significance of great power competition with the People's Republic of China (PRC). The novelty of the threat posed by China increases the difficulty inherent in risk calculation. The PRC, a peer competitor with revisionist aspirations in East Asia, has the world's third-largest nuclear arsenal and the most active missile development program on the planet. However, literature relevant to a potential Sino-American armed conflict is most often limited to the topics of conventional war and gray zone activities. While discussions of strategic deterrence are not infrequent, analysis of non-strategic nuclear weapons is extremely limited. This is especially striking considering the extensive coverage of Russia's low-yield capabilities and begs the question: is the US accurately assessing the threat posed by China's nuclear arsenal? An analysis of the likely strategic, operational, and psychological factors incident to possible US-PRC military conflict reveals that Beijing's use of low-yield battlefield nuclear weapons (LYBNW) is more plausible than existing literature suggests. Although the overall likelihood of theater nuclear war is low, the consequences of US ground forces being caught unprepared are catastrophic.

The US Department of Defense (DoD) is pursuing substantial structural reform to ensure its ability to defeat peer adversaries in large-scale combat operations. The introspection required for this process challenges the organization's ability to remain abreast of changes in the strategic environment. The People's Liberation Army (PLA) has a well-documented strategic nuclear arsenal, but, for American observers, its growing non-strategic capability is mired in uncertainty. In the 2018 *Nuclear Posture Review*, the PLA's non-strategic nuclear weapons capability is

acknowledged, but only once and in a single page addendum to the main text.[1] In their "Tactical Nuclear Weapons, 2019," Hans M. Kristensen and Matt Korda largely exclude the PRC from their analysis.[2] Even the DoD's 2020 annual report to Congress on China limits its non-strategic nuclear assessment to a short 83-word section amidst the 200-page document.[3]

The paucity of current information on the PLA's low-yield nuclear weapons contrasts with that of the recent past. A 1997 Congressional Research Service report suggests that the PRC maintained as many as 150 tactical nuclear weapons just two decades ago.[4] Wide discontinuities across the public and private space, such as disagreement on the nuclear capability of individual platforms, further confound accurate analysis.[5] Chinese efforts to maintain the secrecy of their nuclear capabilities are considerable and contribute to the dearth of literature on the topic; nevertheless, effective operational security neither explains nor excuses what may be an inadequate appreciation of the role of LYBNWs in the future battlespace.

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[1] Media Defense, "Global-Nuclear-Modernization," accessed October 19, 2020, https://media.defense.gov/2018/Feb/02/2001872878/-1/-1/1/GLOBAL-NUCLEAR-MODERNIZATION.PDF.

[2] Hans M. Kristensen and Matt Korda, "Tactical Nuclear Weapons, 2019," *Bulletin of the Atomic Scientists* 75, no. 5 (September 2019): 253–260, accessed August 26, 2020, https://doi.org/10.1080/00963402.2019.1654273. The authors affirm that China possesses "weapons that would be categorized as tactical . . . but [China] doesn't refer to them as such," which leads them to refrain from a detailed discussion of the topic.

[3] US Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020* (Washington, DC: Office of the Secretary of Defense, 2020), 88.

[4] Jonathan Medalia, *Chinese Nuclear Testing and Warhead Development* (Washington, DC: Congressional Research Service, November 1997), 14.

[5] The Defense Intelligence Agency's (DIA), *China Military Power* report states that the DF-15 short-range ballistic missile is a conventional-only system; whereas, the Center for Strategic and International Studies states that it is nuclear-capable and a primary option for creating an electromagnetic pulse. The same DIA report states that the CJ-10 cruise missile is similarly conventional-only. In a 2013 report, the National Air and Space Intelligence Center assesses that it is dual-capable. Defense Intelligence Agency, *China Military Power: Modernizing a Force to Fight and Win* (Washington, DC: Defense Intelligence Agency, 2019), accessed February 12, 2021, www.dia.mil/Military-Power-Publications; Missile Defense Project, "Missiles of China," Missile Threat, Center for Strategic and International Studies, June 14, 2018, accessed November 27, 2020, https://missilethreat.csis.org/country/china/; National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat* (Wright-Patterson Air Force Base, OH: National Air and Space Intelligence Center, 2013), accessed November 30, 2020, https://fas.org/programs/ssp/nukes/nuclearweapons/NASIC2013_050813.pdf.

Methodology

Drawing from Chinese and English-language sources, this paper assesses the threat that PLA LYBNWs pose to US ground forces in the Indo-Pacific region. It uses an interdisciplinary threat analysis technique, supplemented by an abbreviated risk analysis. According to associate professor of intelligence analysis, Hank Prunckun, a threat analysis is a methodology for identifying problems that individuals or organizations may face in a particular environment. This analysis is predicated on the existence of a threat agent and an object of the threat. Within the context of this paper, the PRC is the threat agent and US ground forces in the Indo-Pacific are the object. Threat agents must have both the "intent and capability to produce harm to a target," and, in this case, the harm is specifically that caused by LYBNWs.[6] An LYBNW is a nuclear weapon with a yield of less than 15 kilotons and used to create tactical or operational effects against military targets—primarily ground forces—within a specified theater. See Figure 1 for a depiction of this methodology.

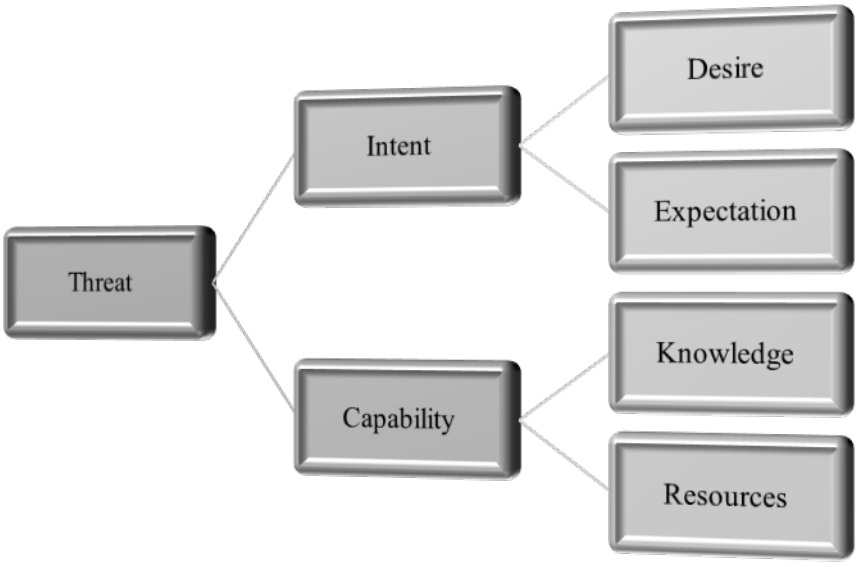

Figure 1. Threat Analysis. Hank Prunckun, *Scientific Methods of Inquiry for Intelligence Analysis*, 2nd ed. (Lanham, MD: Rowman and Littlefield, 2015), 286.

[6] Hank Prunckun, *Scientific Methods of Inquiry for Intelligence Analysis*, 2nd ed. (Lanham, MD: Rowman and Littlefield, 2015), 285.

Threat agents bear no responsibility to openly declare their intentions, and this is especially true regarding China's approach to nuclear warfighting. Gauging intent to use LYBNWs requires establishing the PLA's desire to cause catastrophic harm in pursuit of its objectives; moreover, one must demonstrate expectation, or confidence on behalf of PLA leaders that LYBNWs will accomplish their objectives at acceptable cost. Capability necessitates the knowledge to conduct required processes and the resources to carry them out. Further still, the characteristics of a capability set (i.e., structure, development trajectory, recent activity, etc.) may refine understanding of actor intent. While the preponderance of this paper focuses on assessing the threat, a risk analysis complements discussions of intent and capability by addressing the likelihood and consequences of LYBNW use.[7]

History and Background

The history of the PRC's nuclear weapons program and strategy provides context for understanding how today's leaders may approach nuclear weapons use, including LYBNWs. Overall, China's nuclear thinking remained consistent for the first fifty years of the program's existence. The PRC detonated its first nuclear device in 1964. In 1966, the Central Military Commission (CMC)—the senior Communist Party entity responsible for national defense—created the "Second Artillery" [第二炮兵], or People's Liberation Army Second Artillery Force (PLASAF), to maintain and employ the country's growing nuclear arsenal. While the PLA developed air and sea-based capabilities, the PLASAF was the primary entity responsible for the country's nuclear weapons for most of the late 20th and early 21st centuries.

The CMC established the PLASAF as an "independent" entity [兵种] responsible directly to the military's highest body. This centralized arrangement meant that the PLASAF was not subject to the authority of the other services. Instead, the force was the subject of direct

[7] Prunckun, *Scientific Methods of Inquiry for Intelligence Analysis*, 283-292, 295-302.

intervention by leaders at the top of the Communist Party of China (CCP). For most of the organization's first two decades, in-fighting and domestic political realities dictated the development of the PLASAF. Chinese leaders also cloaked the nuclear program in "absolute secrecy."[8] Senior Communist Party members hand-selected organizational leaders and restricted PLASAF recruitment. Despite significant military modernization over the subsequent five decades, China's nuclear forces remain insulated, secretive, and centralized.[9]

As a function of these factors, the development of China's nuclear arsenal and strategy also remained relatively constant. PLASAF capabilities were consistently smaller and less diverse than those of its adversaries. In part, this reflected the operative role of Mao Zedong in establishing China's nuclear program goals. Mao respected the manifest power of nuclear weapons but remained skeptical of their value in large numbers.[10] In 1958, Mao remarked, "As for the atomic bomb, this big thing, without it people say you don't count for much. Fine, then we should build some."[11]

China's development of nuclear weapons delivery platforms has been similarly consistent. The "four missiles in eight years" plan [八年四弹] delivered China its first generation of ballistic missiles by 1971 and epitomized the incremental approach to technological innovation that is a hallmark of the program. Currently, the PLA is replacing these first-generation, liquid-fueled systems with more accurate and mobile solid-fueled missiles.[12] For much of the second

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[8] John Wilson Lewis and Litai Xue, *Imagined Enemies: China Prepares for Uncertain War* (Stanford, CA: Stanford University Press, 2006), 70.

[9] Ibid., 174-176.

[10] US Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020*, ix. The authoritative report by the DoD, although slightly more conservative than some non-governmental estimates, suggests that the PLA's number of warheads is under 300.

[11] Alastair I. Johnston, "China's New 'Old Thinking': The Concept of Limited Deterrence," *International Security* 20, no. 3 (Winter 1995-1996): 8.

[12] David C. Logan, "Making Sense of China's Missile Forces," in *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, ed. Phillip Saunders, Arthur Ding, Andrew Scobell, Andrew Yang, and Joel Wuthnow (Washington, DC: National Defense University Press, 2019), 394-395.

half of the 20th century, the People's Liberation Army Air Force (PLAAF) and People's Liberation Army Navy (PLAN) also retained nuclear missions.[13] While the PLAAF effectively discarded its nuclear role following the end of the Cold War, a 2018 DoD report affirmed the re-prioritization of the service's nuclear mission.[14]

Although strategic nuclear forces were the priority, the PLA developed and deployed tactical nuclear systems as well. Beyond simply possessing nuclear artillery and short-range ballistic missiles, military exercises of the 1980s rehearsed the employment of battlefield nuclear systems.[15] More than a "paper tiger," the destructive power of nuclear weapons served as a potent means of defeating possible Soviet invasion.[16] China's recognition of the battlefield application of nuclear weapons is further signified by its development of an enhanced radiation weapon (ERW). ERWs, or "neutron bombs," are fission-fusion devices that have reduced blast effects but enhanced radiation that is highly-effective against personnel. From 1977 to 1988, the PRC successfully developed and tested such a bomb. Although government officials state that the

[13] Robert S. Norris and William M. Arkin, "Chinese Nuclear Forces, 1999," *The Bulletin of the Atomic Scientists* 55, no. 3 (May-June 1999): 80, accessed December 4, 2020, https://doi.org/10.1080/00963402.1999.11460342. The PLAAF of the 20th century fielded two nuclear-capable aircraft, the H-6 and Q-5, and, by the mid-1990s, reportedly had nearly 150 warheads. Nevertheless, PLAAF tactical nuclear capabilities in the two decades following the fall of the Soviet Union atrophied as the country prioritized structural reform and conventional combat power.

[14] China Aerospace Studies Institute, *PLA Aerospace Power: A Primer on Trends in China's Military Air, Space, and Missile Forces*, 2nd ed. (Montgomery, AL: China Aerospace Studies Institute, 2019), 81, accessed February 12, 2021, https://www.airuniversity.af.edu/Portals/10/CASI/Books/Primer_2nd_Edition_Web_2019-07-30.pdf. In addition to US government assessments, official statements by PLAAF Chief, General Ma Xiaotian, indicate the re-emergence of the Air Forces' nuclear mission in parallel to the development of China's newest strategic bomber, the H-20; see Zhao Lei, "PLA Air Force Commander Confirms New Strategic Bomber," *China Daily*, September 2, 2016, accessed February 12, 2021, http://www.chinadaily.com.cn/china/2016-09/02/content_26683883.htm.

[15] Norris and Arkin, "Chinese Nuclear Forces, 1999," 79-80. Alastair I. Johnston estimates that China possessed 150 tactical nuclear systems in 1995. See Johnston, "China's New 'Old Thinking'," 32.

[16] John Wilson Lewis and Litai Xue, *China Builds the Bomb* (Stanford, CA: Stanford University Press, 1988), 60.

capability was never deployed, the program's existence suggests that the PLA values nuclear systems for their battlefield utility as well as strategic deterrent effect.[17]

Non-strategic capabilities notwithstanding, China's overall deterrence strategy during the period is best characterized as "minimum deterrence." In this context, minimum deterrence refers to "the ability to carry out a simple, undifferentiated countervalue second strike," requiring very few warheads and an acceptance of quantitative inferiority.[18] In Beijing, a minimum deterrence strategy contrasts with Washington's "maximum deterrence" approach, which is associated with overwhelming quantitative superiority and a "first-strike advantage."[19]

Beijing's minimum deterrence strategy complements the country's official nuclear policy: no first use (NFU). In statements following its first successful nuclear test, the PRC announced, "The Chinese Government hereby solemnly declares that China will never at any time or under any circumstances be the first to use nuclear weapons."[20] The country's most recent defense white papers include nearly identical language.[21] Beginning in the 1990s, the government's continued commitment to its NFU policy, as well as its purported minimum deterrence strategy, served as pillars of its "peaceful rise" narrative. In the West, these themes accentuated perceptions of Chinese strategic culture as Confucian-based, anti-militarist, and defensive-minded.[22]

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[17] Johnathan Ray, *Red China's "Capitalist Bomb": Inside the Chinese Neutron Bomb Program* (Washington, DC: National Defense University Press, 2015), 1-3.

[18] Johnston, "China's New 'Old Thinking'," 18.

[19] Ibid.

[20] Lewis and Xue, *China Builds the Bomb*, 242.

[21] State Council Information Office of the People's Republic of China [国务院新闻办公室], "National Defense in the New Era, Defense White Paper [新时代的中国国防 白皮书]," July 24, 2019, accessed November 24, 2020, http://www.scio.gov.cn/zfbps/ndhf/39911/Document/1660529/1660529.htm.

[22] Alastair I. Johnston, *Cultural Realism: Strategic Culture and Grand Strategy in Chinese History* (Princeton, NJ: Princeton University Press, 1995), 22-25. For a Western perspective on China's strategic culture and modernization as "largely defensive in nature" see Kenneth D. Johnson, *China's Strategic Culture: A Perspective for the United States* (Carlisle, PA: Army War College, Strategic Studies Institute, June 2009), 14.

The historical record of China's nuclear program from 1964 to the present includes more continuity than not. Nuclear forces are insulated and centralized, incrementally improving in capability over time, and heavily influenced by the preferences of top Party leaders. Official commitment to an NFU policy and relatively small arsenal defined most of the period. Inside and outside the PRC, these policies appeared to align with expectations of an anti-militarist Chinese strategic culture. In total, observed reality validated a belief that Beijing, purportedly averse to the idea of nuclear war, valued nuclear capabilities for their latent power only. The development of ERWs and deployment of battlefield nuclear weapons, however, demonstrated the potential for evolution in the country's thinking. As China's technological capabilities and resource-base increased, so did the destructive potential and effectiveness of the systems they developed. Although this is hardly unexpected, it raises an important question: is their approach to nuclear weapons continuing to evolve, and to where?

Assessing Intent

Assessing Intent Part 1: Desire—Why Armed Force?

To assess intent, one must first determine CCP leaders' willingness to accept the level of violence inherent to nuclear war. Prunckun states, "desire can be described as the threat agent's enthusiasm to cause harm in pursuit of their goal."[23] Informed by history, an analysis of current political dynamics provides insight into the Party's so-called "enthusiasm," and reveals troubling possibilities regarding nuclear decision-making in Beijing.

The Record of Violence

Despite the prevalence of a peaceful rise narrative and popularized non-violent Confucian culture, state-sanctioned coercion and armed force is a recurring theme in Chinese history. This theme is especially pronounced after 1949 as the CCP demonstrated its enthusiasm for the use of

[23] Prunckun, *Scientific Methods of Inquiry for Intelligence Analysis*, 285.

armed force. Less than one year after its founding, the PRC initiated the "Great Movement to Resist America and Assist Korea" [伟大的抗美援朝运动] to preserve physical and regime security.[24] In 1979, Deng Xiaoping invaded the Socialist Republic of Vietnam with 100,000 troops to prevent the rise of an influential adversary and demonstrate Beijing's emerging expectations for regional and global respect.[25] Henry Kenny of the Center for Naval Analyses observes, "The first lesson Vietnam learned [from the 1979 war] is that China will use force when necessary to attain important political objectives, regardless of past declarations of principle."[26] Most recently, the CCP's willingness to use overwhelming force to crush popular demonstrations in Tiananmen Square in June 1989 earned global condemnation.

China's record on the use of force provides three interrelated points. First, Beijing considers coercion, including the large-scale employment of armed forces, a legitimate and effective means of achieving its objectives. Sinologist Alastair Iain Johnston demonstrates that the CCP's record of violence is consistent with a much longer cultural reliance on armed force. Although often misunderstood in the West, the operative element of China's strategic culture remains "the use of pure violence to resolve security conflicts."[27] Second, Party leaders are willing to use force to defend vital interests despite potential international consequences. Third, the interests that are most commensurate with the use of violence are those coupled with regime security, which often manifest as challenges to not only Party control, but also territorial integrity and sovereignty.[28]

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[24] Jian Chen, *Mao's China and the Cold War (The New Cold War History)* (Chapel Hill: The University of North Carolina Press, 2001), 55-59.

[25] Henry J. Kenny, "Vietnamese Perceptions of the 1979 War with China," in *Chinese Warfighting: The PLA Experience Since 1949*, ed. Mark A. Ryan, David M. Finkelstein, and Michael A. McDevitt (Armonk, NY: Sharpe, 2003), 218-219.

[26] Ibid., 235.

[27] Johnston, *Cultural Realism*, xi.

[28] Jonathan Wilkenfeld, Michael Brecher, and Sheila Moser, *Crises in the Twentieth Century, Volume II*: *Handbook of Foreign Policy Crises* (Oxford: Pergamon Press, 1988), 160-161.

Domestic Political Dynamics

Given the continued relevance of these historical trends, current political dynamics foster conditions under which leaders in Beijing are likely to find large-scale military force an attractive policy tool. The first dynamic is the growing fragility of the political regime in China. Taleb defines "fragility" as "vulnerability to volatility."[29] Although the CCP is robust in many facets, fragile organizations have critical vulnerabilities; they appear stable but are ill-prepared for unanticipated, monumental shocks. In China, the legitimacy of the Communist Party is such a vulnerability.

Deng Xiaoping's pragmatic, growth-oriented reform and opening policies were wildly successful but came at a cost. Bereft of an ideological or other source of legitimacy, the Party's primacy became dependent on continued domestic growth and prestige. Since 2012, Xi Jinping reinforced the coupling of legitimacy with economic growth and international influence, infusing it with increasingly nationalistic rhetoric.[30] Top-down appeals from the Party magnify similar feelings experienced by citizens. Former Deputy Assistant Secretary of State, Susan Shirk, observes that "for most Chinese, nationalism feels like a healthy act of self-assertion."[31] The ultimate result is a dangerous positive feedback loop: as popular expectations for growth and prestige increase, the pressures on the CCP to meet those expectations also increase.[32]

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[29] Nassim Nicholas Taleb, *Antifragile: Things That Gain from Disorder* (New York: Random House Trade Paperbacks, 2014), 12, 268.

[30] Xi Jinping's Report at the 19th National Congress of the Communist Party of China, "Secure a Decisive Victory in Building a Moderately Prosperous Society in All Respects and Strive for the Great Success of Socialism with Chinese Characteristics for a New Era," *China Daily*, October 18, 2017, accessed November 24, 2020, http://www.chinadaily.com.cn/china/19thcpcnationalcongress/2017-11/04/content_34115212.htm. Xi Jinping calls on the Chinese people to "work tirelessly to realize the Chinese Dream of national rejuvenation."

[31] Susan L. Shirk, *China: Fragile Superpower: How China's Internal Politics Could Derail Its Peaceful Rise* (New York: Oxford University Press, 2008), 63.

[32] For evidence of the growing assertiveness commensurate with expanding economic growth, see Frank S. Hong, "A Strong, Proud China is right to be Assertive in Pursuing its National Interests," *South China Morning Post*, November 15, 2020, accessed November 16, 2020, https://www.scmp.com /comment/opinion/article/3109758/strong-proud-china-right-be-assertive-pursuing-its-national.

As the Party necessarily shoulders the growing burden of popular expectation, the character of Xi Jinping's leadership strains the regime's ability to adapt and meet those demands. General Secretary Xi's approach to strengthening the Communist Party is distinct from his predecessors. Achieving "core leader" status and fostering a cult of personality reminiscent of Mao, Xi abandoned the precedent of collective leadership. His anti-corruption campaign, establishment of the "chairman responsibility system" [军委负责制] in the military, and implementation of "Xi Jinping Thought on the Rule of Law" [习近平法治思想] reinforced his authority at the expense of institutional mechanisms and while increasing popular cynicism toward the Party.[33] In toto, the current domestic political environment in China is characterized by expanding popular expectations being levied on an increasingly rigid, personality-dependent political apparatus; however, internal dynamics are not the only challenges concerning leaders in Beijing.

The Acute Threat

As a second dynamic, the character of Sino-US military competition interacts with political factors to influence decision-making in Zhongnanhai—the headquarters of the CCP and China's central government. Neither Beijing's sensitivity to threats along its periphery, nor the presence of US-China competition are novel. What is different today is the acuteness of the military threat confronting Party leadership. From distributed lethality to conventional prompt strike, the DoD is modernizing to counter the anti-access and area-denial capabilities upon which China relies.[34] Encouraged by withdrawal from the Intermediate Nuclear Forces Treaty, the

[33] Xinhua, "Top Legislator Stresses Implementing Xi Jinping Thought on the Rule of Law," XinhuaNet, November 19, 2020, accessed February 11, 2021, http://www.xinhuanet.com/english/2020-11/19/c_139528388.htm.

[34] Amy F. Woolf, *Conventional Prompt Global Strike and Long-Range Ballistic Missiles: Background and Issues* (Washington, DC: Congressional Research Service, 2019), 1-5.

Pentagon is revitalizing conventional and nuclear integration (CNI).[35] These developments amplify the threat evident in Washington's record of military action. Whether in Iraq, Kosovo, or Libya, Americans leverage technological overmatch, take pre-emptive action, integrate coalition partners, and target adversary leadership with "decapitation" strikes.[36] Chinese literature expresses particular alarm at Washington's willingness to intervene in conflicts such as a possible war across the Taiwan Strait.[37] Whether or not the United States would deliberately seek regime change in a conflict with the PLA, the likely military, economic, and political costs of defeat in Beijing would be catastrophic. Party leaders are likely to perceive any war with the US as a war for the regime's very survival.[38]

Perceptions and Decision-Making

Ultimately, the dynamic interplay of domestic political fragility and an acute external threat exert a powerful influence on Chinese perceptions in a conflict. Popular analysis of US-PRC conflict often explores questions of conflict probability through the lens of international relations theories (e.g., power transition theory). While such studies are undoubtedly important, assessments of decision-making in the midst of a Sino-American conflict are more limited yet no less consequential. Emerging studies in behavioral psychology provide a means for more effectively anticipating leader decisions once across the threshold of war.

First, nuclear and nonproliferation policy scholars Anne Harrington and Jeffrey Knopf state that "people are often motivated more strongly by the desire to avoid or minimize loss than

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[35] Rachel S. Cohen, "USAF Rethinks Relationship Between Conventional, Nuclear Weapons," *Air Force Magazine*, August 19, 2020, accessed November 18, 2020, https://www.airforcemag.com/usaf-rethinks-relationship-between-conventional-nuclear-weapons/.

[36] Dean Cheng, "Chinese Lessons from the Gulf War," in *Chinese Lessons from Other Peoples' Wars*, ed. Andrew Scobell, David Lai, and Roy Kamphausen (Carlisle, PA: Strategic Studies Institute, US Army War College, 2011), 164-167.

[37] M. Taylor Fravel, *Active Defense: China's Military Strategy since 1949* (Princeton, NJ: Princeton University Press, 2019), 222-223.

[38] David L. Shambaugh, *China's Communist Party: Atrophy and Adaptation* (Berkeley: University. of California Press, 2008), 8-9.

by the pursuit of gain."[39] Simply put, decision-makers respond more intensely to potential losses than gains. The second insight relates to the first: decision-making context matters. When in a loss frame—confronted with a choice between degrees of loss—actors are more risk acceptant than when in a gains frame. Individuals in a loss frame are prone to risky gambles in an attempt to completely avoid losses.[40] Third, behavioral psychology research demonstrates the influence of "sacred values." Decisions based on deeply internalized individual or social values are "dominated by beliefs about right and wrong, not by calculations of cost and benefit."[41] As a result, some decisions may defy utilitarian prediction.

When considered within the emerging domestic and geo-political context confronting Chinese leaders, the insights from behavioral economics are significant. First, China's impressive success since 1978 increases the costs of political failure today. As the PRC's prestige and international clout grow, so does the potential for loss. Cognitive science suggests that leaders in Beijing will accept significant risk to avoid loss, including the potential for extremely risky ventures that promise immediate victory. Second, the fragile political structure and perceived existential US threat heightens the CCP's sensitivity to risk—particularly risk of loss. As a result, Party leaders are likely to be in a loss frame in the event of a conflict. Decision-makers confronting loss are more likely to threaten or use force, despite existing deterrence relationships.[42] Lastly, the influence of core values demonstrates that while stated policy preferences are important, they must contend with emotional and psychological phenomena at the

[39] Jeffrey W. Knopf and Anne I. Harrington, "Applying Insights from Behavioral Economics to Nuclear Decision Making," in *Behavioral Economics and Nuclear Weapons*, ed. Jeffrey W. Knopf and Anne I. Harrington (Athens, GA: University of Georgia Press, 2019), 2.

[40] Knopf and Harrington, "Applying Insights from Behavioral Economics to Nuclear Decision Making," 9. The authors state, "when given a choice between a certain loss and a chance to escape from suffering a loss at the risk of losing more . . . subjects accept the risk of greater loss."

[41] Knopf and Harrington, "Applying Insights from Behavioral Economics to Nuclear Decision Making," 11.

[42] Jeffrey D. Berejikian and Florian Justwan, "Testing a Cognitive Theory of Deterrence," in *Behavioral Economics and Nuclear Weapons*, ed. Jeffrey W. Knopf and Anne I. Harrington (Athens, GA: University of Georgia Press, 2019), 45-46.

moment of decision. Sino-US conflict is likely to feature direct threats to core Chinese interests, which elevates the volatile role of emotion in decision-making; furthermore, Party leaders likely perceive an interest asymmetry underlying American military action in East Asia. For example, Beijing considers Taiwan reunification a vital interest while likely considering it of secondary importance to leaders in Washington. When combined with emotional charge, interest asymmetry can cause a misunderstanding of US resolve and intent, and encourage aggressive behavior.[43]

In sum, the CCP is not brittle but is fragile. It is not facing imminent collapse; however, it is an organization facing immense challenges and growing external and internal pressures. Chinese leaders have long feared the combination of internal disturbances and external aggression [内忧外患].[44] The dual influence of loss aversion and core value violation is likely to increase Party risk-taking. In the event of a military conflict with an adversary that is uniquely qualified to defeat PLA defenses, how far will leaders go to preserve CCP rule? If history serves as an analog, Western strategists must not underestimate Beijing's willingness to cause catastrophic harm.

Assessing Intent Part 2: Expectation—Why nukes?

While a fragile CCP facing a direct existential threat will consider extreme coercion to ensure survival, the PRC possesses many tools for achieving its goals. So, why would CCP leaders choose LYBNWs to pursue conflict termination? Within the context of great power conflict, non-strategic nuclear capabilities provide an effective means of achieving objectives featured in PLA strategy and doctrine.

[43] Paul H. B. Godwin and Alice L. Miller, *China's Forbearance Has Limits: Chinese Threat and Retaliation Signaling and Its Implications for a Sino-American Military Confrontation* (Washington, DC: National Defense University Press, 2013), 25-27.

[44] Andrew Scobell, *China's Use of Military Force: Beyond the Great Wall and the Long March* (Cambridge, UK: Cambridge University Press, 2003), 33.

Beijing's Military Strategy

Roughly equivalent to the DoD's notion of national military strategy, the collection of "frameworks and principles" [纲领和原则] known as the "military strategic guidelines" [军事战略方针] provide the "overall guiding principles for planning and for guiding the development and use of the armed forces."[45] The current guidelines were approved in 2014 and are entitled "winning informationized local wars" [打赢信息化局部战争]. The guidance mirrors the historical trends outlined above, stressing a strategic focus on the Taiwan Strait and Western Pacific, and the inviolability of territorial integrity and sovereignty.[46] Emphasis on "local wars" reflects the recognition that individual campaigns or even engagements can prove decisive, elevating the costs of tactical failure.[47]

The 2014 strategic guidelines, like its predecessors, are founded on the principle of "active defense" [积极防御]—the most important concept in contemporary Chinese military thinking. First appearing in Communist Party documents in 1935, the concept advocates "gain[ing] control by striking afterwards" [后发制人].[48] Today, the Chinese publication, *Military Terminology of the Chinese People's Liberation Army*, defines active defense as "using proactive offensive actions to defend against the attacking enemy."[49] The concept features the aggressive use of exterior lines in conjunction with an in-depth, protracted defense of interior lines.[50]

For many Chinese, the operative word is "defense," portraying a reactive nature that connotes righteousness. Pan Zhenqiang, former director of the PLA's Institute of Strategic

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[45] Timothy R. Heath, "An Overview of China's National Military Strategy," in *China's Evolving Military Strategy*, ed. Joe McReynolds (Washington, DC: The Jamestown Foundation, 2016), 3.

[46] Fravel, *Active Defense*, 232.

[47] Ibid., 185.

[48] Ibid., 61.

[49] Ibid., 62.

[50] Ibid.

Studies, asserts that active defense "is self-defensive, is not outward-oriented, and has always adhered to the principles of protecting oneself and gaining mastery by striking after the enemy has struck."[51] The implicit assumption is that armed force is being applied defensively, thereby justifying a "counter-attack" to prevent harm to core interests. Herein, the concept of active defense includes a dangerous ambiguity: how do Party leaders define "first strike?" Chinese strategists suggest that the threshold may be lower than expected and not limited to military action. Whether the "first shot" is fired in the maritime domain or "plane of politics," Party leaders are likely to characterize any conflict with the US as defensive, thereby self-justifying any level of violence deemed appropriate.[52]

PLA Operational Concepts and Doctrine

PLA doctrine and authoritative publications offer more specific insight into how the organization may apply combat power. Operationally, the CMC's strategic guidelines prioritize "information dominance, precision strikes on strategic points, [and] joint operations to gain victory" [信息主导，精打要害， 联合制胜].[53] The resulting theory of victory is often referred to as "system destruction warfare" [体系破击战], which seeks to "paralyze the functions of an enemy's operational system [作战体系]."[54] An influential supporting concept is "target-centric warfare" (TCW) [目标中心战]. TCW is "identifying key vulnerabilities in the enemy's system and attacking those vulnerabilities with speed, precision, and intensity."[55] Both a concept and a

[51] Pan Zhenqiang, "China's No First Use of Nuclear Weapons," in *Understanding Chinese Nuclear Thinking*, ed. Li Bin and Zhao Tong (Washington, DC: Carnegie Endowment for International Peace, 2016), 56, accessed February 12, 2021, https://www.carnegieendowment.org/pubs.

[52] Fravel, *Active Defense*, 63.

[53] Ibid., 231-232.

[54] Edmund J. Burke, Kristen Gunness, Cortez A. Cooper III, and Mark Cozad, *People's Liberation Army Operational Concepts* (Santa Monica, CA: RAND Corporation, 2020), 8, accessed February 12, 2021, https://www.rand.org/pubs/research_reports/RRA394-1.html.RAND.

[55] Ibid., 15.

system, TCW underlies ongoing efforts to integrate PLA joint command and control (C2) and other warfighting systems.[56]

The 2013 *Science of Military Strategy* [战略学] betrays the increasing importance of cyber, space, and nuclear capabilities to Chinese strategists.[57] More importantly, though, the 2006 *Science of Military Campaigns* [战役学] elucidates key points relevant below the strategic level. Consistent with system destruction warfare, the PLA will concentrate "crack forces" and advanced weaponry against the enemy's most vulnerable targets. Instead of focusing on the enemy's source of strength (i.e., center of gravity), the PLA will prioritize targets that are most vulnerable and exploitable with minimal expenditure of resources.[58]

The *Science of Military Campaigns* identifies "integrated firepower" as one of five types of military operations important to future conflict, and defines it as "attack by artillery, air forces, and missile strikes supported by information operations."[59] The *Science of Military Campaigns* companion study guide, *A Guide to the Study of Campaign Theory* [战役理论学习指南], elaborates that integrated firepower will leverage air, ground, and naval strike capabilities against the target sets listed in table 1. The likely high-value targets listed in the study guide mirror others provided in *Science of Military Strategy*.[60] Their shared characteristics suggest that Chinese

[56] Burke et al., *People's Liberation Army Operational Concepts*, 17-20.

[57] M. Taylor Fravel, "China's Changing Approach to Military Strategy: The Science of Military Strategy from 2001 and 2013," in *China's Evolving Military Strategy*, ed. Joe McReynolds (Washington, DC: The Jamestown Foundation, 2016), 52-53.

[58] Timothy Thomas, *The Chinese Way of War: How Has It Changed?* (McLean, VA: MITRE Corporation, June 2020), 14-18.

[59] Dennis J. Blasko, *The Chinese Army Today: Tradition and Transformation for the 21st Century*, 2nd ed. (New York: Routledge, 2012), 129.

[60] Michael S. Chase, "PLA Rocket Force Modernization and China's Military Reforms" (Testimony before the US-China Economic and Security Review Commission, Washington, DC, February 15, 2018), 6, accessed February 12, 2021, https://www.rand.org/content/dam/rand/pubs /testimonies/CT400/CT489/RAND_CT489.pdf. The author states that "Chinese military publications on campaigns envision coordinated missile and air strikes against critical enemy targets, such as command and control facilities, communications and transportation nodes, air and missile defenses, and air bases."

operational planners will prioritize targets with relatively fixed locations and that will most affect the enemy's ability to aggregate, sustain, and control combat power in the theater.

Table 1. Suggested Theater-Level Targets

• Political centers • Economic centers • Major enemy military bases and depots • Enemy command centers • Enemy communications and transportation networks • Major troop concentrations

Source: Larry M. Wortzel, *China's Nuclear Forces: Operations, Training, Doctrine, Command, Control, and Campaign Planning* (Carlisle, PA: Army War College, Strategic Studies Institute, May 2007), 9.

Like overwhelming firepower, psychological warfare is a primary theme in Chinese doctrine. Military planners conduct psychological operations to seize the "psychological initiative." During a conflict, the PLA may employ psychological operations against the US military to slow decision-making or the American homeland to undermine national will.[61] Many in the PLA conclude that the American population and its sensitivity to casualties is an important vulnerability that Washington's opponents in Iraq and Afghanistan failed to exploit.[62] The Russian government's ability to foster social division in the United States during and after the 2016 presidential election exemplifies the opportunity for Beijing.

The Future Operational Environment

The military strategy and doctrine surveyed herein would inform wartime Chinese decision-making and reveals how the PLA anticipates a conflict unfolding. The authoritative documents suggest that the PLA anticipates executing a strategic defense, but an aggressive tactical and operational offense. Joint forces will seek to achieve "operational suddenness" in an

[61] Blasko, *The Chinese Army Today*, 124-133.

[62] Cheng, "Chinese Lessons from the Gulf Wars," 168.

attempt to paralyze the US military's operational system.[63] Assessing that American qualitative advantages will erode Beijing's quantitative superiority in the long-term, the PLA will use overwhelming kinetic and non-kinetic fires early to "forestall the enemy" and, given perceived interest asymmetries, pursue rapid conflict termination under favorable conditions.[64] Applying TCW, senior leaders will prioritize capabilities best able to disrupt American force deployment and staging, and operational C2 by targeting ports and airfields, aircraft carriers, command posts, and depots and sustainment facilities. General Liu Jingsong of the Academy of Military Science publicly criticized Saddam Hussein for "sitting idly by" while Americans staged forces prior to the Gulf War, intimating that the PRC would not make such a mistake in the future.[65]

Unsurprisingly, the characteristics of America's posture in the Indo-Pacific Command (INDOPACOM) area of responsibility (AOR) corroborate the efficacy of China's strategic and doctrinal approach. Vulnerable to PLA capabilities, US forces are proximate to mainland China and concentrated in a relatively small number of fixed sites. In the event of large-scale conflict, forward-deployed forces will require significant follow-on resources that must be mobilized from outside the AOR. In sum, the PLA faces a dual challenge: neutralize the American forces in the region while preventing or marginalizing the in-flow of greater combat power from outside the region. So, are LYBNWs a feasible means of addressing these challenges?

The Nuclear Advantage

While the PLA's capabilities are diverse, LYBNWs offer advantages over comparable means. Relevant PLA means are broadly categorized as information capabilities, conventional strike, and nuclear strike. China's cyber and electronic warfare (EW) capabilities are among the

[63] Zhang Yuliang [张玉良], *Science of Campaigns* [战役学], 96, cited in David C. Gompert, Astrid Stuth Cevallos, and Cristina L. Garafola, *War with China: Thinking Through the Unthinkable* (Santa Monica, CA: RAND Corporation, 2016), 3.

[64] Thomas, *The Chinese Way of War: How Has it Changed?*, 16.

[65] Lewis and Xue, *Imagined Enemies*, 237.

most capable on the globe. In 2015, the PLA created the Strategic Support Force [战略支援部], an independent service unifying the once disparate space, cyber, EW, and psychological warfare portfolios. In a conflict, PLA non-kinetic capabilities will undermine the US operational system by disrupting intelligence gathering and decision-making, and sowing discord within the American public. However, these effects, alone, are not likely to be decisive.[66] Cyber and EW effects lack durability. Individual cyber threats are effective once, as access requires elongated periods of time and target adaptation is rapid. Information capabilities are "prone to denial, counterattack, and uncertain effects."[67] Additionally, these methods are unlikely to have the psychological impact that PLA planners ultimately desire.[68]

Chinese conventional munitions pose another formidable threat to US forces. Military analyst Robert Haddick states, "the game-changing technological advance favoring China in this face-off is China's emerging capability to project precise and high-volume missile power into the Western Pacific."[69] Under the umbrella of strategic nuclear deterrence, the PLA's conventional strike capabilities could prove decisive; however, these advantages are not absolute. First, the modern PLA remains untested on a large-scale. Projecting networked capabilities into the Western Pacific is difficult, particularly when confronting enemy resistance. Second, conventional arsenals may succumb to high expenditure rates. Improving US missile defense technology, requirements for re-attack, and combat attrition may rapidly reduce PLA stockpiles. US naval services are developing smaller and more numerous units and platforms, which will

[66] John Costello and Joe McReynolds, "China's Strategic Support Force," in *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, ed. Phillip Saunders, Arthur Ding, Andrew Scobell, Andrew Yang, and Joel Wuthnow (Washington, DC: National Defense University Press, 2019), 437-446.

[67] Costello and McReynolds, "China's Strategic Support Force," 481.

[68] Ibid., 479-481.

[69] Robert Haddick, *Fire on the Water: China, America, and the Future of the Pacific* (Annapolis, MD: Naval Institute Press, 2014), 84.

further complicate PLA targeting.[70] These factors are amplified if a US-China conflict takes place within the context of a larger struggle, such as a conflagration in Taiwan. If unanticipated or unfavorable dynamics aggregate to limit conventional employment, the PLA's conventional capabilities alone may not provide the kinetic effects required to compel American capitulation.[71]

A third option is nuclear weapons. The advantages of using LYBNWs are noteworthy. First, the destructive potential per warhead defies comparison and is often tailorable to achieve desired effects. Blast energy, nuclear and thermal radiation, electromagnetic pulse, and debris and dislocation decimate material proximate to the detonation. Second, those effects are not only destructive but lasting. Following a blast, activated environmental materials effectively deny re-entry by enemy forces. Equipment not physically destroyed by the blast will remain unusable until decontaminated, an effect with noteworthy implications for strategic and operational mobility.[72] Third, nuclear weapons use of any kind has an immense psychological impact on combatants and non-combatants alike.[73]

Beyond their manifest strengths, LYBNWs prove even more attractive when considering the likely operational environment. They are well-suited to have desired effects against anticipated PLA high-value targets (see table 1). Following a detonation, the distribution and use of contaminated equipment and material could extend the effects of the blast throughout the enemy's operational system. If unanticipated, LYBNW employment is likely to have cascading consequences that will complicate future planning.

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[70] Megan Eckstein, "SECDEF Esper Calls for 500-Ship Fleet by 2045, With 3 SSNs a Year and Light Carriers Supplementing CVNs," *USNI News*, October 6, 2020, accessed November 20, 2020, https://news.usni.org/2020/10/06/secdef-esper-calls-for-500-ship-fleet-by-2045-with-3-ssns-a-year-and-light-carriers-supplementing-cvns.

[71] Haddick, *Fire on the Water*, 85-93.

[72] US Department of the Army, Field Manual (FM) 3-11, *Chemical, Biological, Radiological, and Nuclear Operations* (Washington, DC: Government Publishing Office, 2019), III-7 – III-9.

[73] Nicholas Wright, "The Neurobiology of Deterrence," in *Behavioral Economics and Nuclear Weapons*, ed. Jeffrey W. Knopf and Anne I. Harrington (Athens, GA: University of Georgia Press, 2019), 86.

LYBNWs also align neatly with PLA strategy and operational concepts. Low-yield systems epitomize the system destruction warfare notion of "striking selectively but precisely and decisively."[74] Compared to other means, the employment efficiency, destructive power, enduring effects, and psychological impact of LYBNWs make them a more effective tool for paralyzing US forces early in a conflict, seizing the initiative, and pursuing CMC military objectives.

Re-evaluating the Taboo

Strengths notwithstanding, the risks for the PRC associated with nuclear weapons use are not insignificant. The most immediate risk is that of a US response-in-kind. The Trump administration's fielding of low-yield systems (e.g., the W76-2 warhead) signaled its willingness to cross the nuclear threshold. A Biden administration, however, may be more hesitant. Then President-Elect Joe Biden openly criticized the decision to field the W76-2 and signaled the need to re-evaluate the nuclear modernization agenda outlined in the 2018 *Nuclear Posture Review*.[75] Beijing may question Washington's resolve to pursue nuclear escalation in a conflict.

Wider international condemnation is a second major risk. The *Science of Second Artillery Campaigns* observes, "nuclear deterrence plays a huge shock-value role, but it is obviously restrained by international public opinion."[76] Popular backlash would have economic and political costs for the PRC, may stiffen popular support for the US war effort, and could spark an arms race with regional actors like Japan. On the other hand, today, international condemnation of the CCP's human rights abuses and expansion in the South China Sea have done little to demonstrably alter Beijing's behavior. Reminiscent of 1989, when facing an existential threat,

[74] Burke et al., *People's Liberation Army Operational Concepts*, 8.

[75] Michael R. Gordon, "Biden to Review US Nuclear-Weapons Programs, With Eye Towards Cuts," *The Wall Street Journal*, December 24, 2020, sec. Politics, accessed January 6, 2021, https://www.wsj.com/articles/biden-to-review-u-s-nuclear-weapons-programs-with-eye-toward-cuts-11608805800.

[76] Wright, "The Neurobiology of Deterrence," 87.

Party leaders may be confident in their ability to overcome popular reaction in the long-term. The PRC may be less deterred by the "nuclear taboo" than is commonly assumed.

A closer look at China's policy and purported norms regarding nuclear weapons further corroborates the plausibility of LYBNW use. First, Beijing's NFU pledge is neither absolute nor irreversible. The CMC's 2019 defense white paper states, "China is always committed to a nuclear policy of no first use of nuclear weapons at any time and under any circumstances, and not using or threatening to use nuclear weapons against non-nuclear-weapon states or nuclear-weapon-free zones unconditionally."[77] There is a marked difference between "committed" used in the first clause and "unconditionally" used in the second. Assuming word choice is deliberate, Beijing avoided an absolute proclamation.[78] Official commentary also indicates that the commitment may not apply to weapons use on Chinese soil. Referencing realizing reunification, former Chinese ambassador to the United Nations, Sha Zukang, declared, "[China] will do the business at any cost."[79] Lastly, evolving assessments of the strategic environment may precipitate deliberate policy change.[80] In 2005, Major General Zhu Chenghu quipped, "if the Americans draw their missiles and position-guided ammunition on to the target zone on China's territory, I think we will have to respond with nuclear weapons."[81]

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[77] State Council Information Office of the People's Republic of China [国务院新闻办公室], "National Defense in the New Era, Defense White Paper [新时代的中国国防 白皮书]."

[78] Larry M. Wortzel, *China's Nuclear Forces: Operations, Training, Doctrine, Command, Control, and Campaign Planning* (Carlisle, PA: Army War College, Strategic Studies Institute, May 2007), 15-16.

[79] Xia Liping, *China's Nuclear Doctrine: Debates and Evolution* (Washington, DC: Carnegie Endowment for International Peace, 2016), accessed November 24, 2020, https://carnegieendowment.org/2016/06/30/china-s-nuclear-doctrine-debates-and-evolution-pub-63967. Recently, Xi Jinping not only explicitly re-affirmed the PRC's willingness to use military force to achieve unification, but also describes this goal as "an inevitable requirement for the great rejuvenation of the Chinese people." See BBC News, "Xi Jinping says Taiwan 'Must and Will Be' Reunited with China," *BBC News*, January 2, 2019, accessed February 10, 2021, https://www.bbc.com/news/world-asia-china-46733174.

[80] Caitlin Talmadge, "Beijing's Nuclear Option: Why a U.S.-Chinese War Could Spiral Out of Control," *Foreign Affairs* (November-December 2018): 2-7, accessed November 24, 2020, https://www.foreignaffairs.com/articles/china/2018-10-15/beijings-nuclear-option.

[81] Xu Weidi, "China's Security Environment and the Role of Nuclear Weapons," in *Understanding Chinese Nuclear Thinking*, ed. Li Bin and Zhao Tong (Washington, DC: Carnegie

Similarly, the PLA's nuclear deterrence strategy may be shifting. "Limited deterrence" [有限威慑] is displacing decades of commitment to minimum deterrence. This strategy seeks "sufficient counterforce and countervalue tactical, theater, and strategic nuclear forces to deter the escalation of conventional or nuclear war…If deterrence fails, this capability should be sufficient to control escalation and to compel the enemy to back down."[82] Although short of maximum deterrence, limited deterrence aligns with the aggressive growth witnessed in PLA nuclear capabilities and testing, both of which are discussed later in this paper.[83]

Policy change may not be an isolated phenomenon, rather a reflection of subtle normative evolution.[84] Moscow's overt commitment to the use of LYBNWs and President Donald Trump's about-face regarding his predecessor's "Global Zero" campaign betray changing perspectives by global superpowers.[85] While Chinese policy and force structure dynamics suggest that ideas are evolving, the external environment is also shaping CCP perceptions. Despite distrust in the Sino-Russian relationship, continued military cooperation reflects a degree of mutual influence.[86] In the nuclear realm, a prominent PLA newspaper published an article, entitled "Cracking the Code on Russia's Doubling of Combat Power [破解俄军战力翻倍密码]," that favorably addresses

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Endowment for International Peace, 2016), 33, accessed February 12, 2021, https://www.carnegieendowment.org/pubs.

[82] Johnston, "China's New 'Old Thinking'," 5-6.

[83] Jia Qingguo, "China's New Leadership and Relations," in *Perspectives on Sino-American Strategic Nuclear Issues*, ed. Christopher P. Twomey (New York: Palgrave Macmillan, 2008), 91.

[84] Joseph D. Becker, "Strategy in the New Era of Tactical Nuclear Weapons," *Strategic Studies Quarterly* (Spring 2020): 123.

[85] Amy F. Woolf, *Russia's Nuclear Weapons: Doctrine, Forces, and Modernization* (Washington, DC: Congressional Research Service, 2020), 5-7, accessed February 12, 2021, https://crsreports.congress.gov/product/pdf/R/R45861.

[86] Edmund J. Burke and Arthur Chan, "Coming to a (New) Theater Near You," in *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, ed. Phillip Saunders, Arthur Ding, Andrew Scobell, Andrew Yang, and Joel Wuthnow (Washington, DC: National Defense University Press, 2019), 238. The authors suggest that Russia's joint strategic command structure provided a model for the PLA's adoption of Theater Commands. Also see Yu Sui, "Through Thick and Thin, China and Russia Deepen Bilateral Ties," *China Military Online*, January 13, 2021, accessed January 13, 2021, http://english.chinamil.com.cn/view/2021-01/13/content_9967121.htm.

Russian nuclear forces.[87] In an article later in 2020 entitled "US Uses Russia as an Excuse to Expand Nuclear Arsenal [美借口俄威胁扩充核武库]," the authors pay particular attention to non-strategic nuclear weapons and their role in US-Russia competition.[88] Like larger international norms, Beijing's thinking about the use of nuclear weapons is not fixed.

In sum, historical, strategic, and psychological factors are converging to shape CCP intent relative to LYBNWs. The CCP's historically consistent willingness to use armed force is most prevalent when facing the type of threats created by current domestic and geopolitical dynamics. Motivated by the desire to stave off existential threats on the structural level and affected by fears of loss and cognitive biases on the individual level, CCP leaders are likely to consider all means available to them in a conflict—regardless of perceived norms.[89] Principal among those means are LYBNWs. This class of weapons not only provides an effective means of achieving likely CMC military objectives, but also may not carry the long-term political costs often assumed by Western strategists. While LYBNWs may not be the most likely solution, it is plausible that Party leaders expect them to be a suitable and acceptable one.

Assessing Capability

Diversity: Delivery Systems and Projectiles

The PLA weaponizes ambiguity and does this particularly well concerning its nuclear forces. Nevertheless, an assessment of publicly available information regarding nuclear resources

[87] Li Xining [李锡宁] and Liu Leina [刘磊娜], "Cracking the Code on the Doubling of Russia's Combat Power [破解俄军战力翻倍密码]," *China Military Online* [中国国防报], April 13, 2020, accessed November 24, 2020, http://www.81.cn/gfbmap/content/2020-04/13/content_258761.htm.

[88] Liu Leina, [刘磊娜], "The United States has Threatened to Expand its Nuclear Arsenal on the Pretext of Russia [美借口俄威胁扩充核武库 - 中国国防报 - 中国军网]," *China Military Online* [中国国防报], August 12, 2020, accessed November 24, 2020, http://www.81.cn/gfbmap/content/2020-08/12/content_268247.htm.

[89] James, J. Wirtz, "US Nuclear Posture Review and Beyond: Implications for Sino-American Relations," in *Perspectives on Sino-American Strategic Nuclear Issues*, ed. Christopher P. Twomey (New York: Palgrave Macmillan, 2008), 105-106.

and knowledge supplements the insights provided by analysis of PLA intent. The most instructive aspects of PLA nuclear resources are weapons platforms, organizational structure, and ongoing activities. First, China's LYBNW resources are small but expanding and diversifying rapidly. The PLA's warhead arsenal is modest compared to its global peers, estimated to be in the mid-200s; and, only a small number of these likely qualify as LYBNWs.[90] Still, China's nuclear arsenal is expected to double in size over the coming decade. Technological improvements further suggest that these warheads will continue to decrease in size and feature variable yield options.[91]

LYBNW employment platforms are also diversifying (see Figure 2). While Beijing does not claim to possess LYBNWs, investment in relevant technologies suggests that Party leaders increasingly see this capability gap as an emerging threat.[92] The most prominent LYBNW-capable system is the DF-26 intermediate-range ballistic missile. The DF-26 is a road-mobile, solid-fueled, dual-use platform able to reach Guam and, according to the DoD, "the most likely weapons system to field a lower-yield warhead in the near term."[93] The DF-26 appears to feature a "hot-swap" capability, enabling operators to rapidly alternate between conventional and nuclear warheads in a field setting.[94]

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[90] For more estimates, see Hans M. Kristensen and Matt Korda, "Chinese Nuclear Forces, 2020," *Bulletin of the Atomic Scientists*, December 7, 2020, 172, accessed February 12, 2021, https://thebulletin.org/premium/2020-12/nuclear-notebook-chinese-nuclear-forces-2020/; or Center for Arms Control and Non-Proliferation, "Fact Sheet: China's Nuclear Arsenal," accessed February 12, 2021, https://armscontrolcenter.org/fact-sheet-chinas-nuclear-arsenal/.

[91] US Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020*, 85-88.

[92] Kristensen and Korda, "Tactical Nuclear Weapons, 2019," 259-260.

[93] US Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020*, 88.

[94] Joshua H. Pollack and Scott LaFoy, "China's DF-26: A Hot-Swappable Missile?" *Arms Control Wonk* (blog), May 17, 2020, accessed November 27, 2020, https://www.armscontrolwonk.com /archive/1209405/chinas-df-26-a-hot-swappable-missile/.

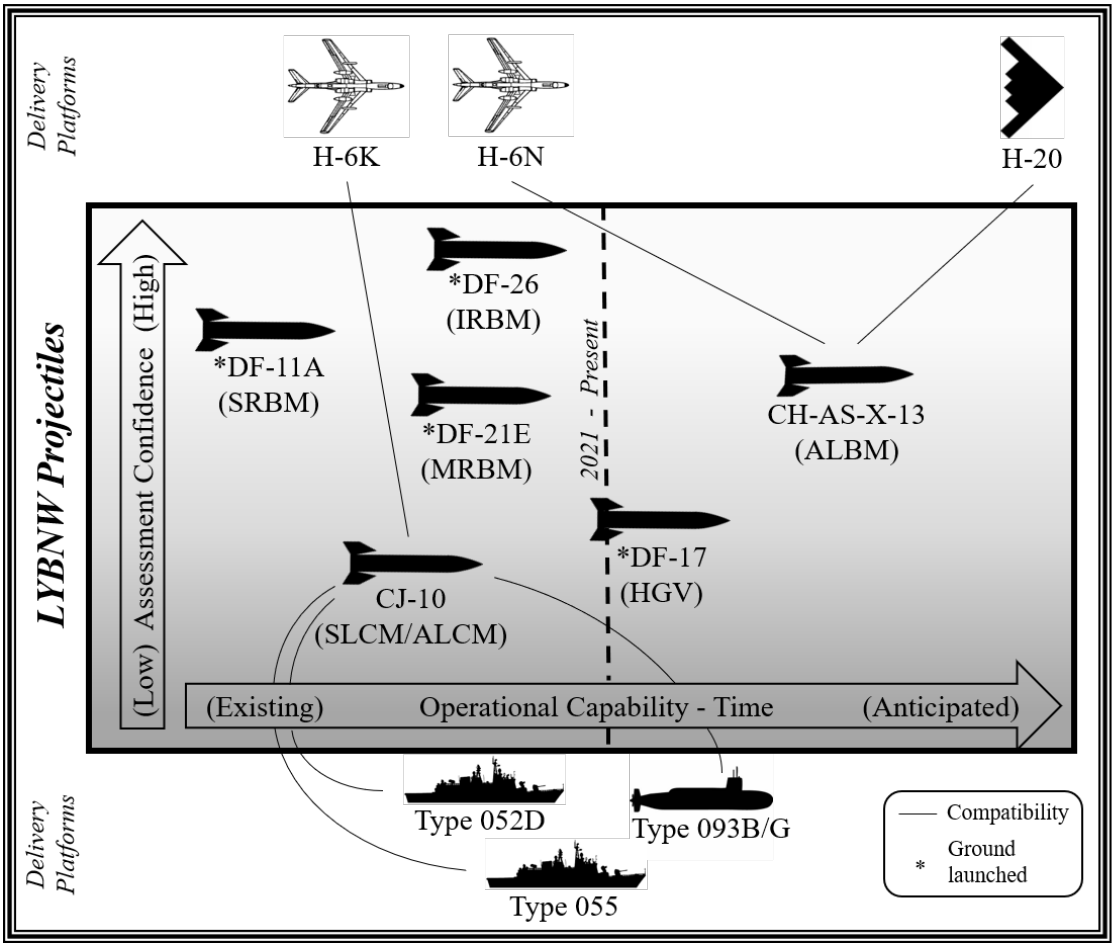

Figure 2. The PLA's LYBNW Systems. Created by author. The figure displays the author's assessment of the PLA's current and future LYBNW operational capability, including projectiles and their associated delivery platforms. The estimate is the product of multi-source information aggregation and the author's analysis. The "Assessment Confidence" scale denotes the lack of confirmatory open-source reporting on relevant capabilities. Assessment based on Department of Defense, *Nuclear Posture Review*; Media Defense, "Global-Nuclear-Modernization"; Department of Defense, *Annual Report to Congress, 2020*; Kristensen and Korda, "Chinese Nuclear Forces, 2020"; Fisher, "China's Nuclear Challenge"; Missile Defense Project, "Missiles of China"; and Gady, "Image Reveals China's New Nuclear Attack Submarine."

PLA legacy systems may also meet LYBNW criteria, yet observers often overlook these capabilities. While the DF-21E (CSS-5 Mod 6) medium-range ballistic missile features the range, precision, and mobility commensurate with LYBNWs, uncertainty surrounding its nuclear yield defies simple classification.[95] According to the Center for Strategic and International Studies, the

[95] Media Defense, "Global Nuclear Capability Modernization."

DF-11A features a variable 2, 10, or 20 kiloton nuclear warhead. Given recent upgrades to improve accuracy, the DF-11A's 600-kilometer range makes it a formidable LYBNW-threat in a Taiwan scenario.[96]

Emerging systems indicate even more substantive growth in the future. The DF-17 hypersonic glide vehicle is reported to be a dual-capable platform featuring a range of 1800 to 2500 kilometers.[97] The PLAAF's re-established nuclear mission likely features LYBNW employment given the H-6N's ability to carry a suspected nuclear-capable air-launched ballistic missile—the CH-AS-X-13.[98] In the mid-2020s, the PLA will field the nuclear-capable H-20, a next-generation bomber similar to the American B-21. Official media states, "The new-generation long-range bomber will have both nuclear and regular strike capability to hit the enemy's key links and systemic weaknesses."[99] Most concerning is the potential development—or perhaps expansion of—nuclear-capable cruise missiles. The Central Intelligence Agency reported likely nuclear cruise missile testing as early as 1995.[100] Whether by modifying the CJ-10 or developing completely new technology, the PLA is likely developing low-yield nuclear cruise missiles that can be paired with air, ground, or sea-launch platforms.[101] While the technical

[96] Missile Defense Project, "Missiles of China," Missile Threat, Center for Strategic and International Studies, June 14, 2018, accessed November 27, 2020, https://missilethreat.csis.org/country/china/.

[97] Lora Saalman, "China's Calculus on Hypersonic Glide," Stockholm International Peace Research Institute, August 12, 2017, accessed November 27, 2020, https://www.sipri.org/commentary/topical-backgrounder/2017/chinas-calculus-hypersonic-glide.

[98] Kristensen and Korda. "Chinese Nuclear Forces, 2020."

[99] Zhang Lijun [张礼军] and Li Wei [李伟], "China's New Strategic Bomber to Make PLA Air Force a Strong Force [中国新一代远程轰炸机拥有五大突出特点]," *China Youth Daily Online* [中青在线], February 16, 2017, accessed February 12, 2021, http://zqb.cyol.com/html/2017-02/16/nw.D110000zgqnb_20170216_1-12.htm. Zhang and Li state, 《从我国新一代远程轰炸机的使用定位上看，虽然具有核打击能力，但主要还是作为常规战略打击力量使用，重点突击对方的关键节点和体系薄弱环节，提高己方的战场控制能力。》

[100] Kristensen and Korda. "Chinese Nuclear Forces, 2020."

[101] Media Defense, "Global Nuclear Modernization." Also see US Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020*, 45-47. The land attack cruise missile capability featured on the most recently launched Type 055 cruisers and Type 052D guided-missile destroyers, as well as the development of a guided missile variant of the

specifications, particularly the explosive yield, of these missiles are unknown, it is feasible, if not likely, that they meet LYBNW criteria.[102]

The necessary complement to delivery platforms is targeting and sensor technologies. The PLA's ability to strike fixed sites on land is unquestioned. Similarly, their ability to target enemy forces throughout the first island chain, including maritime threats, is assured. Beyond the first island chain, however, the PLA's sensor network may be less reliable. Modernization is addressing these deficiencies by prioritizing over-the-horizon and under-sea sensors effective in the Western Pacific; moreover, the continued integration of sea and air-based sensor platforms will only accelerate the PLA's ability to conduct long-range precision targeting across domains.[103] In the coming decade, technological advancements will enable Beijing to transcend current shortcomings.[104]

Alternate Employment Methods

The PLA retains diverse capabilities beyond direct strikes against enemy forces. The most likely indirect method of employment is the production of high-altitude electromagnetic pulse (HEMP). The radiation caused by detonating a low-yield device 70 to 100 kilometers above the Earth's surface would devastate enemy digital systems. Current PLA textbooks affirm that Chinese planners consider HEMP a highly effective weapon against technologically advanced opponents. Interestingly, PLA strategists classify this "critical weapon" as an instrument of information warfare rather than nuclear warfare.[105] Officials at Taiwan's National Defense

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Type 093 submarine, could translate into a diverse nuclear cruise missile threat. Also see Kristensen and Korda, "Chinese Nuclear Forces, 2020."

[102] Richard D. Fisher Jr., "China's Nuclear Challenge," in *Guide to Nuclear Deterrence in the Age of Great-Power Competition*, ed. Adam B. Lowther (Bossier City, LA: Louisiana Tech Research Institute, 2020), 190-192.

[103] US Department of Defense, *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2020*, 59-73.

[104] Defense Intelligence Agency, *China Military Power*, 27-28.

[105] Ray, *Red China's "Capitalist Bomb,"* 1-12.

University assess that a HEMP strike is "the only attack option that meets the demand for making the first, paralyzing strike of a war."[106]

The PLA may also retain ERWs. The PLA has never deployed its ERW capability for reasons that are unclear. Johnathan Ray of the US National Defense University suggests that a lack of interest from senior political leaders and changes in Beijing's perception of the strategic environment contributed to the shelving of the program.[107] A decade later, the 1999 Cox Commission revealed that Beijing stole an array of weapons technologies, including designs for the W-70 Mod 3 warhead—an ERW device.[108] While there is no evidence to confirm the operationalization of the "ideal tactical and antipersonnel weapon" by the PLA today, the country has the knowledge and resources to do so if perceptions of the strategic environment change again.[109]

A final possible use of LYBNWs is for signaling. Historically, China demonstrates a deliberate use of signaling as part of its escalatory calculus.[110] Before deploying Chinese support troops to the Democratic Republic of Vietnam in 1965, Chen Yi strongly stated, "We warn the US aggressors once more: We Chinese people mean what we say!"[111] Today, growing nuclear capabilities expand Beijing's options for such strategic communication.[112]

Priority: Organizational Structure and Influence

Equally important as the platforms is the organizational structure managing those platforms. China's nuclear forces are concentrated in the People's Liberation Army Rocket Force

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[106] Ray, *Red China's "Capitalist Bomb,"* 7.

[107] Ibid., 37.

[108] Ibid., 7.

[109] Ibid., 6.

[110] Allen Suess Whiting, *The Chinese Calculus of Deterrence: India and Indochina* (Ann Arbor: University of Michigan Press, 1975), 205-209.

[111] Ibid., 185-186.

[112] Godwin and Miller, *China's Forbearance Has Limits*, 1.

(PLARF)—the name given the PLASAF in 2016. Today, the PLARF "plays a critical role in maintaining China's national sovereignty and security" by "having both nuclear and conventional capabilities."[113] Whether or not the PLARF will exercise an operational role in the employment of nuclear-capable air and sea-launched cruise missiles is uncertain; nevertheless, the PLARF is the most influential single organization relative to PLA nuclear weapons and policy. This section focuses on China's current ground-based nuclear rocket forces.

The preponderance of rocket forces operates from six service-specific bases, each with a varied number of rocket brigades and battalions, and support regiments. Each of the six operational bases—except Base 61 in Anhui Province—is home to both nuclear and conventional units.[114] Nuclear and conventional units share support facilities, training and deployment areas, and C2 infrastructure. While the PLA's C2 structure reflects a parallel "CMC-theater command-units operational command system and CMC-service-units administrative management system" [军委–战区–部队的作战指挥体系和军委–军种–部队的领导管理体系], nuclear forces are subject to a key difference.[115] Nuclear units enjoy a unified administrative and operational structure, answering directly to the CMC through PLARF headquarters and individual installation headquarters.[116] By contrast, as shown in Figure 3, conventional units have a bifurcated

[113] State Council Information Office of the People's Republic of China [国务院新闻办公室], "National Defense in the New Era, Defense White Paper [新时代的中国国防 白皮书]."

[114] Logan, "Making Sense of China's Missile Forces," 401-408.

[115] Zheng, Wenhao [郑文浩], "China's Second Artillery becomes the PLA Rocket Force [中国二炮部队改名火箭军 不加战略二字有何玄机]," Sina [新浪网], January 2016, accessed November 27, 2020, http://mil.news.sina.com.cn/china/2016-01-01/doc-ifxneept3524560.shtml.

[116] Logan, "Making Sense of China's Missile Forces," 400-413.

administrative and operational structure that provides Theater Commands (TC) control of non-nuclear rocket forces during a conflict.[117]

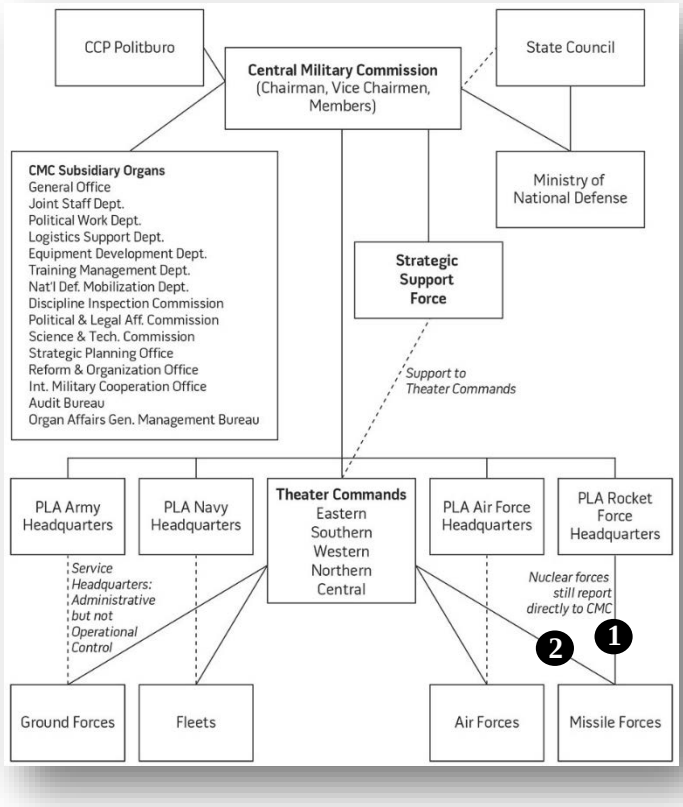

Figure 3. Post-Reform PLA Organizational Structure. Adapted from Phillip C. Saunders and Joel Wuthnow, "China's Goldwater-Nichols? Assessing PLA Organizational Reforms," *Joint Forces Quarterly* 82 (3rd Quarter 2016): 69, accessed February 25, 2021, https://ndupress.ndu.edu/Media/News/Article/793267/chinas-goldwater-nichols-assessing-pla-organizational-reforms/. Note: The figure shows the unique nuclear force command relationship with the CMC. Line 1 (annotation added by the author) signifies the administrative, "force building" [军种主建] responsibilities of the PLARF Headquarters, which applies to conventional and nuclear units. Operationally, line 1 also represents the CMC's control of nuclear forces. However, TCs exercise operational control of conventional missile units, as represented by line 2.

Although PLA nuclear rocket force structure remains largely unchanged by Xi Jinping's military reforms, the PLARF was not unaffected. Principally, the Rocket Force was not only renamed, but also elevated to the status of a full service [军种]. Within the bureaucratic ranking

[117] Roderick Lee, "Integrating the PLA Rocket Force into Conventional Theater Operations," *China Brief* 20, no. 14 (August 2020): 24-31, accessed November 24, 2020, https://jamestown.org/program/integrating-the-pla-rocket-force-into-conventional-theater-operations/.

system, the PLARF is now a theater-level command and serves as an adjacent unit to the five TCs (see Figure 3). Given its relative increase in status within the PLA, the PLARF is arguably the biggest beneficiary of Xi's reforms. The elevation of a previous Rocket Force Commander, Wei Fenghe, to Minister of Defense further symbolizes the service's growing clout.[118]

Analysis of the PLARF nuclear command structure provides three key insights. First, nuclear authority remains firmly in the hands of the CMC despite decades of comprehensive organizational change. Furthermore, increasing PLARF influence may not only be symptomatic of the CMC's growing appreciation of nuclear weapons but may also help explain the country's evolving valuation of its NFU policy.[119] Second, Chinese planners appear to see a more intimate relationship between nuclear and conventional forces than their American counterparts. This creates the potential for the psychological correlation of nuclear and conventional systems that could lead to an underestimation of their differences; moreover, the continued centralization of the nuclear force structure provides CMC leaders a degree of control that may correlate to increased perceptions of availability and growing appeal of nuclear weapons. As more low-yield technologies become operational across common platforms, the risks associated with nuclear-conventional correlation become even more prescient.[120]

Third, the PLARF's platforms, organization, and command structure increase the likelihood of inadvertent escalation. Confronting the risk of unintentional escalation serves as a reminder that nuclear weapons employment may not be a deliberate decision. James Acton outlines the escalatory dangers posed by warhead ambiguity and mischaracterization. Risks of inadvertent escalation are particularly high in a US-PRC conflict because of the increasing

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[118] Logan, "Making Sense of China's Missile Forces," 400-413.

[119] Gregory Kulacki, "China's Military Calls for Putting Its Nuclear Forces on Alert," Union of Concerned Scientists, December 9, 2015, accessed November 27, 2020, https://www.ucsusa.org /resources/chinas-military-calls-putting-its-nuclear-forces-alert.

[120] James M. Acton, *Is It A Nuke?: Pre-Launch Ambiguity and Inadvertent Escalation* (Washington, DC: Carnegie Endowment for International Peace, 2020), 3, accessed November 27, 2020, https://carnegieendowment.org/files/Acton_NukeorNot_final.pdf.

prevalence of dual-use technologies on both sides.[121] The proliferation of intrusive information technologies and grey zone conflict also increases the threat of escalation by diversifying points of interaction and complicating tools for stability. Great power conflict in the information age expands opportunities for nuclear escalation, regardless of leader preferences.[122]

Frenzy: Nuclear and Missile Program Activity

Chinese nuclear and missile program activity further suggests that nuclear technology is a high priority for Party leaders. During prepared remarks at the Hudson Institute, Lieutenant General Robert Ashley, Director of the Defense Intelligence Agency, stated that in 2018 "China launched more ballistic missiles for testing and training than the rest of the world combined."[123] He said that the PLA appears to be continually testing, or preparing to test, nuclear devices using "explosive containment chambers" to minimize the explosive signatures.[124] Interestingly, LTG Ashley's comments echo a 2013 National Air and Space Intelligence Center report that stated, "China has the most active and diverse ballistic missile development program in the world."[125] The PLA's investment in warhead and missile development is not an emerging trend; rather, recent modernization efforts are amplifying the urgency and dynamism of what is a long-term, evolving priority for Party leadership.

The trajectory of the PLA's nuclear force development and program activity underlie the growing importance of resultant capabilities to Party leaders. In stark contrast to its primary

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[121] Acton, *Is It A Nuke?*, 1-3.

[122] Rebecca Hersman, "Wormhole Escalation in the New Nuclear Age," *Texas National Security Review* 3, no. 3 (Autumn 2020): 90-109, accessed July 18, 2020, http://tnsr.org/2020/07/wormhole-escalation-in-the-new-nuclear-age/.

[123] Robert P. Ashley Jr., "Russian and Chinese Nuclear Modernization Trends" (Remarks at the Hudson Institute, May 29, 2019), accessed November 27, 2020, https://www.dia.mil/News/Speeches-and-Testimonies/Article-View/Article/1859890/russian-and-chinese-nuclear-modernization-trends/.

[124] Ibid. LTG Ashley further cited cooperation between Moscow and Beijing in "watering down" a UN Security Council statement affirming the "zero-yield" testing pledge.

[125] National Air and Space Intelligence Center, *Ballistic and Cruise Missile Threat* (Wright-Patterson Air Force Base, OH: National Air and Space Intelligence Center, 2013), 3, accessed November 30, 2020, https://fas.org/programs/ssp/nukes/nuclearweapons/NASIC2013_050813.pdf.

competitor, China is expanding the size and sophistication of its nuclear arsenal. As economic growth slows and fiscal constraints become more prescient, the CCP continues to invest heavily in the diversification of expensive ground, air, and sea-launched precision-guided, nuclear-capable resources.[126] Unconstrained by technical knowledge, improvements to sensor and guidance-system performance are rapidly extending the PLA's reach into the Western Pacific, while also expanding the methods of employment readily available to key decision-makers. Amidst significant national-level institutional change, the role and prioritization of PLA nuclear forces continue to trend upward in an organization that sees less and less distinction between nuclear and conventional warfighting. The PLA's expanding capability to employ LYBNWs complements the plausibility of its intent to do so.

Vignettes and Assessment

Renowned futurist, Peter Schwartz, asserts, "the purpose of scenarios is to help yourself change your view of reality."[127] The following scenarios, although simple, provide a mechanism for conceptual application of the ideas offered in this paper; additionally, they facilitate a rudimentary yet instructive risk analysis of Chinese LYBNWs. The vignettes avoid discussion of conflict causation or jus ad bellum, instead prioritizing the conduct of war and the events surrounding the employment of LYBNWs. To avoid excessive speculation, the vignettes are limited to the INDOPACOM AOR and take place in the months leading up to the CCP's 20th Party Congress in 2022.

[126] Carla Babb, "Chinese Nuke Arsenal Next on Beijing's 'To-Do' List, US Commander Warns," *Voice of America*, September 14, 2020, accessed February 10, 2021, https://www.voanews.com/usa/chinese-nuke-arsenal-next-beijings-do-list-us-commander-warns?amp.

[127] Peter Schwartz, *The Art of the Long View: Paths to Strategic Insight for Yourself and Your Company* (New York: Bantam Doubleday Dell, 1996), 9.

War Across the Strait

Following continued economic decline, costly global isolation, and a popular grassroots independence movement in Taiwan, the PRC initiates armed reunification on national security grounds.[128] A week into the campaign, the PLA has devastated much of the island's military infrastructure with barrages of ballistic missiles and airstrikes, and seized limited footholds near Kaohsiung and Keelung; however, the costs are high given the Republic of China's military use of coastal defense cruise missiles and short-range air defense.[129] Disappointed by the early phases of the war, leaders in Beijing grow increasingly insecure.

Although Washington has not made public commitments to intervene militarily, US forces assume a war posture. Two additional carrier strike groups are advancing toward the Western Pacific and the Pentagon continues preparations to move additional Air Force forces into the AOR. Anticipating significant first-mover advantages, the CMC decides to act. Chinese military planners assess that if the US can aggregate additional combat power in the region and then launch an intervention, the PLA is unlikely to be able to maintain what could be considered a two-front war; moreover, such a catastrophic and public defeat would evaporate already waning popular confidence in the Communist Party.

Tepid US popular support for intervention confirms Beijing's assessment that an initial overwhelming military success may deter further American involvement. The PLA initiates a counter-intervention campaign by targeting US forces in Okinawa and Guam with ballistic and cruise missiles. Beijing's principal operational objective is to deny American forces the use of key regional airfields and port facilities, thereby delaying the aggregation and staging of combat

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[128] For more on rising tensions across the Taiwan Strait, see Gerry Shih, "China Threatens Invasion of Taiwan in New Video Showing Military Might," *The Washington Post*, accessed February 10, 2021, https://www.washingtonpost.com/world/asia_pacific/china-taiwan-invasion-military-exercise/2020/10/12/291f5d86-0c58-11eb-b404-8d1e675ec701_story.html.

[129] Hsi-min Lee and Eric Lee, "Taiwan's Overall Defense Concept, Explained: The Concept's Developer Explains the Asymmetric Approach to Taiwan's Defense," *The Diplomat*, November 3, 2020, accessed December 4, 2020, https://thediplomat.com/2020/11/taiwans-overall-defense-concept-explained/.

power for one to two weeks. Firing more than 270 conventional missiles, including occasional re-attack, the PLARF suspends operations at Kadena Air Base for ten days. The PLA employs a mix of nearly 40 air and surface-launched missiles against Andersen Air Base to initially deny its use; however, effects prove difficult to sustain due to limited intermediate-range systems.[130] Cyber-attacks against DoD networks and strategic communications disrupt US forces en route to the AOR, but the effects are also limited. During this period, the US initiates its military response, methodically interdicting medium and intermediate-range missile platforms, integrated air defense systems, over-the-horizon sensor networks, and PLAN vessels at sea.

Leaders in Beijing retain a quantitative advantage, but a combination of American interdiction and high missile expenditure rates on both "fronts" are depleting resources at an unsustainable rate. Bolstered by moral righteousness and a perceived interest asymmetry, and faced with an imminent existential threat, top Party leaders seek higher-risk options to seize the initiative and demonstrate resolve. The CMC approves the use of an LYBNW against Kadena Air Base to achieve both objectives. Tactically and operationally, the destruction caused, including radiation, shuts down operations for weeks, but is limited to the military installation. The blast from a 5 kiloton surface burst device causes moderate to heavy damage within a 1.5 kilometer (diameter) area around the center point. Thermal effects and fatal radiation extend out an additional kilometer. Personnel not killed by the blast slowly succumb to radiation exposure for the next month.[131] The American operational tempo is significantly disrupted as plans are reconsidered, defended asset lists are re-validated, basing limitations are exacerbated further, and immediate response measures in Okinawa are executed. The ability of ground forces to leverage

[130] Eric Heginbotham, Michael Nixon, Forrest E. Morgan, Jacob L. Heim, Jeff Hagen, Sheng Tao Li, Jeffrey Engstrom, Martin C. Libicki, Paul DeLuca, David A. Shlapak, David R. Frelinger, Burgess Laird, Kyle Brady, and Lyle J. Morris, *The U.S.-China Military Scorecard: Forces, Geography, and the Evolving Balance of Power, 1996-2017* (Santa Monica, CA: RAND Corporation, 2015), 55-65, accessed September 16, 2020, https://www.rand.org/pubs/research_reports/RR392.html.

[131] Alex Wellerstein, "Nuke Map," Nuclear Secrecy, accessed December 4, 2020, https://nuclearsecrecy.com/nukemap/.

strategic lift or operate with desired air support is impacted. Strategically, Congress and the National Command Authority consider the response. Is the country ready to risk nuclear escalation and further loss of life over an island 7,000 miles away?

Escalation in Northeast Asia

A series of crises in July of 2022 reveals that Supreme Leader Kim Jung-un died of natural causes over a month prior. The state collapses as factions vie for power. Chinese and American forces begin operations in the North in an attempt to restore stability and secure the country's nuclear arsenal. Although inadvertent, US military and PLA forces face-off in several limited but intense small-unit skirmishes. US-PRC relations are the tensest since the Korean War. Despite the chaos, combined US and Republic of Korea forces appear to be gaining an upper-hand, consolidating gains northward from the former demilitarized zone.

Strategically, Beijing is isolated. Following recurring border conflict with India, deteriorating relations with Hanoi, and a new US fleet in Singapore, Chairman Xi's fears of encirclement are acutely aggravated by the potential for a US-occupied zone along the Yalu.[132] The long-term presence of American forces, or even a US ally, across the border is unacceptable; it is an existential threat. The high concentration of US ground forces on the peninsula makes LYBNWs an attractive option. Still preferring to avoid large-scale war with the United States, PLA planners take advantage of the chaos in the former Democratic People's Republic of Korea to complicate attribution. The PLARF secretly deploys a DF-21E (CSS-5 Mod 6) in the vicinity of Sohae Satellite Launch Facility. From here, the PLA conducts an LYBNW strike against a new corps support area established north of Seoul. The 10 kiloton surface burst warhead emits lethal doses of radiation over a nearly 5 square kilometer area.[133] Supplemented by PLA Strategic

[132] Greg Jennett, "US Plans to Restore Navy's 1st Fleet in Rebuff to China in South China Sea," *ABC News*, December 2, 2020, accessed December 4, 2020, https://www.abc.net.au/news/2020-12-03/us-plans-to-restore-navys-1st-fleet/12946076.

[133] Wellerstein, "Nuke Map."

Support Force information operations, the PRC espouses the narrative that the attack was carried out by a senior Democratic People's Republic of Korea military commander using a Pukguksong-2 (KN-15) medium-range ballistic missile—a system with characteristics similar to the DF-21.[134] Confronted by Chinese plausible deniability and an immense emergency response effort in the vicinity of the blast, does the United States choose to escalate the conflict with the PRC?[135]

Risk Assessment

Illustrated in both vignettes, the munitions effects of LYBNWs are catastrophic, causing systems and operational failure in the affected area. While the vignettes suggest that their use by the PLA is unlikely, LYBNW employment is plausible. The capability serves as a guarantor of the regime. Militarily, a conflict in East Asia creates vulnerabilities to LYBNWs for the US. Geographic realities strain American operational reach and the ability of commanders to generate forces in the short-term. The PLA has a temporal advantage that it seeks to sustain. Operationally-significant terrain limits basing options and causes ground forces to use large staging areas, often within relatively narrow topography (i.e., islands, peninsulas). The region's sea and air ports of debarkation are also nuclear high-value targets.

[134] Missile Defense Project, "Missiles of North Korea," Missile Threat, Center for Strategic and International Studies, June 14, 2018, accessed December 4, 2020, https://missilethreat.csis.org/country/dprk/.

[135] Mary Beth D. Nikitin and Samuel D. Ryder, "North Korea's Nuclear Weapons and Missile Programs," In Focus, Congressional Research Service, January 5, 2021, accessed February 11, 2021, https://crsreports.congress.gov/product/pdf/IF/IF10472.

Table 2. Risk Rating Matrix

	Consequences				
Likelihood	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Moderate	High	Extreme	Extreme	Extreme
Likely	Moderate	High	High	Extreme	Extreme
Possible	Low	Moderate	High	Extreme	Extreme
Unlikely	Low	Low	Moderate	High	Extreme
Rare	Low	Low	Moderate	High	High

Source: Hank Prunckun, *Scientific Methods of Inquiry for Intelligence Analysis*, 2nd ed. (Lanham, MD: Rowman and Littlefield, 2015), 301.

The scenarios show that low-yield blast effects may be significantly limited, hedging against public opinion blowback. In addition, factors not specifically included in the vignettes could mitigate undesirable consequences for the PLA. The use of an ERW lessens the potential for collateral damage further, while low-yield HEMP-producing munitions affect command, control, computers, communication, intelligence, surveillance, and reconnaissance capabilities at scale. Lastly, in each of the scenarios, misperception played a role in the development of the situation. The lack of well-developed crisis management mechanisms between Washington and Beijing increased the risk of inadvertent conventional and nuclear escalation as a result of a misunderstanding.[136] The probability may be small, but the risk posed by LYBNWs is extreme (See Table 2).

Conclusion and Recommendations

The PLA has the capability to conduct LYBNW strikes using a growing number and variety of employment techniques and platforms; furthermore, the intent to authorize a low-yield nuclear attack is plausible. While LYBNW use is not the most probable potential future, power-law distribution reveals that less frequent yet highly catastrophic potentialities represent a

[136] Kurt M. Campbell and Ali Wyne, "The Growing Risk of Inadvertent Escalation Between Washington and Beijing," *Lawfare*, August 16, 2020, accessed December 4, 2020, https://www.lawfareblog.com/growing-risk-inadvertent-escalation-between-washington-and-beijing.

disproportionately large risk.[137] With this in mind, the paucity of unclassified material on Beijing's low-yield arsenal or potential operational integration is significant. On the other hand, the assessment conducted herein provides some utility in explaining why that may be: the threat of PLA LYBNWs is an emerging phenomenon.

Today, structural and agent-level factors are exerting upward pressure on the probability of tactical nuclear warfare. Within China, political structures are increasingly fragile as popular expectations for continued performance and economic growth apply pressure on a CCP defined more and more by ideological rigidity and over-centralization. Simultaneously, the Party confronts a hostile strategic environment typified by an acute American military threat. From ideological and economic competition to the DoD's deliberate transformation to counter PLA capabilities, today's strategic and operational conditions, in the aggregate, are unique.

More significant than their novelty, though, is how these conditions affect the dynamics of possible US-PRC military conflict. First, any great power conflict in the Indo-Pacific is likely to directly and credibly threaten CCP core interests. These interests include territorial integrity, national sovereignty, national development, and, most importantly, regime survival.[138] Second, Beijing's stilted political structure and narrow basis of legitimacy limit the Party's ability to adapt to uncertainty and endure unforeseen shocks. These conditions also significantly heighten Party leaders' sensitivity to threats. Shirk asserts, "the more developed and prosperous [China] becomes, the more insecure and threatened they feel."[139] Simply put, a US-PRC conflict is likely to be an existential one for Xi Jinping's Communist Party.

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[137] Nate Silver, *The Signal and the Noise: Why so Many Predictions Fail--but Some Don't* (New York: Penguin Press, 2012), 432-438.

[138] Han Songyu [韩松豫], "Xi Jinping Inspects the PLA Marine Corps [习近平视察海军陆战队]," October 13, 2020, accessed February 10, 2021, https://xhpfmapi.zhongguowangshi.com/vh512/share/9464950. Xi Jinping's remarks to the PLA Marine Corps in October of 2020 reflect the importance of these interests and the military's explicit role in defending them.

[139] Shirk, *China: Fragile Superpower,* 5.

The political context of armed conflict affects the likelihood of LYBNW use for a number of reasons. First, students of Chinese history and strategic culture appreciate that leaders in Beijing often use overwhelming military force when confronted with the type of threat outlined above. With few options available for securing regime survival, the CCP will likely appraise LYBNWs as an effective tool for exerting the level of violence required to enable conflict termination. PLA military strategy and operational doctrine corroborate these expectations, demonstrating that LYBNW effects are well-suited to achieve likely military objectives. What is more, they do so within normative bounds that may be more constraining to Washington than Beijing. The role of LYBNWs in the context of US-Russian competition suggests that the nuclear taboo is eroding—a point not overlooked by strategists in Beijing. Second, elevated threat perceptions, amplified by the credibility of American military capabilities, encourage high-risk decision-making by key leaders. CMC members, and most importantly Xi Jinping, are likely to be in a loss-frame during a US-PRC conflict, making them more fearful of the potential for loss than gain. Behavioral psychology demonstrates that loss aversion is a strong motivator, shaping individual preferences and intent that may deviate from expected rationality.

The PLA's LYBNW capabilities reinforce the plausibility of intent. From a budgetary, organizational, and technological perspective, China's nuclear forces remain a priority amidst broad political and social change. The testing and development of low-yield warheads and delivery systems continue at a breakneck pace alongside a nuclear stockpile expected to double in the coming decade. Meanwhile, the General Secretary consolidates his authority over the CMC and the PLA's nuclear structure. Growing uncertainty surrounding the PRC's NFU commitment and adherence to minimum deterrence, as well as the increasing influence of the PLARF, indicate an evolving appreciation for nuclear capabilities at the top of the CCP.

PLA leaders recognized the utility of tactical nuclear weapons decades ago, deploying these capabilities as late as the 1990s; however, the confluence of strategic, operational, and technological factors early this century precipitated the de-prioritization of low-yield

capabilities.[140] Johnston observes about this period, "In an era where much international effort is being put into delegitimizing the utility of nuclear weapons, Chinese military strategists have apparently been moving in the opposite direction."[141] Today, twenty years later, Zhongnanhai's strategic assessment has changed. No longer constrained by resources or technology, LYBNWs are now a feasible, suitable, and acceptable means of achieving Party and PLA objectives. Although the complete implications are emerging, American strategists must update their strategic estimates accordingly and closely consider all future possibilities when estimating risk in INDOPACOM.

Recommendations

Nobel Laureate Daniel Kahneman reveals that humans have a limited ability to process low probability risks, stating that "we either ignore them altogether or give them far too much weight."[142] Recognizing that the lack of an antecedent challenges effective understanding and forecasting, this paper's assessment of LYBNWs is neither alarmist about nor dismissive of the threat. As such, the following recommendations are a pragmatic effort to call attention to an underappreciated risk.

First, the DoD must change the conversation surrounding non-strategic nuclear weapons within the department; or, more bluntly, start having a conversation. As a start, nuclear warfighting and deterrence should be expanded as topics within professional military education to foster increased organizational awareness and understanding of warfare under the revitalized nuclear threat. Intermediate-level education is an appropriate starting point. Nuclear warfighting academic content should focus on LYBNW offensive employment and defensive measures, as well as non-strategic nuclear response at the tactical and operational levels. Reflecting on the

[140] Johnston, "China's New 'Old Thinking'," 31.

[141] Ibid., 42.

[142] Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus and Giroux, 2011), 137-145.

Cold War, Lawrence Freedman, Professor of War Studies at King's College London, observes that the threat of strategic nuclear war "reinforced a sense that the main benefit of force lay in what was held in reserve. The military capacity of the West was never to be used to its full extent."[143] Today, enabled by technological advancements, a new paradigm is emerging in which variable-yield, precision-guided systems provide effects well short of the catastrophic destruction of Hiroshima and Nagasaki.[144]

Second, top-down direction should complement education. The next *National Defense Strategy* should include a more comprehensive treatment of non-strategic nuclear warfare. National level guidance should address nuclear employment and response planning. This may include expectations for CNI and engagement authorities, standards for facility hardening and training, and other measures to improve personnel, equipment, and network resiliency.[145]

Third, combatant command plans and strategies should include a robust treatment of nuclear threats and opportunities. Henry Kissinger said, "a limited nuclear war which had to be improvised in the midst of military operations would be undertaken under the worst possible conditions, both psychologically and militarily."[146] Specifically, the joint force must refine, prepare, and rehearse CNI tactics, techniques, and procedures. Evidenced by the US Navy's fielding of low-yield submarine-launched cruise missiles, commanders at all levels must be familiar with and integrate LYBNWs into their training and operations plans. According to FM 3-94, *Theater Army, Corps, and Division Operations*, Nuclear Employment Augmentation Teams

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[143] Lawrence Freedman, *Deterrence* (Cambridge, UK: Polity Press, 2004), 12-13.

[144] Curtis McGiffin, "Artisans and Advocates: The Importance of Strategic Deterrence Education," in *Guide to Nuclear Deterrence in the Age of Great-Power Competition*, ed. Adam B. Lowther (Bossier City, LA: Louisiana Tech Research Institute, 2020), 5-7.

[145] John K. Warden, "Conventional-Nuclear Integration in the Next National Defense Strategy," Center for New American Security, October 26, 2020, accessed January 13, 2021, https://www.cnas.org/publications/commentary/conventional-nuclear-integration-in-the-next-national-defense-strategy.

[146] Jeffrey A. Larsen, "Limited War and the Advent of Nuclear Weapons," in *On Limited Nuclear War in the 21st Century*, ed. Jeffrey Arthur Larsen and Kerry M. Kartchner (Stanford, CA: Stanford University Press, 2014), 18.

are available at the corps level and above. While their subject matter expertise is critical, it must be integrated at lower echelons—particularly the division.[147] Combatant commands and national-level leaders should review existing authorities to ensure they are commensurate with emerging low-yield capabilities and future operating environments. Nuclear weapons employment is not the exclusive domain of US Strategic Command.[148]

Also, operational level staffs should revise existing plans to include LYBNW response as a primary consideration. Planners must consider individual, installation, locality, regional, and national level implications. US forces should draft themes and messages, and prepare actions in the information environment that will help contain or direct public and servicemember reactions to an attack. Anticipating LYBNW effects and building contingencies to limit possible impacts on operational tempo and preserve US response options should be a specific line of effort.[149]

Fourth, operational plans should account for the possibility of inadvertent escalation to nuclear war. Planners must identify dual-use platforms, such as the DF-26 and DF-21, and prioritize them in intelligence collection plans. In a conflict, targeting decisions should be informed by the possibility of misidentification (identifying non-nuclear systems as nuclear, or vice-versa) and ambiguity (uncertainty resulting from the presence of dual-capable platforms).[150] Established and exercised crisis management channels are necessary to avoid misunderstanding.[151]

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[147] US Department of the Army, Field Manual (FM) 3-94, *Theater Army, Corps, and Division Operations* (Washington, DC: Government Publishing Office, 2014), 5-17 – 5-18.

[148] US Marine Corps, Department of the Navy, and US Coast Guard, *Advantage at Sea: Prevailing with Integrated All-Domain Naval Power* (Washington, DC: Government Publishing Office, December 2020), 22, accessed February 12, 2021, https://media.defense.gov/2020/Dec/17/2002553481/-1/-1/0/TRISERVICESTRATEGY.PDF.

[149] Larsen, "Limited War and the Advent of Nuclear Weapons," 15-18.

[150] Action, *Is it a Nuke?*, 1-3.

[151] Hersman, "Wormhole Escalation in the New Nuclear Age."

Fifth, planners and operational commanders should remain vigilant in the search for indicators of possible LYBNW use. Indicators include: elevated Chinese nuclear alert posture; increased coordination and training between nuclear-armed units and TCs; deployment of nuclear-capable cruise missiles aboard PLAN vessels; actual or practiced loading of dual-capable air-launched cruise and ballistic missiles onto PLA aircraft; and nuclear warhead field distribution and/or installation on DF-26 intermediate-range ballistic missiles.

Sixth, military and political leaders must continue efforts to distribute American combat power throughout the INDOPACOM AOR, thereby reducing dependence on large, isolated installations. These leaders should accelerate and expand efforts such as those in the Defense Policy Review Initiative. A highly distributed posture and diverse array of mobile platforms will challenge the PLA's ability to locate and strike high-value targets with LYBNWs.

Seventh, prior to and during a conflict, American commanders and political leaders should be sensitive to China's potential attempts to signal. For Beijing, detonating an LYBNW in a non-casualty producing area effectively signals resolve. The failure of such an explicit signal to garner a visible American response will only serve to "explain and justify Beijing's resort to military force" and amplify existing beliefs in the righteousness of their resort of violence.[152] In addition, it could telegraph an intent to employ LYBNWs in a counterforce capacity in the future.[153]

Eighth, US military and political leaders must be aware of their own signaling. Before and after conflict outbreak, American strategic communication should be designed with the assumption that Party leaders are in a loss frame. Operations in the information environment directed at political leaders should seek to manage expectations of loss while providing readily available options for de-escalation, accentuating potential positive outcomes, and mitigating

[152] Godwin and Miller, *China's Forbearance Has Limits*, 1.

[153] Chase, "PLA Rocket Force Modernization and China's Military Reforms," 1-2.

perceived damage to prestige. It is also important to formulate termination criteria that enable the CCP to de-escalate.[154]

[154] Berejikian and Justwan, "Testing a Cognitive Theory of Deterrence," 45-47.

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