

THE PLA'S LONG MARCH TOWARD A WORLD-CLASS MILITARY

PROGRESS, OBSTACLES, AND AMBITIONS



Edited by Benjamin Frohman and Jeremy Rausch

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With contributions from

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Liza Tobin, and Jake Vartanian

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China's Sweeping Ambitions for Building World-Class Military Power

Benjamin Frohman and Jeremy Rausch

The 2024 People's Liberation Army (PLA) Conference, cohosted by the National Bureau of Asian Research (NBR), the China Strategic Focus Group at U.S. Indo-Pacific Command, and the National Security Data and Policy Institute at the University of Virginia, examined the implications of the goal of the Chinese Communist Party (CCP) to build a “world-class” military and assessed the progress of the People's Liberation Army (PLA) toward achieving this goal. Key questions the conference sought to address included the following:

- What is the CCP's vision for the PLA as a world-class military, and how does it intend to use this force to attain other national goals?
- How does the CCP assess the PLA's progress toward achieving world-class status, and how do corruption and talent concerns within the PLA affect this judgment?
- What role do artificial intelligence (AI) and other advanced technologies play in the PLA's efforts to gain advantage in a new revolution in military affairs, and how well is the People's Republic of China (PRC) fusing its economic and national defense systems to field these technologies to the PLA?
- How do the modernization and rapid expansion of the PLA's nuclear force support the CCP's goal of building a world-class military?
- Which PLA capabilities are already world-class, which are furthest from attaining this status, and what steps is the PLA taking to build world-class capabilities in the maritime, air, and ground domains?

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- Regardless of whether the PLA's capabilities are uniformly world-class, are they already sufficient for carrying out its key missions such as blockading or invading Taiwan, seizing maritime features in the South and East China Seas, and occupying territory along the Sino-Indian border?

Key findings from the conference include the following:

- The CCP's determination to build the PLA into a world-class military force by the middle of the 21st century is intended not only to match the U.S. armed forces in terms of combat capabilities but also to enhance other tools of national power and support Beijing's goal to catch up to and eventually surpass the United States as the world's most powerful and influential nation.
- Twenty-five years out from midcentury, the PLA already boasts world-class capabilities in numerous warfighting domains, suggesting it may reach important milestones for building world-class combat power before it fully achieves other components of its world-class goal. Capabilities where the PLA is already world-class include its large surface combatants; conventional ground-based missile force, including hypersonics; cyber, space, and information warfare; surface-to-air and air-to-air missiles; and amphibious assault and high-altitude operations.
- The rapid modernization and expansion of the PLA's nuclear arsenal in recent years suggests that world-class nuclear capabilities are essential to the CCP's goal of building the PLA into a world-class military. Chinese leaders view nuclear capabilities as necessary for "counterbalancing and controlling" the United States, including deterring it from intervening in regional conflicts.
- Under the guidance of its military-civil fusion strategy, the CCP is leveraging its economic and technological advancements, including in AI, to support the PLA's development of world-class capabilities. The PRC's substantial industrial capacity in global navigation technology, autonomous systems, shipbuilding, biotechnology, and advanced manufacturing carries particularly consequential dual-use implications.
- Despite the PLA's remarkable progress toward building world-class capabilities, it is not yet world-class by its own standards. Shortfalls in some important weapons systems, deeply entrenched corruption in the PLA and its defense industries, a lack of recent combat experience, and enduring shortcomings in personnel quality negatively affect CCP leaders' confidence in the PLA's warfighting capabilities and readiness to militarily confront the United States.

- Should the PLA achieve world-class capabilities by its own standards, particularly related to building world-class combat power, deterring Beijing from employing military force to coerce or even attack its neighbors could become nearly impossible.

As Beijing continues escalating its use of military coercion across the Indo-Pacific and leverages its massive industrial capacity to support military actions by Russia and Iran, the implications of the growth of the PRC's military power are becoming only more concerning. By 2027, CCP General Secretary Xi Jinping, who also serves as chairman of the Central Military Commission, has instructed the PLA to be capable of invading Taiwan.¹ In July 2024, NATO labeled the PRC a “decisive enabler” of Russia's invasion of Ukraine due to its large-scale provision of dual-use components and materiel to Moscow's war effort.² Likewise, critical chemical precursors and technological support that Beijing provides to Iran's ballistic missile program helped Tehran develop the highly accurate missiles it used to attack Israel and U.S. military assets in the Middle East in 2025. Taken together, Beijing's intention to use its development of world-class military capabilities to revise the territorial status quo in the Indo-Pacific and support its authoritarian partners in pursuing their own aggressive aims illustrates the PRC's growing military threat to the United States and its allies and partners.

Amid these international tensions, it is essential to assess the PLA's progress toward achieving its world-class military goal, the role that technological advancements play in the growth of PRC military power, and the CCP's ambitions for using a world-class PLA to achieve its territorial aims, including when it might feel confident risking a military confrontation that could involve the United States. This PLA Conference volume provides in-depth analysis of the CCP's intentions for wielding the power and influence of a world-class military both in the Indo-Pacific region and globally, the PLA's development and fielding of world-class military technologies, and the PLA's progress and continuing shortfalls in developing world-class capabilities in key warfighting domains.

¹ Michael Martina and David Brunnstrom, “CIA Chief Warns against Underestimating Xi's Ambitions toward Taiwan,” Reuters, February 2, 2023, <https://www.reuters.com/world/cia-chief-says-chinas-xi-little-sobered-by-ukraine-war-2023-02-02>.

² Amy Hawkins, “China a ‘Decisive Enabler’ of Russia's War in Ukraine, Says Nato,” *Guardian*, July 11, 2024, <https://www.theguardian.com/world/article/2024/jul/11/nato-summit-russia-ukraine-war-china-enabler>.

A World-Class Military for a New World Order

The CCP's goal to build the PLA into a world-class fighting force is inseparably linked to its far more sweeping ambitions to create a new world order with Beijing at its center. When General Secretary Xi announced his intention to build a world-class military by midcentury at the 19th Party Congress in 2017, he did not describe this goal in isolation from the party's other priorities. Beyond building a world-class military, Xi called on the PRC to also develop world-class enterprises, universities, and academic disciplines. In this "new era," military power would be one of many tools the PRC would wield as it strode toward the world's "center stage" and built a "community of common human destiny" backed by its growing global power and influence over world affairs.³

For the CCP, a world-class military is therefore an essential tool for exercising its power in a new world order more closely aligned with Beijing's interests and values. As Evan McKinney notes in his chapter in this volume, building such a force requires "far more than simply world-class combat capabilities." Rather, it requires the PLA to help break the United States' "values hegemony" and allow Beijing to set the standards for international military cooperation, redefine norms concerning the use of military force, and "shape international public opinion regarding international military issues." The PRC's latest defense white paper, published in 2019, reinforces this notion, declaring that a core function of the PLA is to "actively participate in the reform of the global security governance system."⁴ In recent years, Beijing has announced a series of initiatives to realize this vision. Among these is the Global Security Initiative, announced in 2022, which aims to establish PRC-led security dialogues and other initiatives as the premier venues for resolving global security issues and guiding international cooperation in areas such as counterterrorism, cybersecurity, biosecurity, and policing.⁵

Still, world-class combat power remains central to the PLA's modernization goals. Moreover, the PLA may attain it long before it

³ The full text of Xi's speech is available at <https://www.andrewerickson.com/2017/10/full-text-of-xi-jinping-19th-national-party-congress-work-report-related-documents>.

⁴ State Council Information Office (PRC), *China's National Defense in the New Era* (Beijing, July 2019), available at https://www.airuniversity.af.edu/Portals/10/CASI/documents/Translations/2019-07%20PRC%20White%20Paper%20on%20National%20Defense%20in%20the%20New%20Era.pdf?ver=a_kpbGkO5ogbDPPbflQkb5A%3d%3d.

⁵ Erik Green et al., "The Global Security Initiative: China's International Policing Activities," International Institute for Strategic Studies, October 24, 2024, <https://www.iiss.org/research-paper/2024/10/the-global-security-initiative-chinas-international-policing-activities>.

develops the other, more global features the CCP views as befitting a world-class military power. As a tool for accomplishing the “great rejuvenation of the Chinese nation,” a world-class PLA will serve an indispensable role in backstopping the CCP’s stated intent to annex territory around its periphery from Japan and Taiwan to Southeast Asia and India. Building the capabilities to militarily subjugate Taiwan will likely prove the most challenging set of requirements driving the PLA’s development of world-class combat power. General Secretary Xi’s directive to the PLA to be capable of invading Taiwan by 2027, to which some sources add building the capabilities to “counter the U.S. military in the Indo-Pacific region,” suggests the PLA might intend to attain important world-class combat capabilities long before midcentury.⁶ Similarly, routine operations and training to seize maritime features from Japan, the Philippines, and Vietnam, combined with its large-scale buildup of power-projection capabilities along the Sino-Indian border, imply that the PLA might believe it already possesses the requisite combat capabilities to execute these missions, at least absent U.S. military intervention.

To be sure, the PLA already possesses world-class capabilities in numerous warfighting domains. The PLA Navy boasts large surface combatants such as the Renhai cruiser and Luyang III destroyer, which feature 112- and 64-cell vertical launch systems, respectively. These systems are capable of launching cruise, surface-to-air, and antisubmarine missiles, as well as potentially land-attack and anti-ship ballistic missiles when naval variants of those systems become operational.⁷ For its part, the PLA Air Force has developed world-class surface-to-air missile forces and beyond-visual-range air-to-air missiles, while the PLA Rocket Force has devoted decades to fielding what is now the world’s largest arsenal of ground-based conventional missiles, including what the U.S. Department of Defense terms “the world’s leading hypersonic arsenal.”⁸ The PLA has also devoted enormous resources to developing capabilities that offset traditional U.S. advantages, such as by building world-class capabilities in cyber, space, and electronic warfare. As Joshua Arostegui and Jake Vartanian argue in their chapter, the PLA also possesses world-class capabilities in key areas required for an invasion of

⁶ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2024* (Washington, D.C., December 2024), <https://media.defense.gov/2024/Dec/18/2003615520/-1/-1/0/MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA-2024.PDF>.

⁷ Ibid.

⁸ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023* (Washington, D.C., October 2023), <https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>.

Taiwan, such as amphibious assault vehicles, as well as for high-altitude operations against India, such as light tanks and truck-mounted howitzers. Lastly, Beijing is engaged in an unprecedented modernization and expansion of its nuclear forces which, according to Gerald Brown, aims to support the PRC's territorial and other goals by "counterbalancing and controlling" the United States.

Despite the PLA's remarkable progress in these areas, however, it is clear that the PRC's top civilian and military leaders do not yet judge their military to be fully world-class. Central to this assessment is their perception that the PLA remains inferior to the armed forces of the United States, which emerge from PRC sources as the exemplar of what a world-class military should be.⁹ This view was encapsulated in Beijing's 2019 defense white paper, which assessed that the PLA "still lags far behind the world's leading militaries" and is even "confronted by risks from a growing technological generation gap."¹⁰ The PLA's judgment of its comparative inferiority appears to grow particularly acute relative to the United States, which the document alleges is "engaging in technological and institutional innovation in pursuit of absolute military superiority."¹¹ Moreover, in addition to shortfalls in hardware and technology like indigenous jet engines, submarine-quieting technology, and air assault capabilities, the PLA suffers from endemic corruption, including in its weapons procurement system, and a lack of recent combat experience that senior leaders refer to as the "peace disease." The force's combat readiness is further weakened by outdated and sometimes irrelevant instruction in its training academies and a host of shortcomings in the quality and competence of its officer and enlisted corps, including what senior leaders refer to as the "five incapables."¹² In the view of James Char, for these reasons "it will be a while yet before the PRC feels confident or competent enough to call into question the United States' status as the incumbent world-class military power."

⁹ U.S.-China Economic and Security Review Commission, "2019 Report to Congress of the U.S.-China Economic and Security Review Commission," November 2019, chap. 4, <https://www.uscc.gov/sites/default/files/2019-11/Chapter%204%20Section%201%20-%20Beijing%E2%80%99s%20%E2%80%9CWorld-Class%E2%80%9D%20Military%20Goal.pdf>.

¹⁰ State Council Information Office (PRC), *China's National Defense in the New Era*.

¹¹ Ibid.

¹² These refer to "the inability of too many PLA officers to effectively judge the military situation, understand their orders, make operational decisions, direct troops in combat, and handle unforeseen battlefield developments." U.S.-China Economic and Security Review Commission, "2019 Report to Congress of the U.S.-China Economic and Security Review Commission," chap. 2, <https://www.uscc.gov/sites/default/files/2019-11/Chapter%202%20-%20Beijing%27s%20Internal%20and%20External%20Challenges.pdf>.

The PLA's unrelenting efforts to overcome its weaknesses in pursuit of regional dominance and global influence make it essential to better understand the implications of its ambition to become a world-class military power. To this end, this volume takes stock of three key questions. First, what do Chinese leaders mean when they call on the PLA to become a world-class military, and is the interpretation of this requirement uniform across the PLA? Second, how do Chinese leaders assess the PLA's progress toward building world-class capabilities? And finally, what are the most significant challenges the PLA faces in achieving world-class status? To answer these questions, NBR assembled leading specialists from academia, think tanks, and government in the United States, Asia, and Europe, whose contributions to this volume will shape analysis on the PLA's trajectory for years to come.

What Is World-Class? The PLA, Its People, and Its Problems

The opening section of this volume examines the CCP's expectations for PLA modernization and benchmarks for achieving its world-class military goal. It also inquires as to how Chinese leaders assess the PLA's progress in tackling long-standing challenges in the areas of corruption, loyalty, and personnel quality as evidenced in countless corruption cases against senior PLA officers and defense industry officials and in slogans such as the "five incapables" and "two incompatibles."

In the volume's first chapter, Evan McKinney argues that Xi aspires to wield a world-class PLA on the global stage as an increasingly active tool of national power commensurate with the PRC's status as a global leader. Although McKinney acknowledges that the precise characteristics of a world-class military are not always clearly defined, he argues that such a military will play a significant role in Beijing's exercise of both hard and soft power. Through a comprehensive analysis of primary source literature, he points out that Beijing's intent to build a world-class military should not be misconstrued solely as a capability goal. Instead, this aspiration encompasses a broad range of military and nonmilitary tasks that the PLA will need to support as one of many tools of national power as the PRC more actively exerts its influence both regionally and globally. McKinney also refers to the PLA's supporting role for the PRC's development of "discourse power" where it will help enable Beijing's efforts to dominate the information environment and shape global norms and discourse.

In the second chapter, James Char studies the endemic nature of corruption in China's military and defense industries and its impact on

Xi's confidence in the PLA. Char attributes many of Xi's removals of top military officials to political objectives such as eliminating political rivals, discouraging internal dissent, and consolidating authority over the PLA. By mapping the number of PLA officers and other security officials caught in Xi's purges, Char uncovers a disproportionate number of officials working on political, logistical, and weapons procurement issues who have been the most significantly impacted by the sweeping campaigns. While the implications of Xi's anticorruption campaigns for his confidence in the PLA's warfighting capabilities are uncertain, Char concludes that Xi appears to be willing to trade "short-term instability" in the force for "long-term prowess."

The third chapter examines the PLA's attempts to improve the overall personnel quality and in particular the political loyalty and technical acumen of its officers and soldiers. Eric Hundman identifies numerous strategies initiated by the PLA to simultaneously reinforce political loyalty to the CCP and enhance military professionalism, including by doubling down on a commitment to political work and offering more educational and training opportunities. As a result, PLA academic institutions have intensified their ideological coursework while aiming to improve the living and medical conditions for military families. Nevertheless, the PLA continues to face challenges in successfully implementing some of these initiatives. For instance, efforts to standardize assessment programs for promotion have been met with some backlash from within its ranks, and training programs for officers to learn how to use new technologies are inadequate. Hundman concludes by cautioning against overestimating China's military effectiveness on the battlefield without considering the limitations the PLA faces in its officers' professionalism amid enduring concerns about political loyalty.

Strategic Technologies in a World-Class PLA

The second section of this volume assesses the PLA's development of world-class military technologies and its integration of these technologies into its doctrine and fielded capabilities. Against the backdrop of a new revolution in military affairs, the chapters in this section examine topics ranging from AI's role in next-generation combat systems and decision-making to the PRC's military-civil fusion (MCF) national development strategy. They also examine how frontier technologies are reshaping nuclear deterrence dynamics as the PLA rapidly modernizes and expands its nuclear arsenal.

In the fourth chapter of the volume, Meia Nouwens challenges previous thinking on PLA assessments of AI to craft a new framework for understanding the PLA's intentions to integrate the technology into its weapons and command systems. AI-enabled technologies enhance speed and accuracy, which are vital for command and control. They also serve a dual-use function, allowing the PLA to co-opt civilian AI-enabled decision-making applications for military use to train PLA forces and collate battlefield data for an eventual "command brain." To inform her analysis, Nouwens tracks the number of AI-related contracts per PLA service branch and the number of PLA service branch contracts according to types of AI application. Drawing on these findings, she suggests that PLA analysts closely observe developments in these technologies to determine their potential military uses. She also finds that the warfighting applications of AI-enabled technologies increase the risk of miscalculation during conflict due to an overreliance on automated decisions, necessitating closer scrutiny of these technologies.

The next chapter examines the evolution of China's military-civil fusion strategy and its subordination under the broader concept of the national strategic system and capabilities (NSSC). Liza Tobin, Addis Goldman, and Katherine Kurata investigate the increasingly central role of MCF in supporting the PLA's growth into a world-class military. The authors scrutinize the mobilization of civilian state resources under the NSSC to advance the MCF concept, arguing that it is essential for the United States to clearly discern the motivations driving the PRC to leverage the industrial capacity and technological advancements of its ostensibly civilian economy for military purposes. The PRC's openly articulated objective to transfer civilian resources to the PLA erases the distinction between technological breakthroughs for civilian use and those for military applications and presents the United States with particularly acute risk in the areas of global navigation technology, autonomous systems, shipbuilding, and biotechnology, and among others.

In the volume's sixth chapter, Gerald Brown assesses the role of the PLA's nuclear forces in attaining its world-class military goal. China's nuclear arsenal has grown exponentially in recent years to over six hundred nuclear warheads and is now on track to reach a force of approximately one thousand nuclear-capable weapons by 2030. In addition, the PLA is incorporating new technologies like low-yield nuclear weapons, hypersonic glide vehicles, and fractional orbital bombardment systems to further strengthen and modernize its nuclear deterrent. Brown conducts an extensive review of Chinese-language sources to identify the primary drivers and goals of the

PLA's nuclear modernization efforts. According to his findings, the PRC is increasingly concerned that the United States might turn to nuclear weapons to compensate for its conventional weakness in the Indo-Pacific theater and has concluded that it must bolster its own nuclear capabilities in response. Perhaps more importantly, the PRC aims to use its growing nuclear capabilities as a strategic counterbalance against the United States in the context of intensifying strategic competition, evidenced in part by Xi's promotion of the PLA Rocket Force to a full military service in 2016. Brown argues that as the PRC accelerates its nuclear modernization program, the United States might have fewer nuclear options of its own and could be constrained more broadly in intervening in a conflict over Taiwan.

Assessing World-Class Capabilities in Key Warfighting Domains

The final section of this volume uses a domain-based approach to identify where the PLA already possesses world-class capabilities, the challenges the PLA faces in becoming fully world-class, and steps the PLA is taking to address remaining capability shortfalls. Focusing on the PLA Army, Navy, Air Force, and conventional rocket forces, this section's authors delve deeper into how each service is contributing to Xi's vision to achieve world-class capabilities in key warfighting domains.

In the volume's seventh chapter, Joshua Arostegui and Jake Vartanian measure the PRC's progress in achieving a world-class military by pinpointing recent technological, educational, and organizational developments in the PLA ground forces. They highlight the U.S. military's joint all-domain operation capability as a motivator for the PLA Army to match the U.S. Army in key areas while gaining advantages in other domains to make up for capabilities where it still trails the United States. The PLA Army has acquired modern land-domain systems that allow for greater maneuverability in complex terrain, advanced jamming systems to support land and air operations, and long-range rocket launchers to support the PLA Navy at sea. Some of these systems, according to Arostegui and Vartanian, can already be considered world-class. Further, the PLA Army is prioritizing training for its senior leaders to operationalize its new weapons systems and rotating forces to high-threat areas such as the Sino-Indian border to diversify operational experience.

In the next chapter, Christopher Sharman and Andrew Erickson examine the PLA Navy's midcentury modernization ambitions. China

already boasts the world's largest navy by number of ships and submarines, the world's largest shipyard infrastructure, and the world's most productive shipbuilding industry. Nevertheless, Sharman and Erickson argue that neither Xi nor PLA Navy leaders yet believe their naval forces to be world-class. Through analyzing numerous internal speeches and documents from PLA Navy sources, they identify the service's sweeping ambitions for building itself into a globally deployable force that is "more powerful than the world's most powerful navy"—the U.S. Navy. As part of this objective, the PLA Navy seeks to be capable not only of fighting and winning maritime conflicts in the Indo-Pacific but also of projecting power to "win local regional wars" outside the Indo-Pacific and influence international maritime governance. Similar to the PLA Army's modernization metrics, the PLA Navy uses the U.S. Navy as its primary benchmark for measuring its progress toward achieving world-class status.

The volume's ninth and final chapter analyzes the modernization of the PLA Air Force's and PLA Rocket Force's conventional missile forces. Cristina Garafola and Elliot Ji begin by identifying milestones required for the PLA Air Force and PLA Rocket Force to achieve world-class status. They then outline four unique criteria to assess progress toward that goal that are applicable to both services: military theory, organizational structure, service personnel, and weapons and equipment. The chapter concludes that both the PLA Air Force and the PLA Rocket Force have transformed their hardware in recent decades but face continued challenges with it, as well as in technology, corruption, and personnel quality. Still, Garafola and Ji emphasize a number of key capabilities fielded by both services that they judge to already be world-class and assess that both the Air Force and Rocket Force will be instrumental in driving the PLA's transformation into a world-class military in the coming years.

Conclusion

The nine chapters in this volume from NBR's 2024 PLA Conference explore the PLA's efforts to answer General Secretary Xi's call to build a world-class military by midcentury. The first three chapters identify the ambitious vision behind this directive as well as some of the key challenges, such as corruption and personnel issues, the PLA will face in achieving it in the near term. The next three chapters identify critical technologies and policies the PLA is leveraging to modernize its arsenal, including AI, military-civil fusion, and cutting-edge nuclear weapons technology.

The final three chapters examine the PLA's remarkable progress as well as areas of continued shortfalls in achieving the goals of the PLA Ground Forces, Navy, Air Force, and Rocket Force to become fully world-class military services.

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EXECUTIVE SUMMARY

This chapter argues that Xi Jinping envisions a world-class PLA as a tool to advance hard and soft power on the world stage, compete for global comprehensive national power, and exercise international influence.

MAIN ARGUMENT

PRC sources describe a world-class military as requiring both world-class combat and noncombat capabilities. World-class combat capabilities include cutting-edge technology such as AI, unmanned systems, directed energy, network weapons, algorithms, and even social media. World-class noncombat capabilities likely include softer elements of the PLA such as talent, theory, political cohesion, and international image. PRC literature suggests that Xi envisions a world-class PLA as an increasingly active global tool of national power, commensurate with China's status as a global leader, which can be flexibly employed to advance PRC interests through both hard and soft power. Although it is too early to tell how this approach for utilizing a world-class military might differ from the U.S. approach, early evidence suggests that Beijing will increasingly look to the PLA to play a role in its exercise of soft power. A worst-case scenario would entail the PRC achieving national rejuvenation, surpassing the U.S. in comprehensive national power, and developing a world-class PLA by midcentury.

POLICY IMPLICATIONS

- Xi's intent to build a world-class military by midcentury should not be mistaken for an assessment that the PRC must still improve to be capable of fielding world-class combat capabilities. The benchmark of a world-class military undergirds a much more ambitious undertaking, and U.S. policymakers should plan to face a PLA that operates at or beyond a U.S. standard in the coming decades.
- A debate is ongoing within the PRC about the role the PLA will play in advancing discourse power. Western policymakers and observers should pay careful attention to this discussion to more effectively identify opportunities to better compete in the information space.
- The PLA's role in the "community of common destiny" and its associated initiatives does not appear to be clearly defined. As the PRC continues to employ the PLA globally, Western institutions and militaries will increasingly need to view the PLA as a global actor.

The PLA as a “World-Class” Tool of National Power

Evan McKinney

Chinese linkages between the concepts of a “strong country” and a “strong military” have ancient origins—at least as far back as *The Book of Lord Shang* in the third century BCE.¹ Xi Jinping linked the concepts of prosperity and military strength almost immediately upon taking office in 2012 through the “China dream.”² Today, *People’s Daily* commentators continue to trace the concept of “strong country, strong army” to these classic roots: “history has inspired us that a strong country must be backed by a strong army.”³

The phrase “world-class military” has a shorter lifespan. Xi first used the phrase in February 2016 at an enlarged meeting of the Central Military Commission, and since then it has come to represent the benchmark for the modernization of the People’s Liberation Army (PLA) by midcentury.⁴ However, People’s Republic of China (PRC) standards for what constitutes a

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Note: This chapter reflects the sole views of the author and is not intended to be representative of the views of the U.S. government, the Department of Defense, or the Department of the Air Force.

¹ Shang Yang, *The Book of Lord Shang: A Classic of the Chinese School of Law*, trans. J.J.L. Duyvendak (London: Arthur Probsthain, 1928), chap. 8. I am grateful to John Sullivan for his assistance in tracing the ancient roots of these concepts.

² Yi Zhang et al., “把人民军队建设成为世界一流军队” [Building the People’s Army into a World-Class Army], *People’s Daily*, September 24, 2022, http://www.xinhuanet.com/politics/2022-09/24/c_1129029296.htm.

³ Zhao Xinyue and Yuan Bo, “军强国安护和平: 如何理解加快把人民军队建成世界一流军队是全面建设社会主义现代化国家的战略要求?” [Strengthening the Military and Safeguarding the Country’s Peace: How to Understand that Accelerating the Building of the People’s Army into a World-Class Army Is a Strategic Requirement for Comprehensively Building a Modern Socialist Country?], *People’s Daily*, October 9, 2023, <http://politics.people.com.cn/n1/2023/1009/c1001-40090996.html>.

⁴ Xu Jianwen, “深刻把握习近平强军思想的体系化发展脉络” [Deeply Grasp the Systematic Development Context of Xi Jinping’s Thought on Strengthening the Military], *Xinhua*, July 31, 2023, <https://www.12371.cn/2023/07/31/ARTI1690792984238516.shtml>.

world-class military are not clearly defined, in part because it is impossible for the Chinese Communist Party (CCP) to predict what a world-class standard will be in 2049. This leaves a great deal of room for interpretation among both PRC and international observers as to what Xi means when he refers to a world-class military. This chapter attempts to clarify what is meant by the phrase and assesses how the CCP intends to leverage a world-class PLA to achieve national rejuvenation by midcentury. The chapter argues that Xi envisions a world-class PLA as a tool to advance PRC hard and soft power on the world stage at the forefront of the global competition for comprehensive national power (CNP) and international influence.

It is undeniable that the PLA possesses a range of capabilities that are on par with U.S. standards. These capabilities include fifth-generation aircraft, the largest naval fleet in the world, and an expanding nuclear arsenal.⁵ Moreover, the PLA's rapidly improving capability to employ joint-domain warfare arguably sets it apart from all other national militaries aside from the U.S. military.⁶ Against this backdrop, the U.S. military and the PLA can be uniquely regarded as world-class militaries today.

According to *People's Daily* commentary, however, the PLA perceives that it has a long way to go before it can be considered a world-class military by its own standards.⁷ Additionally, the PRC's own 2027 and 2035 modernization goals for the PLA (described in detail later in this chapter) are even more perplexing, as achieving either of these goals would undoubtedly require the PLA to attain a standard for a world-class military far in advance of the midcentury benchmark. This contradiction challenges Western observers to reconcile what they are seeing on a day-to-day basis with the possibility that Beijing's ambition is to challenge the United States as a global military actor.

Xi Jinping clarified the PRC's world-class military standard in October 2017 at the 19th National Congress of the Communist Party of China, when he established Xi Jinping Thought on Strengthening the Military, which has since provided some insight into the CCP's thinking on the subject.⁸ In 2019 the Central Military Commission issued the "Outline for Studying Xi

⁵ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023* (Washington, D.C., October 2023), <https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>.

⁶ Ibid.

⁷ Zhao and Yuan, "军强国安护和平."

⁸ Xu Jianwen, "深刻把握习近平强军思想的体系化发展脉络" [Deeply Grasp the Systematic Development Context of Xi Jinping's Thought on Strengthening the Military], *Xinhua*, July 31, 2023, <https://www.12371.cn/2023/07/31/ART11690792984238516.shtml>.

Jinping Thought on Strengthening the Military” to every soldier in the PLA.⁹ This document is an authoritative guide from the highest level of the party offering an “action plan for...building a world-class army in an all-round way.”¹⁰ Studying and implementing the outline, which was updated in August 2023, is the primary long-term strategic task for the PLA. This chapter will contribute to existing literature by integrating guidance from Xi Jinping Thought on Strengthening the Military with post-2020 authoritative PRC documents and commentary to assess why the PRC thinks it needs a world-class military, how it defines a world-class military, how the PRC will use such a military, and how this use may differ from that of the United States.¹¹

Why Does the PRC Think It Needs a World-Class Military?

An examination of CCP ideology illuminates several reasons for the PRC’s belief that it needs a world-class military. The goal of building such a military by midcentury begins with Xi Jinping himself: “accelerating the building of the people’s army into a world-class military is a strategic requirement for the comprehensive construction of a modern socialist country.”¹² Xi Jinping Thought on Strengthening the Military represents “the military thought of the party in the new era.”¹³ CCP ideology frames the

⁹ “经中央军委批准‘习近平强军思想学习纲要(2023年版)’印发全军” [Approved by the Central Military Commission, the “Outline for Studying Xi Jinping’s Thought on Strengthening the Military” (2023 Edition) Was Issued to the Entire Military], Xinhua, August 1, 2023, https://www.gov.cn/yaowen/liebiao/202308/content_6895995.htm. I am grateful to Nathan Beauchamp-Mustafaga for helping me locate the specific text that was issued to the PLA.

¹⁰ “经中央军委批准‘习近平强军思想学习纲要(2023年版)’印发全军” [“Xi Jinping Thought on Strengthening the Army” (2023 Edition) Is Issued to the Entire Army], China Military Network, August 2, 2023, http://www.81.cn/szb_223187/szbqxq/index.html?paperName=jfjb&paperDate=2023-08-02&paperNumber=01&articleid=911783; and Liu Guangming et al., “坚持用习近平强军思想引航新征程” [Adhere to Xi Jinping’s Thought on Strengthening the Military to Guide the New Journey], *PLA Daily*, November 20, 2023, http://www.81.cn/szb_223187/szbqxq/index.html?paperName=jfjb&paperDate=2023-11-20&paperNumber=07&articleid=919696.

¹¹ Western PLA experts have assessed the topic of a world-class military in detail, including comprehensively tracing Xi’s use of the phrase and evaluating pre-2020 PRC scholarly commentary on its meanings. For an outstanding overview of this literature, see M. Taylor Fravel’s testimony before the U.S.-China Economic and Security Review Commission’s hearing on “A ‘World-Class’ Military: Assessing China’s Global Military Ambitions,” June 20, 2019, available at https://www.uscc.gov/sites/default/files/Fravel_USCC%20Testimony_FINAL.pdf.

¹² Xi Jinping, “实现建军一百年奋斗目标,开创国防和军队现代化新局面” [Achieve the Goal of the 100th Anniversary of the Founding of the Army and Create a New Situation for National Defense and Military Modernization], *Qinushi*, July 31, 2024, http://www.moe.gov.cn/jyb_xwfb/moe_176/202408/t20240801_1143716.html.

¹³ Liu Guangming et al., “坚持用习近平强军思想引航新征程” [Adhere to Xi Jinping’s Thought on Strengthening the Military to Guide the New Journey], *PLA Daily*, November 20, 2023, http://www.81.cn/szb_223187/szbqxq/index.html?paperName=jfjb&paperDate=2023-11-20&paperNumber=07&articleid=919696.

PRC's strategic outlook through the “two overall situations” (两个大局), which are “the great rejuvenation of the Chinese nation” and “great changes unseen in a century.”¹⁴ Party leaders view both concepts as historical inevitabilities, which drives the manner in which the PRC approaches its national goals: to achieve socialist modernization by 2035, and to become “a socialist modern power with leading comprehensive national power and international influence by the middle of this century.”¹⁵

The expression “the great rejuvenation of the Chinese nation” means that China and the international system will evolve together, resulting in an international system that defines norms and provides benefits in ways that facilitate national goals.¹⁶ PRC scholars describe the process of national rejuvenation as requiring a world-class military to provide the strength to ensure national security and to protect development activities both at home and abroad.¹⁷ *PLA Daily* commentary notes that this includes “safeguarding national sovereignty, unity, and territorial integrity,” as well as “safeguarding [PRC] overseas interests” and “promoting world peace and development.”¹⁸

Within the context of national security goals, the PRC also requires a world-class military to compete with the United States, which it assesses as unwilling to allow for China's national rejuvenation. National defense strength is a critical component of CNP, requiring the PLA to modernize into a world-class force. CCP leaders further assess that the post–Cold War international system is designed to advance and protect U.S. interests at the cost of the international community and that the United States uses the international system to directly contain and constrain PRC power in

¹⁴ Xi Jinping, “习近平:高举中国特色社会主义伟大旗帜 为全面建设社会主义现代化国家而团结奋斗——在中国共产党第二十次全国代表大会上的报告” [Xi Jinping: Hold High the Great Banner of Socialism with Chinese Characteristics and Work Together to Build a Modern Socialist Country in an All-Round Way—20th Party Congress Work Report], State Council Web Portal, October 18, 2022, https://www.gov.cn/xinwen/2022-10/25/content_5721685.htm; and Yu Jingkan, “深刻理解和把握‘两个大局’的丰富内涵” [Deeply Understand and Grasp the Rich Connotation of “Two Overall Situations”], *Sichuan Party School Newspaper*, 2021, <http://www.scge.gov.cn/html/website/outside/sichuandangxiaobao/2021niandi3qi/di6ban%20lilunshiye/1434877682046394369/1434893816229453825.html>.

¹⁵ Xi, “习近平.”

¹⁶ Wei Ling, “China and the International System in the Context of the Great Changes Unseen in a Century,” *Asia Pacific Security and Maritime Affairs*, March 3, 2019, trans. Samuel George, Center for Strategic Translation, <https://www.strategictranslation.org/articles/china-and-the-international-system-in-the-context-of-the-great-changes-unseen-in-a-century>.

¹⁷ Wu Zhaoifei and Wan Peng, “高举强军思想旗帜 建设世界一流军队” [Hold High the Ideological Banner of Strengthening the Military and Build a World-Class Military], Research Center for Studying Jinping Thought on Socialism with Chinese Characteristics for a New Era, August 3, 2020, <http://theory.people.com.cn/n1/2020/0803/c40531-31807364.html>.

¹⁸ “强国必须强军” [A Strong Country Must Have a Strong Army], China Military Network, August 4, 2023, http://www.81.cn/szb_223187/szbqx/index.html?paperName=jfjb&paperDate=2023-08-04&paperNumber=01&articleid=911926.

order to protect U.S. hegemony.¹⁹ According to this line of thinking, the PRC's national rejuvenation will provide China with the CNP to catch and eventually surpass the United States, resulting in a changed international order due to this power transition.²⁰ Such a worldview has led some PRC analysts to conclude that U.S. discourse power, or the United States' capability to translate CNP into international influence, underpinned in part by military power, has created an international order where U.S. values shape global norms, resulting in false labels of good or bad nations. Achieving national rejuvenation within this context requires the PRC to leverage a world-class military to break "U.S. values hegemony," creating a fairer playing field where PRC preferences can be better accommodated.²¹

The second overall situation, "great changes unseen in a century," refers to the decline of the United States and has produced a global governance gap, resulting in a security and development deficit.²² According to PRC state councilor Wang Yi, the "community of common destiny" launched in 2013 and the Global Security Initiative launched in 2022 reflect proactive efforts to reshape the international order with China at the center as a dominant power.²³ One PRC scholar noted that these initiatives will allow the PRC to prescribe Chinese solutions to global security dilemmas and to promote changes to international security concepts that suit its interests.²⁴

Such ambition far outstrips both the 2027 and 2035 goals for military modernization. The 2027 goal of promoting the "realization of the centenary goal of the founding of the army" focuses on improving strategic capabilities to defend national sovereignty, security, and development interests.²⁵ This goal appears to be aimed at positioning the PRC to fight and win wars of national sovereignty within its periphery, including an effort to annex Taiwan.

¹⁹ Chen Hanghui and Qi Dapeng, "权力斗争、民主和平与地缘政治:美国遏制战略的思想根源" [Power Struggle, Democratic Peace and Geopolitics: The Ideological Roots of the U.S. Containment Strategy], *American Studies*, no. 2 (2024), https://www.cssn.cn/qygbx/202407/t20240730_5767709.shtml.

²⁰ I am grateful to Erik Quam for spending many hours assisting me with interpreting PRC literature on CNP competition and PRC views of anti-containment.

²¹ Zhao and Yuan, "军强国安护和平."

²² Men Honghua, "中国三大全球倡议的战略逻辑" [The Strategic Logic of China's Three Major Global Initiatives], *Modern International Relations*, no. 7 (2023), <https://www.aisixiang.com/data/149563.html>.

²³ Wang Yi, "Answering Questions from Chinese and Foreign Journalists on China's Foreign Policy and External Relations," transcript, March 7, 2024, <https://www.aisixiang.com/data/150231.html>.

²⁴ Zhang Kun, "中国全球安全倡议的意义" [The Significance of China's Global Security Initiative], China Review Press, April 30, 2023, <https://www.aisixiang.com/data/142418.html>.

²⁵ He Shuyin, "解放军报评论员:把人民军队建成世界一流军队" [PLA Daily Commentator: Build the People's Army into a World-Class Army], *PLA Daily*, August 5, 2024, <http://www.mod.gov.cn/gfbw/qwfb/16242670.html>; and Jun Zheng, "在习近平强军思想引领下胜利前进" [Advancing Victoriously under the Guidance of Xi Jinping's Thoughts on Strengthening the Military], *Qishi*, March 1, 2023, <https://www.12371.cn/2023/03/01/ART11677660637881465.shtml>.

Similarly, the 2035 goal of “basically realizing the modernization of national defense and the army” focuses strongly on concepts such as organizational reform, training, procurement, and the employment of all-domain combat capabilities with highly developed mechanization, basically realized informatization, major progress in intelligence, and comprehensive improvement of joint combat capabilities.²⁶ On the other hand, the PRC’s midcentury goal is much more ambitious and directly links the construction of a world-class military to the CCP’s strategic goals: “Comprehensively building a world-class military by the middle of this century is consistent with the long-term goal of building our country into a modern socialist power with leading comprehensive national power and international influence... commensurate with our country’s status as a great power and to be able to comprehensively and effectively safeguard national security.”²⁷

In sum, the CCP believes it needs a world-class military to safeguard territorial interests, contribute to global security, and create a positive international image.²⁸ The PRC also links the midcentury goal of building a world-class military to “participating more extensively and deeply in international security cooperation and making greater contributions to building a community with a shared future for mankind,” demonstrating the relevance of a world-class PLA to the PRC’s ambitions to change the international order.²⁹

What Is a “World-Class Military”?

As the CCP works toward a world-class military, it is helpful to divide the elements into two categories: combat and noncombat. *PLA Daily* commentators emphasize that for the PLA to indeed be considered world-class, both combat and noncombat elements must be strong, consistent with PRC views of the development of CNP and competition with the West.³⁰

²⁶ He, “解放军报评论员”; Shen Zhihua, “全面把握加快把人民军队建成世界一流军队的战略部署” [Comprehensively Grasp the Strategic Deployment of Accelerating the Development of the People’s Army into a World-Class Army], *Seeking Truth*, May 1, 2023, http://www.qstheory.cn/dukan/qs/2023-05/01/c_1129582135.htm; and Jun, “在习近平强军思想引领下胜利前进.”

²⁷ He, “解放军报评论员.”

²⁸ Xiao Tiefeng, “探索建设世界一流军队的特点规律” [Explore the Characteristics and Laws of Building a World-Class Military], *PLA Daily*, February 27, 2018, <http://www.mod.gov.cn/gfbw/jmsd/4805481.html>; and Zhao and Yuan, “军强国安护和平.”

²⁹ Ibid.

³⁰ Wu Qian and Deng Mi, “提升话语权塑造我军良好国际形象” [Enhance the Right to Speak and Shape Our Military’s Good International Image], *PLA Daily*, March 2, 2018, <http://www.mod.gov.cn/gfbw/jmsd/4805719.html>; and Hu Huaifu, “提升中国军队国际话语权” [Enhance the International Voice of the Chinese Military], *Military Journalist*, January 1, 2019, http://www.81.cn/rmjz_203219/jsjz/2019nd1q/jsjz_203531/9430486.html.

Authoritative CCP literature makes it clear that a world-class military is more than just a force capable of annexing Taiwan. The 20th Party Congress Work Report sets the goal of “strengthen[ing] China’s voice in international affairs so it is commensurate with our comprehensive national power and international status.”³¹ Within this context, a world-class military must be defined as a force that enables the PRC to achieve these goals, requiring far more than simply world-class combat capabilities. The report goes on to outline a series of specific tasks for elevating the PLA to world-class standards. These tasks focus on both combat and noncombat elements, including strengthening party building, strengthening organization, establishing a strong system of strategic deterrence, improving the command system for joint operations, reforming military colleges, and improving training.³²

Combat elements of a world-class military are underpinned by Xi Jinping’s vision of “new quality combat power” (新质战斗力), which provides insight into the types of combat capabilities the party views as critical to achieving world-class military status.³³ These capabilities appear to reflect the PLA’s views of the changing nature of warfare through areas such as “strong system empowerment,” deepening human-computer interaction, and multidimensional domain expansion.³⁴ Commentaries on “new quality combat power” observe that this concept is the materialization of scientific and technological innovation, resulting in cutting-edge technologies designed to provide advantage in emerging combat spaces, including the information and cognitive domains.³⁵ These capabilities include artificial intelligence, unmanned systems, directed energy, network weapons, algorithms, and social media, among others. More specifically, combat elements of a world-class military must be sufficient to project power across multiple domains simultaneously, ensuring a reliable force that can be called on when needed to safeguard national security and to advance PRC interests.

³¹ Xi, “习近平,” 39.

³² Ibid.

³³ Cheng Xiang and Liu Guangming, “深入贯彻习近平强军思想 充分解放和发展新质战斗力” [Thoroughly Implement Xi Jinping’s Thoughts on Strengthening the Military and Fully Liberate and Develop New Combat Capabilities], *Party Building Research*, September 16, 2024, <https://djjj.12371.cn/2024/09/16/ART11726473629223147.shtml>.

³⁴ Ji Ming et al., “加快提升新质战斗力建设水平” [Accelerate the Improvement of the Level of New Quality Combat Capability Construction], *PLA Daily*, June 27, 2024, <http://www.mod.gov.cn/gfbw/jmsd/16318850.html>.

³⁵ Ma Quan, “把握新质战斗力建设的着力点” [Grasping the Focus of Building New Quality Combat Capability], *PLA Daily*, July 18, 2024, http://www.81.cn/yw_208727/16325264.html; and Cheng and Liu, “深入贯彻习近平强军思想 充分解放和发展新质战斗力.”

PRC sources also cite noncombat elements as critical to achieving world-class military status. These elements span a broad range of characteristics, including talent, political work, cohesion, image charisma, and organizational management, among others.³⁶ Xi Jinping Thought on Strengthening the Military stresses that the “essence of world military competition is a competition of first-class talents,” highlighting the need for college-educated, politically loyal, high-character personnel to compete on the world stage.³⁷ These personnel must have “newer and braver minds” to “establish a thinking concept that is compatible with the development of emerging fields and the generation of new combat forces.”³⁸ Beyond talents, Xi Jinping Thought on Strengthening the Military also illuminates the importance of other noncombat elements, including the ongoing need for reform, improving the military legal system, accelerating anticorruption efforts, and modernizing military theory and policy.³⁹ Additionally, it emphasizes the significance of continuing to reform the size and structure of the military so as to “promote the strategic transformation of services and arms,” with the goal of maximizing “synthesis, multifunctionality, and flexibility.”⁴⁰

Importantly, some PLA commentators note that a “good international image” of the PLA is critical to attaining world-class military status because it is critical to advocating for, creating, and maintaining peace.⁴¹ This image requires the PLA to develop specific traits recognized by global actors: loyalty, power, openness, and responsibility.⁴² Other commentators note that the PLA’s development of an international voice commensurate with China’s global image will be reflected in the PRC’s ability to help formulate international military standards and rules, master military operations, set

³⁶ Xiao, “探索建设世界一流军队的特点规律。”

³⁷ “强军之道要在得人” [The Way to Build a Strong Army Is to Win People], *PLA Daily*, August 10, 2023, http://www.81.cn/szb_223187/szbxq/index.html?paperName=jfjb&paperDate=2023-08-10&paperNumber=01&articleid=912286.

³⁸ Cheng and Liu, “深入贯彻习近平强军思想 充分解放和发展新质战斗力”

³⁹ Ministry of National Defense of the People’s Republic of China (PRC), “全面推进新时代强军事业的科学指南” [A Scientific Guide for Comprehensively Advancing the Cause of Strengthening the Military in the New Era], China Military Network, August 2, 2023, http://www.81.cn/szb_223187/szbxq/index.html?paperName=jfjb&paperDate=2023-08-02&paperNumber=01&articleid=911785.

⁴⁰ Ministry of National Defense (PRC), “改革是强军的必由之路” [Reform is the Only Way to Strengthen the Army], China Military Network, August 8, 2023, http://www.81.cn/szb_223187/szbxq/index.html?paperName=jfjb&paperDate=2023-08-08&paperNumber=01&articleid=912117.

⁴¹ Wu and Deng, “提升话语权塑造我军良好国际形象。”

⁴² Ibid.

the agenda for international military cooperation, and shape international public opinion regarding international military issues.⁴³

In sum, a survey of PRC literature underscores the criticality of combat and noncombat elements to achieving the status of a world-class military. This holistic approach is reflected in the roles that the PRC likely views a world-class PLA as playing in achieving the midcentury goal of national rejuvenation.

How Does Xi Jinping Envision the PLA as a Tool of National Power in 2049?

A survey of PRC literature suggests that Xi Jinping envisions a world-class PLA as an increasingly active global tool of national power, commensurate with China's status as a global leader, which can be flexibly employed to advance PRC interests through both hard and soft power. This vision is encompassed within the "community of common destiny," as China's "plan for the world," underlying the need to more actively leverage the PLA than the PRC has done in the past.⁴⁴ Ling Shengli, the director of the Center for International Security at China Foreign Affairs University, summarized China's role in global security governance as a "builder of world peace, defender of the international order, a mediator on hot issues, and a leader in security concepts."⁴⁵ Since the announcement of the community of common destiny, and more specifically the Global Security Initiative, the PRC has increasingly worked to shape the outcomes of international crises and conflicts toward its preferences. For example, PRC commentators point to the PRC's contributions to re-establishing relations between Iran and Saudi Arabia in 2023 as being linked to this vision.⁴⁶

The PLA is a part of the toolkit Beijing foresees shaping future crises and the international order, as outlined in the PRC 2019 defense white paper.⁴⁷

⁴³ Zhou Yang, "我军提升国际话语权的策略研究" [Research on the Strategies of Our Military to Enhance Its International Voice], *Military Reporter* 11 (2020), http://www.81.cn/rmjz_203219/jsjz/2020nd11q/yldgzzyj_203384/9945595.html.

⁴⁴ Wang, "Answering Questions from Chinese and Foreign Journalists on China's Foreign Policy and External Relations"; and Ling Shengli, "全球安全倡议与中国特色大国安全治理" [Global Security Initiative and Major Power Security Governance with Chinese Characteristics], *Aisixiang*, August 10, 2023, <https://www.aisixiang.com/data/145263.html>.

⁴⁵ Ling, "全球安全倡议与中国特色大国安全治理."

⁴⁶ "Saudi Arabia, Iran Agree to Resume Ties, Reopen Embassies, after Talks in Beijing," *Global Times*, March 10, 2023, <https://www.globaltimes.cn/page/202303/1287076.shtml>.

⁴⁷ State Council Information Office (PRC), *China's National Defense in the New Era* (Beijing: Foreign Languages Press, 2019).

The white paper notes that a world-class PLA will be asked to conduct a variety of missions and tasks, including protecting China's overseas interests and participating in disaster rescue and relief.⁴⁸ These tasks will require broader missions for the PLA. The 20th Party Congress Work Report, for example, notes that “we will become more adept at deploying our military forces on a regular basis and in diversified ways...to shape security posture, deter and manage crises and conflicts, and win local wars.”⁴⁹ Moving forward, the PLA will likely increase its presence abroad, such as through military escorts, international peacekeeping, humanitarian support, the construction of maritime supply points, and other public goods.⁵⁰

Xi Jinping Thought on Strengthening the Military contains clarifying guidance on how the PRC should employ a world-class military through the concept of “five persistences.”⁵¹ Combined with the vision for a world-class PLA offered above, this concept provides a basic framework for understanding how the CCP would employ a world-class military within the context of CNP competition.⁵² For example, the second persistence—“persist in using force to stop war”—appears rooted in the Chinese concept of “win without fighting.” *PLA Daily* commentators observe that within the context of wielding a world-class military, the way for a country to ensure it does not need to fight is to field an overwhelming fighting force. Put another way, the stronger the PLA becomes relative to the PRC's rivals, the more proactive the PRC can be in shaping the international environment to suit its preferences. PRC commentators note, “We must give full play to the strategic function of our military in shaping situations, managing crises, containing wars, and winning wars” and “create a favorable strategic situation for the country's peaceful development.”⁵³ Additionally, the third persistence—“persist in being proactive”—underscores the concept of “active defense” in the context of a world-class military.⁵⁴ Going beyond the traditional view of active defense, a world-class PLA will likely be combined with other elements of Chinese CNP to actively and decisively advance PRC interests ahead

⁴⁸ State Council Information Office (PRC), *China's National Defense in the New Era*.

⁴⁹ Xi, “习近平,” 48.

⁵⁰ Zhou, “我军提升国际话语权的策略研究.”

⁵¹ The five persistences are (1) adhere to political guidance, (2) persist in using force to stop war, (3) persist in being proactive, (4) adhere to the overall planning and consideration, and (5) and persevere and win if you dare to fight.

⁵² “牢牢把握当代中国马克思主义军事观和方法论” [Firmly Grasp Contemporary China's Marxist Military Outlook and Methodology], *PLA Daily*, August 14, 2023, http://www.81.cn/szb_223187/szbqx/index.html?paperName=jfjb&paperDate=2023-08-14&paperNumber=01&articleid=912468.

⁵³ “牢牢把握当代中国马克思主义军事观和方法论.”

⁵⁴ Ibid.

of rivals. *PLA Daily* commentators note, “We must insist on putting ourselves first...playing first-hand moves and taking the initiative and be[ing] good at finding opportunities in crises...and striv[ing] to be proactive.”⁵⁵

How Will a World-Class PLA Be Used Differently from the U.S. Military?

Although it is too early to fully discern how a world-class PLA will be utilized differently from the U.S. military, a survey of PRC sources, combined with observations of recent PLA behavior, provides a basis for an assessment. PRC efforts to establish overseas military facilities have garnered attention in the Western scholarship and media in recent years.⁵⁶ Today, the PLA maintains two overseas facilities: a support base in Djibouti (since 2017) and a smaller, less-developed facility in Ream, Cambodia (since 2024).⁵⁷ Protecting PRC overseas interests is identified as a critical task in the 2019 defense white paper, and in a world-class military context this could involve more than simply providing highly localized security in support of PRC commercial interests.⁵⁸ However, expectations that a world-class PLA plans to establish an extensive network of overseas bases in the image of the U.S. military do not find support in PRC literature. PLA forces are already capable of leveraging some aspects of PRC commercial overseas infrastructure to enable power projection,⁵⁹ and this support could become even more robust due to the evolution of military-civil fusion. Moreover, the U.S. network of overseas military bases stems in large part from leftover remnants of World War II and the Cold War, a legacy that the PLA does not share. Consequently, the midcentury overseas footprint of a world-class PLA will likely look very different from that of the U.S. military.

⁵⁵ “牢牢把握当代中国马克思主义军事观和方法论.”

⁵⁶ For an outstanding study on the potential implications of PRC overseas bases, see Cristina L. Garafola, Stephen Watts, and Kristin J. Leuschner, “China’s Global Basing Ambitions: Defense Implications for the United States,” RAND Corporation, December 8, 2022, https://www.rand.org/pubs/research_reports/RRA1496-1.html.

⁵⁷ Aadil Brar, “Chinese Warships Permanently Deployed at New Overseas Naval Base,” *Newsweek*, April 25, 2024, <https://www.newsweek.com/china-cambodia-ream-new-permanent-naval-base-1894012>; and Christopher Woody, “China’s Newest Military Base Abroad Is Up and Running, and There Are More on the Horizon,” *Breaking Defense*, July 12, 2024, <https://breakingdefense.com/2024/07/chinas-newest-military-base-is-up-and-running-and-us-officials-see-more-of-them-on-the-horizon>.

⁵⁸ State Council Information Office (PRC), *China’s National Defense in the New Era*.

⁵⁹ See Isaac B. Kardon’s testimony before the U.S.-China Economic and Security Review Commission’s hearing on “China’s Military Diplomacy and Overseas Security Activities,” January 26, 2023, https://www.uscc.gov/sites/default/files/2023-01/Isaac_Kardon_Statement_for_the_Record.pdf.

In terms of the CCP's goal to wield discourse power through military power projection, a world-class PLA will undoubtedly play a role. However, it appears the party is still experimenting with the use of the military for discourse power. On the one hand, the PLA has undeniably become increasingly visible on the global stage. For example, the hospital ship *Peace Ark* embarked on its twelfth overseas mission in 2024, and a PLA Navy task force visited Bangladesh and Singapore as recently as October 2024.⁶⁰ PLA Air Force Y-20s provided highly visible humanitarian support to Solomon Islands during the Covid-19 pandemic, showcasing Beijing's ability to leverage strategic airlift to assist third countries.⁶¹ On the other hand, the PLA still has a long way to go to realize its goals of being viewed as a "loyal, powerful, open, and responsible" military and a reliable means for providing global common goods. Despite participating in counterpiracy missions in the Gulf of Aden since 2009, PLA efforts may be more show than substance. For example, in 2023 three PLA Navy vessels failed to respond to a distress call by a Liberian-flagged vessel that was under attack by Houthi rebels.⁶²

The PRC's recent willingness to use the military element of national power, against UN preferences, provides additional context for how it might employ a world-class PLA differently from the United States. PRC actions with respect to the ongoing Russia-Ukraine war demonstrate that Beijing increasingly views the military space as a legitimate domain for challenging U.S. hegemony over norms and values. Rather than condemning the Russian invasion of Ukraine in 2023, along with the vast majority of the UN General Assembly, Beijing has instead opted to support Moscow throughout the campaign. Its support, moreover, has not been limited to political rhetoric or economic relations. The PRC is continuously providing material support through machine tools, microelectronics, and other critical technology used to sustain Russian military forces.⁶³ Although this support does not directly leverage the PLA, the realities of military-civil fusion will continue to blur the lines concerning security cooperation. Nevertheless, by leveraging security cooperation as a tool for shirking the

⁶⁰ Cao Hanwen and Yu Junhao, "Chinese Naval Ships Wrap Up Visit to Bangladesh," China Military Online, October 16, 2024, <http://eng.chinamil.com.cn/SIDEBAR/WeRecommend/16345830.html>.

⁶¹ "Chinese PLA Transport Aircraft Arrives in Solomon Islands with Anti-Epidemic Supplies," *Global Times*, February 18, 2022, <https://www.globaltimes.cn/page/202202/1252588.shtml>.

⁶² Aadal Brar, "Chinese Navy Ignored SOS Call as U.S. and Ally Stopped Pirate Attack," *Newsweek*, November 28, 2023, <https://www.newsweek.com/china-navy-gulf-aden-piracy-attack-us-navy-1847499>.

⁶³ Amer Madhani, "U.S. Intelligence Finding Shows China Surging Equipment Sales to Russia to Help War Effort in Ukraine," Associated Press, April 19, 2024, <https://apnews.com/article/united-states-china-russia-ukraine-war-265df843be030b7183c95b6f3afca8ec>.

United Nations and undermining the security of a democratic state, Beijing continues to demonstrate its willingness to threaten the existing rules-based international order.

A world-class PLA wielding discourse power to achieve the PRC's preferred objectives in line with PRC strategic goals could have a considerable impact on the rules-based international order. PRC scholars note that combining military strength with discourse power could influence the direction of international public opinion surrounding territorial disputes and other issues.⁶⁴ An active, global PLA posture could offer the CCP leadership a powerful soft-power tool to alter the trajectory of crises that are well outside traditional PRC spheres of influence, but that nevertheless affect PRC interests, in ways that run against U.S. preferences and Western values. Additionally, if the PRC decides to employ the PLA as an offensive, unconstrained tool of national power to coerce other states, inconsistent with current global norms, this could pose an unprecedented challenge to U.S. values.

Implications and Conclusion

Beijing's goal of building a world-class military by midcentury presents challenges and opportunities for the U.S. military and U.S. policymakers alike. On the one hand, the above findings demonstrate that even a PLA that fails to reach the world-class benchmark by its own criteria will present significant challenges for the United States and its allies. The advanced technologies and capabilities associated with the PRC's military modernization goals will undoubtedly stress operational planners and policymakers. A PRC wielding an increasingly capable PLA will become more difficult to counteract, especially within its immediate periphery. Furthermore, a PLA that achieves its own world-class standard could be nearly undeterrable. In this case, Beijing would be able to act unchecked, leveraging all tools of CNP to compel, coerce, or entice global actors to behave in line with PRC preferences, regardless of the United States' capability or willingness to intervene.

From a U.S. standpoint, a worst-case scenario would entail the PRC achieving national rejuvenation, surpassing the United States in CNP, and developing a world-class military by midcentury. In this hypothetical

⁶⁴ Wei Ling, "全球安全治理的中国方案" [China's Solution to Global Security Governance], Aisixiang, <https://www.aisixiang.com/data/146342.html>.

scenario, the United States would face an unconstrained PLA that will help the CCP realize its vision for global order. If Beijing uses the PLA aggressively, as dominant powers have throughout history, it could pose unprecedented challenges to U.S. interests. That said, the evidence to date suggests that the PRC does not yet fully understand how to leverage its military most effectively to exercise discourse power. A PLA widely supported by global public opinion feels a long way off, providing time for the United States and its allies to ensure that the PRC never achieves this advantage. To this end, U.S. planners and policymakers alike should consider every available action, especially within the information space, to protect the “values advantage” possessed by the United Nations, NATO, the United States, and the rules-based international order for decades to come.

EXECUTIVE SUMMARY

This chapter examines the recent spate of graft cases in the PLA and assesses the nature and tenor of this anticorruption campaign across Xi Jinping's three terms as China's commander-in-chief.

MAIN ARGUMENT

Endemic corruption in China's military system is largely due to the lack of checks and balances independent of the Chinese Communist Party (CCP). An analysis of the confirmed list of PLA personnel indicted on graft since the 18th Party Congress points to distinct politico-military significance behind each round of the purges since Xi assumed the chairmanship of the Central Military Commission (CMC). As the latest iteration underlines, China's defense ecosystem continues to be plagued by unresolved issues. But despite the fact that the *coup de grâce* against graft continues to elude Xi, the problems of the previous state of affairs prior to his time at the helm are gradually, albeit slowly, being addressed, thereby boosting China's future warfighting capabilities going forward.

POLICY IMPLICATIONS

- While high-profile graft cases have continued to emerge a decade into Xi's anticorruption campaign in the PLA, some successes have been achieved in curbing malfeasance. This complicates simple media narratives about the supposed abject "failure" of the initiative, Xi's lack of authority over China's armed forces, and the PLA's lack of combat readiness.
- The cleanup of the PLA Rocket Force, the CMC Equipment Development Department, and China's military-industrial complex in Xi's third term in office highlights unresolved challenges in the PLA procurement and acquisitions system.
- Given the CCP's continued monopoly on power and the lack of external checks and balances, corruption cases in the Chinese military will re-emerge. Still, those corrections initiated during Xi's period of leadership are likely to have a positive net effect on the ability of the PLA to improve its prospects against the U.S. armed forces in a potential future contingency over the distant horizon.

Corruption and Reliability Concerns in a World-Class PLA

James Char

Military malfeasance, and more specifically corruption, in the People's Liberation Army (PLA) has existed since its Red Army days before the People's Republic of China (PRC) was established.¹ Notably, as it became clear by early 1949 that the armed wing of the Chinese Communist Party (CCP) was ready to strike at the heart of Nationalist power south of the Yangtze River, Mao Zedong cautioned the PLA against succumbing to the material temptations proffered by “capitalists” in the country's urban centers. He warned his battle-hardened troops to be mindful of the former's “sugar-coated bullets” (糖衣炮弹).²

Corruption continues to plague China's armed forces, especially after the country's economic opening-up. As chairman of the Central Military Commission (CMC), Xi Jinping has waged an anticorruption campaign against his party's praetorian guard since the 18th Party Congress, but the coup de grâce continues to elude him. Over a dozen full generals and more than one hundred officers at the grade of corps deputy leader and above have been dismissed after an initial fifteen senior officers were named and shamed in January 2015.³ However, a more recent and extensive list of purged uniformed officials from December 2023 underscores the

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¹ Broadly defined, corruption in China covers improper behavior by CCP, government, or PLA officials. This contrasts with the common Western definition regarding the abuse of public office for one's personal gain or favor in violation of established rules and regulations.

² Mao Tse-Tung, “Report to the Second Plenary Session of the Seventh Central Committee of the Communist Party of China,” in *Selected Works of Mao Tse-Tung*, vol. 4 (Beijing: Foreign Languages Press, 1961), https://www.marxists.org/reference/archive/mao/selected-works/volume-4/mswv4_58.htm.

³ “去年15名将军落马徐才厚家现金堆积如山(全文)” [15 Generals Fell from Grace Last Year; Mountains of Cash Uncovered at Xu Caihou's Home (Full Text)], NetEase, January 28, 2015.

difficult, if not impossible, task of eradicating graft from China's military system.⁴ Why has corruption persisted, despite the best efforts of its latest strongman leader? What significance does the latest batch of deposed elites from the PLA Rocket Force and the CMC Equipment Development Department (CMC EDD) have for China's procurement of world-class capabilities and the state of PLA combat readiness? And in view of the goal set by Xi for the PLA to fully transform itself into "world-class forces by the mid-21st century," what is the impact on its trajectory toward that outcome?⁵

In an attempt to answer the above questions, this chapter will examine the possible reasons behind the latest fight against military graft in China and compare the rationale behind it with those iterations in Xi's previous five-year terms. Contrary to media reportage suggesting how the latest cleanup is indicative of the commander-in-chief's lack of leverage over his armed servants, this chapter argues this is instead evidence of his supreme authority in the PLA high command and tight grip over Chinese military strategy. In light of how the anticorruption campaign has uncovered numerous cases in the PLA Rocket Force and China's military-industrial complex, this chapter also delves into the possible reasons behind the charges against those affected personnel. Lastly, given how the anti-graft drive in the PLA was launched over a decade ago, the chapter recounts some of the campaign's successes and highlights other unresolved issues.

The chapter is divided into four parts. Following the introduction, the first section briefly revisits the circumstances in post-reform China leading up to Xi's decision to tackle PLA corruption. The second section then details those senior officers who have been indicted or stripped of their official roles since the 18th Party Congress by identifying their professional backgrounds, as well as their patron-client affiliations with one another (if any existed). In so doing, it revisits a key theme in the study of Chinese politics: the "rule of man" (人治) as opposed to the notion of the "rule of law" (法制) as the term is commonly understood outside the PRC. The third section examines the latest sector of China's defense ecosystem to be targeted in the campaign: the entities overseeing military procurement and acquisitions. In reminding readers of the institutional weakness inherent

⁴ "China's Defense Purge Strikes at Heart of Xi's Military Reforms," Bloomberg, January 4, 2024, <https://www.bloomberg.com/news/articles/2024-01-04/china-s-defense-purge-strikes-at-heart-of-xi-s-military-reforms>.

⁵ State Council Information Office of the People's Republic of China (PRC), *China's National Defense in the New Era* (Beijing, July 2019), https://english.www.gov.cn/archive/whitepaper/201907/24/content_WS5d3941ddc6d08408f502283d.html.

in an authoritarian governance system, the section also details unresolved challenges in China's military-industrial complex and highlights some of the regime's most recent new countermeasures. The final section then discusses the limits and limitations of what is essentially a personality-driven and state-led movement. Given how corruption leads to operational inefficiency, demoralizes service personnel, and degrades combat power, the section also elucidates the effects of graft on the PLA's utility as an instrument of national military power vis-à-vis the U.S. military and offers concluding remarks.

CCP-PLA Dynamics from Jiang and Hu to Xi: Precursors to the Anti-Graft Campaign

Three decades after Mao Zedong's "emancipation" of China, Deng Xiaoping's own liberation of the Chinese economy resulted in a party-army no longer insulated from society. With China's former paramount leader prioritizing reform and opening-up as the Cold War drew to a close, the PLA's leaders were forced to accept the interim shelving of the country's military modernization. Further, Deng even authorized the PLA to generate its own income independent of the party-state to make up for shortfalls in national defense expenditure and to improve infrastructure and services for its personnel.⁶ As China's GDP growth began to soar, graft also started to creep into the ranks.

Partly motivated by what Jiang Zemin deemed was a necessary evil to maintain the PLA's "conditional compliance" via the use of economic leverage,⁷ extensions were granted to the military to grow its commercial activities. Indeed, it would not be until PLA leaders were instructed more than once in the late 1990s to divest the PLA of its holdings that Jiang moved to divest it of its businesses.⁸ Under Jiang's successor, military malfeasance took a turn for the worse alongside the establishment's growing autonomy.⁹ Besides illicit dealings such as the unlawful privatization

⁶ Ezra F. Vogel, *Deng Xiaoping: And the Transformation of China* (Harvard University Press, 2011), 548–51.

⁷ James Mulvenon, "China: Conditional Compliance," in *Coercion and Governance: The Declining Political Role of the Military in Asia*, ed. Muthiah Alagappa (Stanford: Stanford University Press, 2001), 28.

⁸ Along the way, a number of high-profile diplomatic exposés implicating the PLA also emerged. See, for instance, "China 'Flooding Philippines with Drugs,'" BBC, March 28, 2001.

⁹ For an example, see Andrew Scobell, "The J-20 Episode and Civil-Military Relations in China," testimony before the U.S. China Economic and Security Review Commission, March 10, 2011.

of military housing,¹⁰ Hu Jintao once even had to rely on the civilian Central Discipline and Inspection Commission (CDIC) after the PLA's own disciplinary body had ignored his orders to investigate one blatantly corrupt major general.¹¹ Such bifurcation between the party and its army, recalcitrance by senior officers in disregarding legitimate civilian command, and the PLA's noncompliance with earlier prohibitions against commercial interests would persist as Hu handed over his party portfolios to Xi Jinping in late 2012. The PLA's image problem as perceived by Chinese society—epitomized by the unregulated issuance of military vehicle license plates at the time—likely motivated Hu and Xi to jointly call for greater accountability by the PLA.

As public anger over the flagrant abuses of power by some military personnel simmered,¹² negative perceptions fed into and reinforced the crisis of legitimacy plaguing the regime. By then, limitations in the “conditional control” model had become clear as the Chinese economy no longer enjoyed nearly double-digit growth. Further, the buying and selling of ranks and rampant misappropriation of national resources by some PLA elites was also commonplace. With as much as half of the country's military coffers believed to have been siphoned off by corrupt generals at the start of Xi's tenure,¹³ some authoritative media reported that prices had also been set for the various billets.¹⁴ With coteries of patron-client ties in the chain of command congealed by corruption, such unmeritocratic practices were having an adverse effect on morale in the ordinary rank and file. Moreover, as revealed by the later indictments of some senior officers, serious doubts about political loyalty in the CCP's armed wing also emerged, calling into question the party's ideological penetration into its forces. This happened just as China's national interests were taking on global proportions as the country assumed more obligations and engaged in a greater number of overseas image-building exercises. Alongside the rise in cost of PLA equipment and operations, the need to “improve management of military expenditures” would be acutely felt as

¹⁰ Michael Chase et al., *China's Incomplete Military Transformation: Assessing the Weaknesses of the People's Liberation Army* (Santa Monica: RAND Corporation, 2015).

¹¹ John Garnaut, “Rotting from Within,” *Foreign Policy*, April 16, 2012, <https://foreignpolicy.com/2012/04/16/rotting-from-within>.

¹² “PLA Launches Anti-corruption Drive,” *Xinhua*, April 29, 2013.

¹³ “焦点对话:徐才厚翻船,解放军大震撼?” [Focus Dialogue: PLA Shocked by Xu Caihou's Removal?], *Voice of America*, July 4, 2014, available at <https://www.youtube.com/watch?v=oGmRPeS6pII&t=38s>.

¹⁴ “Special Planning of the Two Sessions: Major General Reveals the Inside Story of Xu Caihou's Selling of Ranks,” *Phoenix Information*, March 9, 2015; and Jeremy Page, “China's Antigraft Drive Exposes Military Risks,” *Wall Street Journal*, March 11, 2015.

the regime's "purchasing" of PLA obedience became unsustainable.¹⁵ In the midst of reforms to correct the previous state of affairs and reclaim the party's control of the gun, the *modus operandi* of Xi's anticorruption campaign resorted to compensatory tactics as he strove for Maoist absolute control.¹⁶ While the former strongman leader had toppled his detractors on the grounds of ideology, now there was utility in tackling corruption in the PLA.

Likely to avert Hu's "reign without overt rule,"¹⁷ Xi's removal of military elites in his first five-year term after the 18th Party Congress suggests that his campaign was initially driven by politics more so than policy, aiming to extirpate rival factions and interest groups and pave the way for his national defense agenda. Within the PLA, some three years after the entrenched networks of Guo Boxiong and Xu Caihou had been dismantled, Xi's consolidated position by late 2015 enabled him to push ahead with major reforms of the PLA against the "overconcentrated powers" and "independent command structure" of its four former general headquarters.¹⁸ In addition to addressing the previous excesses of some PLA elites, the psychological intimidation inherent in Xi's anti-graft campaign effectively reduced their internal resistance and at the same time helped restore pride in the rank and file.¹⁹ Thereafter, continuous PLA support for Xi likely also facilitated the successful attempt by the CMC chairman to abolish the two-term limit prescribed by Deng Xiaoping for the party's top leader.²⁰

¹⁵ "The Decision on Major Issues Concerning Comprehensively Deepening Reforms in Brief," *China Daily*, November 16, 2013.

¹⁶ Cheng Li, "Promoting 'Young Guards': The Recent High Turnover in the PLA Leadership (Part 1: Purges and Reshuffles)," *China Leadership Monitor*, Fall 2015, available at <https://www.brookings.edu/articles/promoting-young-guards-the-recent-high-turnover-in-the-pla-leadership-part-1-purges-and-reshuffles>.

¹⁷ You Ji, "Unravelling the Myths About Political Commissars," in *Civil-Military Relations in Today's China: Swimming in a New Sea*, ed. David M. Finkelstein and Kristen Gunness (Armonk: M.E. Sharpe, 2007), 156.

¹⁸ Other than criticizing the four headquarters, a *PLA Daily* commentary also described the former seven military regions as "fiefdoms." See "重塑我军领导指挥体制是强军兴军的必然选择" [Reshaping Our Command and Control Structure Is an Inevitable Choice to Have a Strong and Powerful Military], *PLA Daily*, November 30, 2015.

¹⁹ James Char, "Reclaiming the Party's Control of the Gun: Bringing Civilian Authority Back in China's Civil-Military Relations," *Journal of Strategic Studies* 39, no. 5–6 (2016): 608–36.

²⁰ Laura Zhou, "China's Military Throws Weight Behind Controversial Move to Scrap Term Limits," *South China Morning Post*, February 27, 2018, <https://www.scmp.com/news/china/policies-politics/article/2134939/chinas-military-throws-weight-behind-controversial-move>; and Chris Buckley and Keith Bradsher, "China Moves to Let Xi Stay in Power by Abolishing Term Limit," *New York Times*, February 25, 2018, <https://www.nytimes.com/2018/02/25/world/asia/china-xi-jinping.html>.

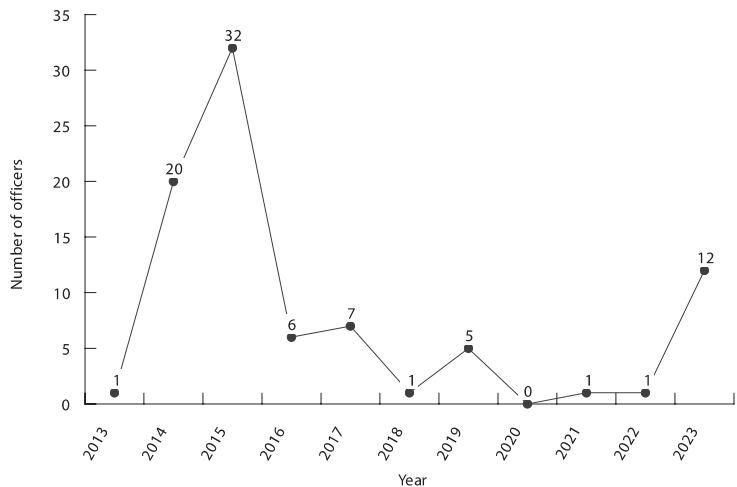
The Backgrounds and Affiliations of Purged Senior Officers (2013–23)

The number of senior PLA officers confirmed to have been caught up in Xi Jinping's anti-graft campaign has been uneven across his decade-plus-long tenure as CMC chairman (see **Figure 1**). Following the 66 confirmed by state media and CCP-affiliated mouthpieces in his first term as China's top leader (November 2012–October 2017), only 7 would emerge during Xi's second term (October 2017–October 2022). Less than two years into his third five-year term, 12 PLA officers and 3 civilian executives from China's state-owned defense enterprises were dismissed from their roles in the country's top legislature in December 2023. Then in June 2024, the extraordinary news broke that China's last two former defense ministers had been indicted on corruption charges.²¹ Overall, from 2013 to 2023, official reportage suggests that the opportunities for graft appear to be greatest in those sectors of the Chinese military that handle vast sums of money (i.e., armaments and logistics) and personnel appointments (i.e., political work) (see **Figures 2 and 3**). Given the large number of logisticians who were implicated in the first iteration of the campaign, it remains a puzzle as to why no senior logistician or PLA officer at the grade of corps deputy leader and above from the CMC Logistics Support Department was charged from 2017 until September 2025—when the CMC LSD director, Lieutenant General Zhang Lin, was dismissed from the National People's Congress.

Significantly for the PLA, it is opportune that the anti-graft tumult within its high command has proceeded in the absence of military crises in the Indo-Pacific. Despite the inclusion of two CMC member grade leaders (i.e., Wei Fenghe and Li Shangfu) and no less than four theater command grade officers (i.e., Ding Laihang, Zhou Yaning, Li Yuchao, and Liu Yazhou) in the list of purged personnel in 2023 and 2024, none of the dozen or so PLA and People's Armed Police (PAP) leaders indicted so far are first-line operational leaders. (For a list of some of the PLA officers who have been investigated for graft since the 18th Party Congress, see the **Appendix**.)

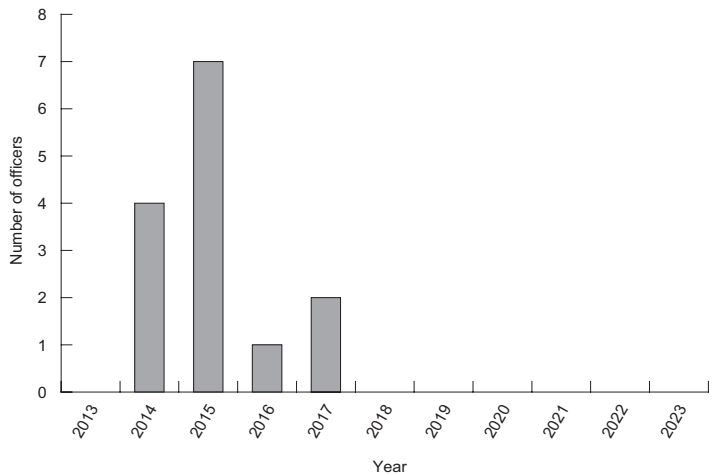
²¹ Jiang Chenglong, "Two Former Defense Ministers Expelled from CPC," *China Daily*, June 28, 2024, <https://www.chinadaily.com.cn/a/202406/28/WS667df2efa31095c51c50b3c3.html>. While Wei Fenghe and Li Shangfu have been handed over to the PLA procuratorate, the absence of the rule of law in the PRC (as the term is more commonly understood in mature democracies with a longer history of judicial reform) means that they are likely to be found guilty.

FIGURE 1 PLA and PAP officers indicted (corps deputy leader and above)



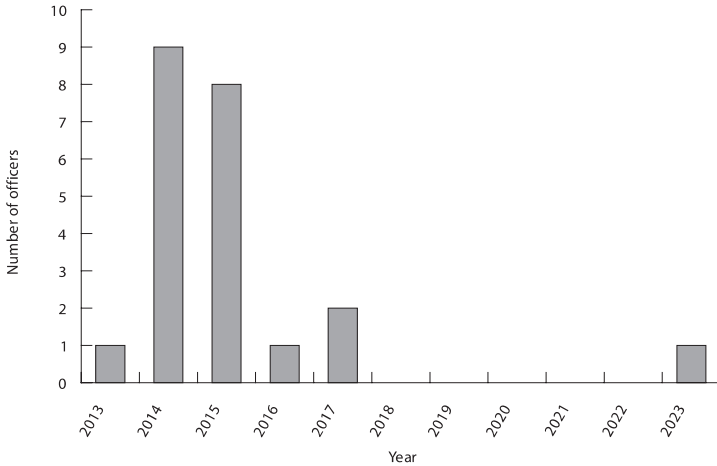
SOURCE: Data compiled by the author.

FIGURE 2 PLA and PAP officers indicted (logistics)



SOURCE: Data compiled by the author.

FIGURE 3 PLA and PAP officers indicted (political)



SOURCE: Data compiled by the author.

Xi Jinping's First Term (2012–17)

In accordance with the majority of misdemeanors committed by so-called PLA “tigers” purged in Xi Jinping’s first five-year term (i.e., between November 2012 and October 2017), a large proportion of the known 66 officers at the grade of corps deputy leader and above hailed from the political and logistics departments—which state media would later refer to as “the worst-hit areas” (重灾区). Of those logisticians officially named, most were charged with misappropriating funds or had been implicated in unauthorized and illegal commercial activities. On the other hand, political commissars and senior personnel affiliated with the now-defunct General Political Department were to a large extent guilty of accepting bribes in their selection and promotion of officers. A number of these political commissars and logisticians were also directly associated with Guo Boxiong and Xu Caihou. By the end of Xi’s first term, two standing CMC members, the former chiefs of the reformed CMC Joint Staff Department and CMC

Political Work Department, would also be implicated through their close association with the two disgraced former CMC vice-chairmen.²²

Given the potentially sensitive nature of any country's defense industry and its weapon systems, a lack of transparency about cases is understandable. Nevertheless, although China's defense research, development, and acquisition system had long been identified by the PLA high command as one of a number of high-risk areas for corruption,²³ the former major general Li Mingquan—then director of the General Equipment Support Department under the General Armaments Department, since renamed the CMC Equipment Development Department²⁴—was the only senior officer known to have been caught in the dragnet.²⁵ In view of the number of cases against Chinese military technocrats that would be uncovered by the second half of 2023, the anticorruption campaign initiated under Xi's watch was clearly anything but foolproof. Indeed, there may be some truth to the Chinese axiom that “there is no official who is not corrupt” (无官不贪). In other words, graft will be uncovered wherever investigators decide to look.

In a nutshell, Xi's efforts during his first term at curbing PLA autonomy are encapsulated in his use of a combination of psychological intimidation (through his anticorruption drive) and institutional mechanisms (through reforms). In addition to adjusting the administrative grades of the former general headquarters and placing them directly under the CMC, the former General Political Department and General Logistics Department were relieved of their respective discipline inspection and auditing powers. At the operational level, the former seven military regions have since 2015 been revamped into five regional theater commands. Their respective commanders or political commissars were intermittently rotated to prevent them from colluding or establishing deep-rooted networks. Such geographic rotations extend downward to the theater command army level and group

²² “房峰辉与张阳曾共事3年同一天各自家中被查” [Fang Fenghui and Zhang Yang Worked Together for Three Years; Were Investigated Respectively on the Same Day], *Global People Magazine*, January 15, 2018.

²³ Tai Ming Cheung, “Innovation in China's Defense Technology Base: Foreign Technology and Military Capabilities,” in *Reshaping the Chinese Military: The PLA's Roles and Missions in the Xi Jinping Era*, ed. Richard A. Bitzinger and James Char (Abingdon: Routledge, 2018), 161–92.

²⁴ The CMC EDD mainly carries out the functions of planning for the development of military equipment, research and development, testing and appraisal, procurement management, and information system construction, among other responsibilities. The department is tasked with building an institutional structure with centralized management under the CMC EDD, specific management of the respective PLA services, and the joint application of equipment across the five theater commands.

²⁵ Apparently, Li Mingquan had helped a private enterprise obtain military orders in exchange for 1.4 million renminbi. Yang Yi, “Causes and Solutions: Corruption in Chinese Military Enterprises,” *Journal of Humanities, Arts and Social Science* 5, no. 1 (2021): 69–80.

army level.²⁶ Other measures from that period included the use of CCP-approved mass media (e.g., the *Paper* and Caixin) to expose corrupt officers and set up platforms for the public to report on violations.²⁷ Overall, the changes have increased the authority of Xi's CMC office at the expense of senior officers, whose opportunities to rise to the highest levels of command have also been restricted by the reforms.²⁸

In the wake of the 2023 purges of China's military-industrial complex and with the benefit of hindsight, three other major generals in addition to Li Mingquan either oversaw the technical aspects of the PLA and the PAP in such areas as engineering and armaments or were associated with the Rocket Force and the newly defunct PLA Strategic Support Force: Chen Qiang (Base 56/Unit 96351), Miao Guirong (chief engineer, PAP Traffic Command), and Shen Tao (president, PAP Engineering University).²⁹ In that same period, civilian executives from China's defense industry, such as the leaders of the Aviation Industry Corp of China and the Anhui Military Industry Group Holding, were also arrested for corruption.³⁰ On the important matter of combat power, front-line operational leaders indicted in Xi's first five-year term were limited to Lieutenant General Yang Jinshan (deputy commander, former Chengdu Military Region) and Major General Zhang Ming (chief of staff, former Jinan Military Region)—suggesting that military corruption might be a secondary consideration after operational readiness.³¹ This could also underscore the reality that senior Chinese officers in command or staff positions are expected to be less exposed to opportunities for taking bribes than their colleagues in vocations that handle vast amounts of defense funding or manage construction projects.³²

²⁶ Dennis J. Blasko, "The PLA Army after 'Below the Neck' Reforms: Contributing to China's Joint Warfighting, Deterrence and MOOTW Posture," *Journal of Strategic Studies* 44, no. 2 (2021): 149–83.

²⁷ "Chinese Military Opens Channels for Reporting Disciplinary Violations," China Military Online, February 16, 2016.

²⁸ By the time of the 19th Party Congress, Xi had reduced the CMC membership by four when the PLA's four service chiefs were denied from joining the top decision-making body.

²⁹ On April 19, 2024, the former PLA Strategic Support Force was restructured and broken up into the following branches of the Chinese military: Information Support Force, Aerospace Force, and Cyberspace Force. See "Defense Ministry Spokesperson's Remarks on Recent Media Queries Concerning the PLA Information Support Force," Ministry of National Defense (PRC), April 22, 2024, http://eng.mod.gov.cn/xb/News_213114/NewsRelease/16302635.html.

³⁰ An Baijie, "Oversight of Military Firms on Rise," *China Daily* (U.S. edition), June 5, 2014, http://usa.chinadaily.com.cn/epaper/2014-06/05/content_17565578.htm.

³¹ Dennis J. Blasko, "Corruption in China's Military: One of Many Problems," War on the Rocks, February 16, 2015, <https://warontherocks.com/2015/02/corruption-in-chinas-military-one-of-many-problems>.

³² Author's interviews, 2023.

Xi Jinping's Second Term (2017–22)

Externally, there are neither effective countervailing checks and balances nor a free media in China to scrutinize the CCP and its praetorian guard. As a mostly insular institution, the PLA cannot be penetrated by the civilian CDIC. Instead, the onus for oversight falls on the armed wing's own mechanism: the CMC Discipline and Inspection Commission (CMC DIC) and its roving teams of discipline inspectors whose responsibilities mirror those of the party's powerful civilian CDIC.³³ Whereas the CMC DIC's previous status as a subordinate entity under the General Political Department meant that it was controlled by the very same personnel whom it was meant to supervise, the administrative grade of the CMC DIC was swiftly promoted to that of CMC member grade after the 19th Party Congress. Since then, the PLA's top discipline inspection function has been overseen by a PLA Rocket Force officer, General Zhang Shengmin.

Perhaps due initially to the political expediency to propagandize the supreme leader's "successes" in cleaning up the PLA and later the more pressing national concern of dealing with the Covid-19 pandemic, only half a dozen officers at the grade of corps deputy leader and above were reported between October 2017 and October 2022. In chronological order of their public denouncement, the six personnel are Rao Kaixun (deputy commander and chief of staff, PLA Strategic Support Force), Qian Weiping (deputy director, CMC EDD), Xu Xianghua (deputy commander, Western Theater Command Army), Ye Qing (political commissar, Hainan Military District), Meng Zhongkang (political commissar, Jiangsu Military District), and Song Xue (deputy chief of staff, PLA Navy). Of the aforementioned, two—Qian Weiping and Rao Kaixun—can be considered as holding a technical appointment at the time of their indictments. Qian's expertise in space tracking, telemetry, and command and his personal involvement in China's manned space programs as an engineer from Shenzhou 1 to 9, as well as Chang'e 1 and Chang'e 2, are particularly noteworthy.³⁴ The latter projects also directly associate him with the former defense minister, Li Shangfu, who is another deposed senior PLA leader with expertise in space

³³ Zhao Lei, "Inspection Teams to Cover all of Military," *China Daily*, May 6, 2016. As part of Xi's anti-graft program, the CDIC and the CMC DIC have also jointly held meetings.

³⁴ "中央军委高层再有一人履新" [Another New Member of the Central Military Commission Takes Office], *Beijing Youth Daily*, April 4, 2019, <https://news.sina.com.cn/c/2019-04-04/doc-ihvhiewr3021233.shtml>.

programs.³⁵ Where operational readiness is concerned, only one out of the six indicted officers was holding command authority in a theater: Major General Xu Xianghua, formerly of the 74th Group Army.

Xi Jinping's Third Term (2022–June 2023)

Even as Xi Jinping's anticorruption drive and defense reforms since the 18th Congress have been described by state media as having had "a gradual impact" (阶段性成效) in curbing egregious malfeasance, corruption in the PLA remains endemic—as evinced by the latter purges of personnel managing high-value assets.³⁶ Following the lull in the campaign from Xi's second term until the latter half of 2023,³⁷ the sudden announcement on the WeChat account of the CMC EDD on July 26 inviting the public to report procurement violations (dating back to October 2017) soon set off a chain of events as China's then defense minister quickly disappeared from public view. Violations highlighted in the announcement included "the lack of integrity and supervision," "formation of cliques," and the "leaking of secrets."³⁸ By late 2023, an extensive list of senior officers suspected of graft was released. Indeed, from October to December of that year, two major generals, five lieutenant generals, and five generals were dismissed from their official posts in China's politico-military system. While Li Shangfu's removal in October 2023 as defense minister and state councilor was the highest-profile dismissal, nine other senior officers were dismissed from the National People's Congress and stripped of their parliamentary (and legal) privileges. Likewise, another senior officer lost his membership in the provincial-level Beijing Municipal People's Congress. Including the former defense minister, six of the dismissed officers were affiliated with the CMC EDD. Most strikingly, the majority of the twelve share a technocratic background, in either the artillery corps or the armaments sector.

As Xi eviscerated the entire PLA Rocket Force leadership in July 2023 (see **Figure 4**), he also made the unusual move of replacing the former generals Li Yuchao and Xu Zhongbo in their respective posts as commander

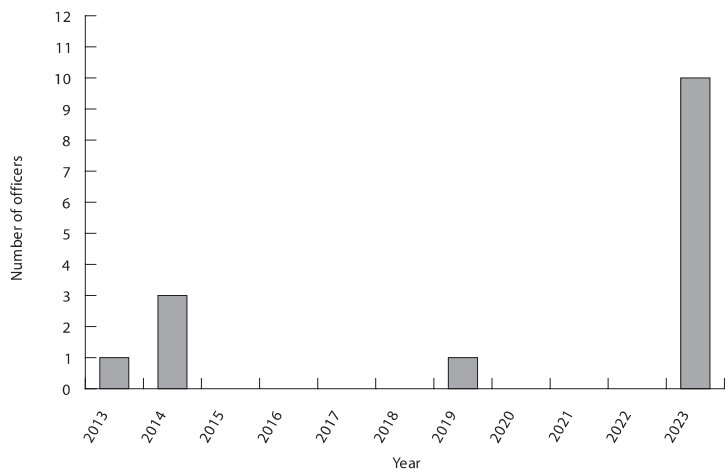
³⁵ Li Shangfu led the Xichang Satellite Launch Center and Jiuquan Satellite Launch Center and also became deputy commander of the now-defunct PLA Strategic Support Force before his appointment as director of the CMC EDD in September 2017.

³⁶ "China's Defense Purge Strikes at Heart of Xi's Military Reforms."

³⁷ A senior PAP officer, Major General Zhang Fusheng (deputy director of the Fire Department, Ministry of Emergency Management), is the only casualty during this period.

³⁸ "中国军方查军备采购弊案追溯至6年前" [The Chinese Military's Investigation of Arms Procurement Fraud Dates Back to 6 Years Ago], Deutsche Welle, July 28, 2023, <https://www.dw.com/zh/中国军方查军备采购弊案-追溯至6年前/a-66375543>.

FIGURE 4 PLA and PAP officers indicted (CMC EDD/Rocket Force)



SOURCE: Data compiled by the author.

and political commissar with officers with no artillery background. This decision perhaps suggests his lack of trust in the Rocket Force’s highest echelons.³⁹ Indicative of the rot that had set in, a number of previous top artillery officers became implicated.⁴⁰ These included Li Yuchao’s immediate predecessor as commander, General Zhou Yaning; the former deputy commander, Lieutenant General Li Chuanguang; and another former deputy commander, Lieutenant General Zhang Zhenzhong. One other former deputy commander, Lieutenant General Wu Guohua, had died earlier in 2023 under mysterious circumstances.⁴¹ Highlighting the overlapping

³⁹ Xu Zhongbo’s case is pending confirmation by China’s state media. While there had been speculation that Li Yuchao’s dismissal was apparently due to an intelligence leak based on a detailed publication on the PLA Rocket Force prepared by BluePath Labs for the China Aerospace Studies Institute in 2022, such a conjecture is implausible.

⁴⁰ William Zheng, “Former Chinese Defence Minister Wei Fenghe Emerges after Months of Speculation,” *South China Morning Post*, May 8, 2024, <https://www.scmp.com/news/china/politics/article/3261826/former-chinese-defence-minister-wei-fenghe-emerges-after-months-speculation>. Rumors that the anti-graft campaign had caught up with Wei were confirmed in June 2024.

⁴¹ James Char, “Commentary: What’s Going On with China’s Surprise Military Shake-up?” CNA, September 14, 2023. Yet another former deputy PLA Rocket Force commander, Lieutenant General Liu Guangbin, is rumored to have been under investigation by the CMC DIC since July 2023, although China’s state media has yet to confirm such a possibility. See “港媒:中国火箭军司令、副司令和前副司令接受反腐败调查” [Hong Kong Media: China’s Rocket Force Commander, Deputy Commander and Former Deputy Commander under Anticorruption Investigation], *Lianhe Zaobao*, July 28, 2023, <https://www.zaobao.com.sg/news/china/story20230728-1418465>.

functions between the PLA's rocket and space programs, Zhang Zhenzhong and a former CMC EDD deputy director, Lieutenant General Zhang Yulin, hail from the same Jiuquan Satellite Launch Center that Li Shangfu had helmed earlier in his career.

At the same time, three high-profile civilian executives from the China Aerospace Science and Technology Corporation (CASC) and China North Industries Group Corporation (NORINCO) were swept up in the same cleanup: Wu Yansheng, Liu Shiquan, and Wang Changqing.⁴² Together, these technocratic elites and the other recently purged PLA leaders are part of an important system in China's party-state: the Chinese Academy of Sciences, which is the highest-level consultancy for science and technology in the PRC. Li Shangfu and others in this group had indeed contributed to the country's military modernization earlier in their careers, but it is hard to tell whether they also used those positions to make illicit personal gains. Additionally, the downfall of two well-known generals was confirmed in that same period. The first is the former PLA Air Force commander, General Ding Laihang, who is rumored to have accepted bribes in relation to construction work at the Beijing Xijiao Airport managed by the 34th Air Division.⁴³ The second concerns another former PLA Air Force general, Liu Yazhou, whose last post was as political commissar of the PLA National Defense University. A "princeling" by virtue of his marriage to the scion of a former PRC president, Liu had been dogged by serious graft and extramarital allegations,⁴⁴ prior to news of his suspended death sentence (with a two-year reprieve).⁴⁵

Another critical component of the PLA responsible for the conduct of informationized warfare has not been spared either. The former commander of the now-defunct PLA Strategic Support Force, General Ju Qiansheng, is believed to have been disciplined when he disappeared for some months in 2023 (including from the annual banquet on August 1 to commemorate the PLA's founding). Rather unexpectedly, General Ju resurfaced in Guizhou Province in January 2024 before losing his post altogether some three months later when the PLA Strategic Support Force underwent restructuring.

⁴² "China's Defense Purge Strikes at Heart of Xi's Military Reforms."

⁴³ "中国军中反腐延扩空军传有习家军也落马" [China's Military Anticorruption Campaign Extends to the Air Force—Rumored Xi's Associates Also Fell], RFI, November 9, 2023, <https://www.rfi.fr/cn/中国/20231109-中国军中反腐延扩空军-传有习家军也落马>.

⁴⁴ "解放军上将刘亚洲疑因白灵及贪腐遭免职" [General Liu Yazhou Is Suspected to Have Been Removed from Office Due to Bai Ling and Corruption], RFI, January 26, 2017, <https://www.rfi.fr/cn/中国/20170126-解放军上将刘亚洲疑因白灵及贪腐遭免职>.

⁴⁵ "劉亞洲上將落馬移交司法" [General Liu Yazhou Was Arrested and Handed Over to the Judiciary], *Sing Tao Daily*, April 13, 2023, <https://web.archive.org/web/20230417011036/https://www.stheadline.com/article/3220005/劉亞洲上將落馬移交司法>.

Whether this was a consequence of the Chinese spy balloon incident in early 2023 remains unclear. According to U.S. intelligence, Xi purportedly berated senior PLA generals for failing to inform him promptly after the near-space instrument had drifted toward the U.S. mainland, derailing scheduled talks with the then U.S. secretary of state.⁴⁶ As the most senior officer responsible for PLA technical reconnaissance, Ju's previous role probably accounts for his downfall.

As evidence of the entrenched nature of irregularities in military procurement and acquisitions in China, discipline investigators have targeted research and development further down the Chinese Academy of Sciences ecosystem. Following the ousting of the civilian executives from CASC and NORINCO in December 2023, further moves have since been made against personnel overseeing the PLA's space and rocket programs. In January 2024, Wang Xiaojun, the former dean and party secretary of the China Academy of Launch Vehicle Technology overseeing the Long March 7 family of rockets, was removed from the Chinese People's Political Consultative Conference.⁴⁷ A more recent dismissal occurred in October 2024 when the same advisory body dismissed another prominent rocket scientist, Xiao Longxu. Xiao, who previously headed the Chinese Academy of Engineering and conducted research at the Rocket Force Research Institute, also served in the science and technology committee directly under the CMC EDD.⁴⁸ In view of the multi-level and cross-sector lapses in the PLA's procurement and acquisitions, it is no coincidence that the CCP passed a plan at its Third Plenum in July 2024 calling for deeper reforms to strengthen Xi's and the party's oversight of its armed wing.⁴⁹ In addition to urging faster development of equipment and other emerging technologies that constitute the PLA's strategic deterrence capabilities, the

⁴⁶ Julian E. Barnes and Edward Wong, "In Risky Hunt for Secrets, U.S. and China Expand Global Spy Operations," *New York Times*, September 17, 2023, <https://www.nytimes.com/2023/09/17/us/politics/us-china-global-spy-operations.html>.

⁴⁷ Jack Lau, "China to Expel Prominent Scientist Wang Xiaojun from Top Body as Corruption Probe Keeps Sights on PLA Rocket Force," *South China Morning Post*, January 30, 2024, <https://www.scmp.com/news/china/military/article/3250256/china-expel-prominent-rocket-scientist-top-body-corruption-probe-keeps-sights-defence-aerospace>. The China Manned Space Agency operates under the auspices of the CMC EDD.

⁴⁸ Amber Wang, "PLA Rocket Force Scientist Stripped of Political Advisory Post amid China's Corruption Crackdown," *South China Morning Post*, October 12, 2024, <https://www.scmp.com/news/china/military/article/3282122/pla-rocket-force-scientist-stripped-political-advisory-post-amid-chinas-corruption-crackdown>.

⁴⁹ "中共中央关于进一步全面深化改革推进中国式现代化的决定" [Decision of the CCP Central Committee on Further Deepening Reform in an All-Round Way and Promoting Chinese-Style Modernization], CCTV, July 21, 2024, https://content-static.cctvnews.cctv.com/snow-book/index.html?item_id=6299129959378427466&toc_style_id=feeds_default&track_id=77F012F5-6112-4BA8-B361-AFE0B79D38A4_743243843587.

decision by the Central Committee called for better integration between the armed forces and Chinese defense companies.⁵⁰

Cases in PLA Procurement and Acquisitions: Causes, Outcomes, and Countermeasures

Similar to how graft afflicts China's civilian officialdom, individual and institutional causes likewise drive military corruption. As a common maxim in the PRC ("the Politburo runs political affairs; the CMC runs military affairs") asserts, the onus of imposing institutional and personal authority on the PLA falls squarely on the shoulders of the CMC chairman.⁵¹ In reality, daily operations in each unit are governed by another mechanism peculiar to the Chinese military system: the "chief responsibility system" (首长负责制). The arbitrariness of this system is epitomized by the aforementioned announcement on the CMC EDD WeChat account in July 2023 seeking public input regarding procurement violations dating back only to October 2017. This had the effect of implicating General Li Shangfu but conveniently disregarding the activities of his predecessor, who happens to be Xi Jinping's long-time associate and adviser in the Chinese military.⁵² Put together, this lack of civilian oversight and the weakness of human nature mean that reports of graft will continue to emerge in the PLA from time to time. Even when the relevant personnel try to steer clear, entrepreneurs might try to tempt them to do otherwise by buying relationships with either senior officers or lower-ranking service members.⁵³ Moreover, those companies that are less well-networked may grease their palms to build the necessary working relationships to secure business contracts.⁵⁴

The recent spate of cases inculcating Chinese defense executives and senior PLA leaders affiliated with the Rocket Force and CMC EDD highlight a network of corruption in China's weapons procurement system.

⁵⁰ Josh Xiao, "China Wants Better Arms Procurement System to Meet Security Aims," Bloomberg, July 21, 2024.

⁵¹ You Ji, "Fragmented Party Control of the Gun: Civil-Military Relations in China," in *Chinese Politics as Fragmented Authoritarianism*, ed. Kjeld Erik Brødsgaard (Abingdon: Routledge, 2016), 204–22.

⁵² "关于征集全军装备采购招标评审专家违规违纪线索的公告" [Announcement on Collecting Clues of Violations of Laws and Disciplines by Military Equipment Procurement Bidding Review Experts], Sohu, July 27, 2023, https://www.sohu.com/a/706743469_121478296. The CMC executive vice-chairman, General Zhang Youxia, was director of the former General Armaments Department from November 2012 to October 2017.

⁵³ Author's interviews, 2024.

⁵⁴ Ibid.

According to some seasoned China watchers, what had likely begun as an investigation into individual misdemeanors probably uncovered additional “interconnected cases” (窝案)—especially since the CMC EDD shares a long history of working alongside the country’s military-industrial complex.⁵⁵ To be sure, what connects these entities also has to do with the nearly “unbroken run of double-digit real annual growth” in defense spending in the post-Deng Xiaoping era in underwriting the PRC’s aggressive upgrades of its military hardware.⁵⁶ With the regime investing vast resources in defense R&D and acquisitions and procurement, the power concentrated in the hands of a few decision-makers among Chinese technocratic elites provided a fertile ground for corruption. Supported by those investments and as part of the current CMC chairman’s penchant for “military struggle,” the PLA over the past decade has made significant strides in improving its equipment.⁵⁷ Where the PLA Rocket Force is concerned, for example, it significantly increased its organizational strength amid the 2016 reforms, even as the PLA Army was being downsized.⁵⁸

In addition to the absence of an impartial politico-legal structure at the macro level, the market-oriented procurement of military equipment in China remains immature, given that the supporting reform measures are incomplete. Based on audits examined by researchers from the CMC Audit Office and the PLA Naval University of Engineering in the years prior to the Covid-19 outbreak, the procedures for equipment acquisition suffer from two key problems. The first is bid-rigging among potential contractors who consult with one another beforehand to artificially inflate or lower bidding prices to restrict competition. The second problem is collusion between merchants and PLA personnel (or the tendering

⁵⁵ Yu Zeyuan, “[Big Read] Long Journey to Purging Military Corruption in China,” trans. Bai Kelei, ThinkChina, July 24, 2024, <https://www.thinkchina.sg/politics/big-read-long-journey-purging-military-corruption-china>.

⁵⁶ Richard A. Bitzinger, “Reforming China’s Defense Industry,” in Bitzinger and Char, *Reshaping the Chinese Military*, 193–222. On the back of annual double-digit increases of 16.2% per annum from 1999 to 2008, China’s national defense budget grew by 600% between 1997 and 2020. See also Richard A. Bitzinger and James Char, “The Price of Power,” *National Interest*, November/December 2021, 63–68.

⁵⁷ Coincidentally, “equipment expense” has apparently taken the lion’s share of China’s annual defense expenditure since Xi’s time in charge. See State Council Information Office (PRC), *China’s National Defense in the New Era*.

⁵⁸ Matthew Bruzzese, “Organization and Structural Reforms of the PLA Rocket Force,” in *Modernising the People’s Liberation Army: Aspiring to Be a Global Military Power*, ed. James Char (Abingdon: Routledge, 2024), 121–59.

agencies) to exclude other bids.⁵⁹ On the demand side, these loopholes arise due to deficiencies in the PLA's enterprise management systems that a few individuals exploit to give their preferred bidders an advantage. On the supply side, overcapacity in China's manufacturing industry and excessive competition among defense companies to secure major long-term projects to create economies of scale and boost profits have also driven some to win bids illegally.⁶⁰

At the individual level, the production of military hardware and weapon systems by its very nature demands high technical thresholds, meaning there is a limited number of qualified manufacturers. Due to frequent collaborations between those businesses and their government clientele, favoritism and nepotism have also seeped into the system.⁶¹ Indeed, even on those occasions when the relevant PLA departments overseeing the tendering process practice due diligence, such work at times has been hampered by administrative interference from those higher up in the system. Other issues have emerged after the signing of contracts when opportunistic contractors either neglect to deliver goods on time or fail to meet the agreed-on quantitative and qualitative standards. In addition to abetting such corrupt practices, these incidences of bid-rigging and collusion result in honest, high-quality enterprises losing their market share and competitiveness over time. The utilization of the annual equipment funding is also reduced because the PLA has to pay more for equipment of average or substandard quality. In one such audit, for instance, a unit's procurement of communications equipment from the winning bidder was discovered to be 2 million renminbi above the actual cost.⁶² While the losses from these issues are mostly monetary in peacetime, the consequences on the battlefield could be deadly.

Nevertheless, the continued existence of corruption in China's military system does not mean the problem is not being addressed. While regulations governing the bidding for military contracts and their fulfillment already exist,⁶³ new measures have since been promulgated to oversee the actions of bidders. In February 2021, for example, the CMC EDD passed new management measures on a trial basis to improve the quality assurance

⁵⁹ Duan Hang, Huang Wei, and Wang Wei-dong, "Analysis and Countermeasures of Surround-Bidding and Forging Bid in Equipment Acquisition," *Journal of Naval University of Engineering* 15, no. 1 (2018): 77–80.

⁶⁰ Ibid.

⁶¹ Ibid.

⁶² Ibid.

⁶³ See, for instance, "军队采购网" [Military Procurement Network], <https://www.plap.mil.cn>.

of its procurement and acquisitions processes. The measures target the market to sieve out those companies that are unable to strictly meet their contractual obligations, fulfill their confidentiality provisions, and meet the PLA's quality and safety standards.⁶⁴ As well as reviewing the background of companies to ascertain their industrial capacity and verifying the quality of their work in similar previous projects, the authorities can now impose penalties ranging from prohibiting recalcitrant merchants for a period of one, two, or three years to banning them for life.⁶⁵ As a notice issued by the now-defunct PLA Strategic Support Force Staff Headquarters Combat Service Planning Bureau in 2023 demonstrates, such countermeasures apply not only to those companies found guilty of illegal procurement activities but also to those commercial entities associated with them, their legal representatives and project agents.⁶⁶ Regarding potential interference from within the PLA during the bidding process, review experts deemed unprincipled have also been publicly identified and punished with penalties ranging from written warnings across the PLA Strategic Support Force or the entire PLA to outright bans against participation in procurement activities for either one or two years.⁶⁷ As part of a whole-of-government approach to improve the efficiency and competitiveness of the bidding and tendering market, the PRC State Council issued a new set of authoritative guidelines in May 2024.⁶⁸ Yet, it remains to be seen how effective these turn out to be; one need only look at earlier endeavors by the PLA to codify its people's behavior and set rules to know they did not always lead to the desired outcomes.

⁶⁴ “装备市场准入制度改革” [Reform of the Equipment Market Access System], PLA-Wide Weapons and Equipment Procurement Information Network, June 19, 2021, <https://www.capumit.org.cn/newsDetail.html?id=15&contentId=1601>.

⁶⁵ “违规参与军队采购的供应商和评审专家名单曝光” [List of Suppliers and Evaluation Experts Involved in Military Procurement Violations Exposed], China Government Procurement News Network, July 10, 2023, <http://www.cgpnews.cn/articles/64250>.

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ “国务院办公厅关于创新完善体制机制推动招标投标市场规范健康发展的意见” [State Council General Office Opinions on Innovation and Improvement of Institutional Mechanisms Opinions on Promoting the Standardized and Healthy Development of the Bidding Market], China Government Network, May 2, 2024, https://www.gov.cn/zhengce/content/202405/content_6949845.htm.

Conclusion: The Politics of PLA Anticorruption and the Impact on Chinese Military Power

The Limits and Limitations of a State-Sanctioned, Personality-Driven Anticorruption Drive

Despite the success of the anticorruption drive in removing powerful PLA leaders and modifying the behavior of ordinary soldiers in their day-to-day entertainment expenses since the 18th Party Congress, the fact that Xi Jinping has had to continue cleaning house more than a decade later has raised questions about the success of the program as a whole. Indeed, the cases regarding Wei Fenghe and Li Shangfu—who are both alleged to have willfully resisted internal investigations by the CMC DIC⁶⁹—evoke memories of that earlier phase of Xi's fight against graft after the PLA's former top soldiers had the temerity to obstruct the legitimate command of his immediate predecessor to tackle corruption. In view of the PLA's class-leading levels of graft with the indictments of an unprecedented number of standing members of the CMC and its retired vice-chairmen during Xi's time at the helm, the periodic cleanups can be regarded as a symptom of centralized one-party rule. Until the CCP is willing to contemplate a legal and judicial system no longer sanctioned by itself, such personnel purges are likely to continue.

One of the primary limitations of a state-sanctioned system is the personality-driven nature of the efforts. There is no way for the party mouthpieces to evaluate the campaign other than to call it a success, given that Xi has staked his legacy on it. Nonetheless, the record so far demonstrates that the ability to vet and control appointments is no substitute for overseeing how those appointees conduct themselves. While most of the current senior PLA leadership at the corps leader grade and above were appointed by the CMC chairman himself, the dismissals of Li and Wei and the purging of the PLA Rocket Force leadership underscore that there is only so much Xi can do in terms of exercising oversight of PLA elites. However regularly these senior officers profess their loyalty to him and their party, such utterances are little more than acts of self-preservation.⁷⁰ Although Xi has accorded the Chinese military pride of place in the party-state and

⁶⁹ See “CPC Expels Former Chinese Defense Wei Fenghe,” Xinhua, June 27, 2024, <https://english.news.cn/20240627/86b7cc05900344aca1bbaa654bec6ca2/c.html>; and “CPC Expels Former Chinese Defense Li Shangfu,” Xinhua, June 27, 2024, <https://english.news.cn/20240627/ed54cc4029c44a8e9a163d47fb8c77cd/c.html>.

⁷⁰ Joel Wuthnow and Phillip C. Saunders, “More Red but Still Expert: Party-Army Relations Under Xi Jinping,” *Journal of Contemporary China* (2024), <https://doi.org/10.1080/10670564.2024.2400529>.

set it on a clear modernization trajectory, what comes of his signature domestic campaign after his eventual retirement is unclear. The prospect of a comparatively weak successor taking over from Xi and assuming leadership over the country's powerful military establishment does not bode well for the longevity of the project.

Corruption versus Reliability Concerns

A key paradox of Xi Jinping's crusade to weed out corruption and tighten political control over the party's armed wing became evident when a spy balloon floated over the contiguous United States in early 2023. If the Chinese military has been reshaped over the past decade by its commander-in-chief into a more pliant foreign policy instrument, it remains a mystery how such an incident could have taken place. Still, this chapter puts forth two established facts to dispute the assertion that the ongoing cleanups in the PLA are proof of Xi's weakened military authority. The first is that scores of senior officers have been caught in the anti-graft drive and replaced at will by the CMC chairman.⁷¹ The second is the continued absence of an heir-apparent, which shows that the incumbent still retains wide support from the party and its army to stay in power—possibly indefinitely.

Other claims about Xi's weakened authority are similarly unsubstantiated. For example, it is unlikely that the anti-graft maneuvers against some PLA elites are due to their lack of support for Xi and his policies, given how senior officers tend to “say the right things” in public.⁷² While some analysts have suggested that the recent purges of Chinese military technocrats are due to “high-tech sections of the PLA hav[ing] been exposed to ‘Western’ thinking, so [that they] are not politically trustworthy,”⁷³ such an assertion is difficult to prove. Lastly, no evidence has emerged to support claims that senior Rocket Force leaders had been deposed for disagreeing

⁷¹ Jun Mai, “Xi Jinping's Anti-corruption Drive Brings Down More Generals Than 20th Century Warfare,” *South China Morning Post*, November 17, 2017, <https://www.scmp.com/news/china/policies-politics/article/2120430/xi-jinpings-anti-corruption-drive-brings-down-more>.

⁷² Wuthnow and Saunders, “More Red but Still Expert.” Less observable is whether PLA elites are politically unreliable in private. One recent exception, Gong Fangbin, formerly of the PLA National Defense University, is believed to have been punished for criticizing the government's pro-Moscow position in Russia's war with Ukraine. See “多名中国学者因发表与官方立场不同言论遭处分” [Several Chinese Scholars Have Been Punished for Expressing Opinions That Differ from the Official Position], *Lianhe Zaobao*, October 4, 2024, <https://www.zaobao.com.sg/news/china/story20241004-4941862>.

⁷³ Wen-Hsuan Tsai, “Wave of Military Purges in PLA Unlikely to Be Over,” *ThinkChina*, February 27, 2024, <https://www.thinkchina.sg/politics/wave-military-purges-pla-unlikely-be-over>.

with their commander-in-chief's wishes to invade Taiwan.⁷⁴ In fact, one can more easily find statements that assert the contrary.⁷⁵

The Impact of Graft on Combat Capabilities

While corruption degrades the scale and quality of a country's pursuit of military modernization, assessing its degree and impact on the Chinese military outside of wartime conditions remains a challenging undertaking given the opaque nature of the PLA's inner workings. For instance, how was the PLA still able to achieve "rapid hardware modernization" despite the decade of decadence under the disgraced CMC deputies Guo Boxiong and Xu Caihou?⁷⁶ This conclusion will offer a set of rudimentary near-, medium- and long-term projections.

Regarding the impact of the recent purges on the PLA's reliability as an instrument of national power in the immediate period, the fact that the current PLA Rocket Force commander and political commissar were respectively transferred from the navy and air force means that the service will suffer temporary knock-on effects in its operational training and combat readiness for the time being. Nevertheless, it is salient that the majority of the identifiable senior officers caught in the latest campaign are not in the first line of command; in other words, the overall combat capabilities of China's military have not been significantly retarded over the near term. The Rocket Force's test of an intercontinental ballistic missile over the South Pacific on September 25, 2024,⁷⁷ coupled with Xi Jinping's visit to Base 61 (611 Brigade) in Chizhou, Anhui Province, also seeks to demonstrate that the service is on the mend and gradually recovering from its rotten core.⁷⁸

In the medium term, however, technological applications in the PLA's warfighting could be affected by the ongoing cleanups of the Chinese

⁷⁴ "China's Xi Replaces Commander of the Country's Nuclear Arsenal," Radio Free Asia, July 31, 2023, <https://www.rfa.org/english/news/china/nuclear-commander-07312023132031.html>.

⁷⁵ Yip Wai Yee, "Xi Denies 2027 Taiwan Invasion Plans, but Analysts Say Island Should Remain Vigilant," *Straits Times*, November 17, 2023, <https://www.straitstimes.com/asia/east-asia/xi-denies-2027-taiwan-invasion-plans-but-analysts-say-island-should-remain-vigilant>. Regarding the extraordinary claim by Xi, some Chinese commentators also joke that PLA leaders had convinced the CMC chairman as such to dissuade him from contemplating the risky undertaking.

⁷⁶ You Ji, "All for Winning the Next War: The Socio-Political and Technological Attributes of PLA Modernization through Continuing Force Transformation," *Issues and Studies* 60, no. 3 (2024).

⁷⁷ Greg Torode, "Beyond the Politics, China's Missile Test Reflects Military Need," Reuters, October 9, 2024, <https://www.reuters.com/world/china/beyond-politics-chinas-missile-test-reflects-military-need-2024-10-09>.

⁷⁸ During his visit to Base 61, Xi emphasized the need to "strengthen targeted training with new equipment, new skills and combat methods." "Xi Urges Strategic Missile Troops to Enhance Deterrence, Combat Capabilities," Xinhua, October 19, 2024, http://eng.chinamil.com.cn/ARMEDFORCES/RocketForce/News_209156/16346621.html.

military-industrial complex. The PRC faces intense restrictions on its procurement of high-tech equipment due to the Sino-U.S. tech rivalry, while research institutions in China now receive less funding as the post-pandemic economic malaise and the PLA anti-graft drive continue to take their toll.⁷⁹ As a result, competition for available state funds—a large part of which originates from the military—has become stiffer. Although this could mean that available resources will be better utilized, the prospect of fewer scientific breakthroughs is another potential consequence.

Over the distant horizon, the enforcement of tighter oversight of the PLA Rocket Force, the CMC EDD, and arms procurement and acquisitions can only be a positive development for Chinese military power as long as Beijing can maintain economic growth. Through the extension of disciplinary inspections deep into the country's defense ecosystem, China's military-industrial complex clearly is undergoing a fresh start. The Ministry of Science and Technology in July 2024 targeted six top researchers for their lack of academic integrity in state-funded scientific programs and banned them for up to five years.⁸⁰ One can infer from the above that the military and quasi-civilian sectors that support the PLA's growing technological edge will be more inclined to conduct their work with greater prudence going forward. The recent crackdown on China's military scientists for plagiarism and other infractions raises the possibility of the PLA's prevailing weapon systems underperforming in combat. The uncovering of fraudulent research practices and the regime's tendency to overstate its achievements perhaps also explain the continued non-emergence of the vaunted H-20 stealth bomber that has been under development since 2016.⁸¹ Likewise, it remains to be seen whether other state-of-the-art PLA equipment, such as the purportedly powerful electromagnetic catapult for China's new aircraft carriers, will in reality match up to descriptions in some media portrayals.⁸²

⁷⁹ The PLA Rocket Force in August 2024 accused Xi'an Jiaotong University, Xi'an Technological University, and Southwest Jiaotong University of colluding with competing bidders and bid tenderers. As punishment, these institutions have been banned from partaking of Rocket Force procurement processes for a period of three years. Jane Cai, "Why the U.S.-China Tech War Has Put Bugs in the Academic System Back in Beijing's Sights," *South China Morning Post*, September 17, 2024, <https://www.scmp.com/news/china/politics/article/3278195/why-us-china-tech-war-has-put-bugs-academic-system-back-beijings-sights>.

⁸⁰ Cai, "Why the U.S.-China Tech War."

⁸¹ "China Says Developing New Type of Long-Range Bomber," Reuters, September 2, 2016, <https://www.reuters.com/article/us-china-defence-idUSKCN11809E>.

⁸² Stephen Chen, "China's Electric Car Scientists Create Powerful Electromagnetic Catapult for Aircraft Carriers," *South China Morning Post*, March 25, 2024, <https://www.scmp.com/news/china/science/article/3256377/chinas-electric-car-scientists-create-powerful-electromagnetic-catapult-aircraft-carriers>.

Considering the PLA's focus on offsetting U.S. military advantages in the Indo-Pacific, the attainment of its military modernization goals may yet create an exclusionary area of primacy in China's coastal waters in the event of open conflict against the United States.⁸³ More realistically, however, as the preceding analysis on the anticorruption campaign in the PLA has underlined, Xi appears to be trading short-term instability for long-term prowess. Considering how fighting military malfeasance has extended the longevity of his regime and restored some semblance of meritocracy to the armed forces,⁸⁴ he has bought time for the PLA to improve its combat capabilities and can afford to adopt a longer-term view in confronting China's regional security challenges—his age permitting. Indeed, despite the oft-cited fact that Chinese shipbuilding capacity is now far greater than that of the United States, the prerequisite software of PLA personnel continues to lag behind.⁸⁵ In the overall analysis, it will be a while yet before the PRC feels confident or competent enough to call into question the United States' status as the incumbent world-class military power.

⁸³ Steven Lee Myers and Jason Gutierrez, "With Swarms of Ships, Beijing Tightens Its Grip on South China Sea," *New York Times*, April 3, 2021, <https://www.nytimes.com/2021/04/03/world/asia/swarms-ships-south-china-sea.html>.

⁸⁴ "国防部:新的军官制度由基于职务等级调整为基于军衔等级" [Ministry of National Defense: The New Officer System Is Adjusted from Job Rank to Military Rank], Ministry of National Defense (PRC), January 28, 2021, http://www.mod.gov.cn/jzhzt/2021-01/28/content_4878080.htm. Still, at the top echelon of the Chinese high command, senior officers from the former Nanjing Military Region and its defunct 31st Group Army appear to be favored for high positions under Xi.

⁸⁵ "一艘出海组训多舰共享受益" [One Ship Goes to Sea for Group Training, Multiple Ships Share Benefits], *PLA Daily*, December 26, 2022, http://www.81.cn/jfjbmap/content/2022-12/26/content_330630.htm.

APPENDIX PLA senior officers under graft probes since the 18th Party Congress

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
1	Zhang Gongxian	Xu Caihou	Shandong	Director, Political Department, Jinan Military Region (suspended from office in 2014)	MG	Corps leader	Army	General Political Department; 13 Group Army	2014.07.22
2	Xu Caihou	Jiang Zemin	Liaoning	Vice Chairman, CMC	G	CMC vice-chairman	Army	Shenyang; 16 Group Army	2015.01.15
3	Yang Jinshan	Xu Caihou	Henan	Deputy Commander, Chengdu Military Region	LG	MR deputy leader	Army	Chengdu	2015.01.15
4	Liu Zheng	Xu Caihou	Liaoning	Deputy Director, General Logistics Department	LG	MR deputy leader	Army	General Logistics Department	2015.01.15
5	Fan Changmi	Guo Boxiong and Tian Xiusi	Shandong	Deputy Political Commissar, Lanzhou Military Region	LG	MR deputy leader	Army	Lanzhou; 47 Group Army	2015.01.15
6	Yu Daqing	Xu Caihou	Liaoning	Deputy Political Commissar, Second Artillery Corps	LG	MR deputy leader	Artillery (Rocket Force)	General Political Department	2015.01.15
7	Fang Wenping	Xu Caihou	Beijing	Commander, Shanxi Military District	MG	Corps leader	Army	Beijing	2015.01.15
8	Ye Wanyong	Xu Caihou and Yang Jinshan	Hubei	Political Commissar, Sichuan Military District (retired in 2012)	MG	Corps leader	Army	Chengdu	2015.01.15
9	Zhang Qibin	NA	Hebei	Deputy Chief of Staff, Jinan Military Region	MG	Corps leader	Army	Jinan; North Sea Fleet	2015.01.15

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
10	Wang Minggui	NA	Henan	Political Commissar, Air Defense Command Academy	MG	Corps leader	Army	Information Engineering University; General Staff Department	2015.01.15
11	Wei Jin	Xu Caihou and Yang Jinshan	Shanxi	Deputy Political Commissar, Tibet Military District	MG	Corps deputy leader	Army	Chengdu	2015.01.15
12	Chen Qiang	NA	Hubei	Deputy Commander, Second Artillery Corps, Base 56 Unit 96351	MG	Corps deputy leader	Artillery (Rocket Force)	Beijing	2015.01.15
13	Fu Linguo	Xu Caihou and Liao Xilong	Guizhou	Deputy Chief of Staff, General Logistics Department	MG	Corps deputy leader	Army	General Logistics Department	2015.01.15
14	Dai Weimin	NA	Anhui	Vice President, Nanjing Institute of Politics	MG	Corps deputy leader	Army	General Political Department	2015.01.15
15	Gao Xiaoyan	NA	Shanxi	Deputy Political Commissar, Information Engineering University	MG	Corps deputy leader	Army	General Staff Department; 309 Hospital	2015.01.15
16	Ma Xiangdong	NA	NA	Director, Political Department, Nanjing Institute of Politics	SR COL	Corps deputy leader	Army	General Political Department	2015.01.15
17	Zhang Daixin	Xu Caihou	NA	Deputy Commander, Heilongjiang Military District	MG	Corps deputy leader	Army	Shenyang; 16 Group Army	2015.01.15

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
18	Zhang Dongshui	Xu Caihou	Shandong	Deputy Political Commissar, Second Artillery Corps	MG	MR deputy leader	Artillery (Rocket Force)	General Political Department	2015.03.03
19	Zhu Heping	Zhang Wannian	Jiangxi	Director, Joint Logistics Department, Chengdu Military Region	MG	Corps leader	Army	Chengdu; 14 Group Army; Chongqing Reserve Unit	2015.03.03
20	Yuan Shijun	NA	Hebei	Commander, Hubei Military District	MG	Corps leader	Army	Guangzhou	2015.03.03
21	Wang Aiguo	NA	Jiangsu	Director, Joint Logistics Department, Shenyang Military Region (retired in 2011)	MG	Corps leader	Army	Shenyang	2015.03.03
22	Huang Xing	NA	NA	Director, Scientific Research Guidance, Academy of Military Sciences	MG	Corps leader	Army	Central Military Commission	2015.03.03
23	Duan Tianjie	NA	Shanxi	Deputy Director, Political Department, National Defense University	MG	Corps deputy leader	Army	Central Military Commission	2015.03.03
24	Huang Xianjun	NA	Hebei	Director, Political Department, Shanxi Military District	MG	Corps deputy leader	Army	Beijing	2015.03.03
25	Lan Weijie	Gu Junshan	NA	Deputy Commander, Hubei Military District	MG	Corps deputy leader	Army	Guangzhou	2015.03.03

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
26	Liu Hongjie	Xu Caihou and Guo Boxiong	NA	Deputy Director, Management and Support Department, General Staff Department	MG	Corps deputy leader	Army	Central Military Commission	2015.03.03
27	Cheng Jie	NA	NA	Deputy Chief of Staff, PLA Navy North Sea Fleet	MG/ RADM	Corps deputy leader	Navy	Jinan	2015.03.03
28	Chen Jianfeng	NA	NA	Deputy Director, Joint Logistics Department, Guangzhou Military Region	MG	Corps deputy leader	Army	Guangzhou	2015.03.03
29	Chen Hongyan	NA	NA	Deputy Director, Political Department, Beijing Military Region, Air Force	MG	Corps deputy leader	Air Force	Beijing	2015.03.03
30	Wang Sheng	NA	NA	Director, Logistics Department, Guangzhou Military Region, Air Force	MG	Corps deputy leader	Air Force	Guangzhou	2015.03.03
31	Guo Zhenggang	Guo Boxiong	Shaanxi	Deputy Political Commissar, Zhejiang Military District	MG	Corps deputy leader	Army	Nanjing	2015.03.03
32	Cai Guangliao	NA	Guangdong	Deputy Director, Guangdong Provincial Party Committee	MG	Corps deputy leader	PAP	Guangzhou	2015.03.30
33	Zhan Jun	Guo Boxiong	Hubei	Deputy Commander, Hubei Military District	MG	Corps deputy leader	Army	Guangzhou	2015.04.26

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
34	Zhan Guoqiao	Guo Boxiong	Zhejiang	Director, Joint Logistics Department, Lanzhou Military Region	MG	Corps leader	Army	Lanzhou; General Logistics Department	2015.04.26
35	Dong Mingxiang	Guo Boxiong	Anhui	Director, Joint Logistics Department, Beijing Military Region	MG	Corps leader	Army	Beijing; General Logistics Department	2015.04.26
36	Fu Yi	Guo Boxiong	Shanxi	Commander, Zhejiang Military District (retired in 2013)	MG	Corps leader	Army	Nanjing	2015.05.29
37	Zhou Minggui	NA	Jiangsu	Political Commissar, Joint Logistics Department, Nanjing Military Region	MG	Corps leader	Army	Nanjing; General Political Department	2015.05.29
38	Kou Tie	NA	Heilongjiang	Commander, Heilongjiang Military District	MG	Corps leader	Army	Shenyang	2015.06.16
39	Liu Zhanqi	NA	Hebei	Commander, People's Armed Police Traffic Headquarters	MG	Corps leader	PAP	Lanzhou	2015.06.16
40	Deng Ruihua	Guo Boxiong	Gansu	Political Commissar, Joint Logistics Department, Lanzhou Military Region	MG	Corps leader	Army	Lanzhou	2015.07.10
41	Guo Boxiong	Jiang Zemin	Shaanxi	Vice Chairman, Central Military Commission	G	CMC vice-chairman	Army	Lanzhou; 47 Group Army	2015.07.30

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
42	Wang Xin	NA	NA	Political Commissar, People's Armed Police, Traffic Headquarters	MG	Corps leader	PAP	Beijing	2015.07.31
43	Zhang Wansong	NA	NA	Director, Joint Logistics Department, Lanzhou Military Region	MG	Corps leader	Army	Lanzhou	2015.08.18
44	Miao Guirong	NA	Gansu	Chief Engineer, People's Armed Police, Traffic Engineering Department	MG	Corps deputy leader	PAP	Beijing	2015.09.15
45	Cheng Yongli	NA	Hebei	Political Commissar, Zhejiang Fire Brigade Division	SR COL	Corps deputy leader	PAP	Hebei Provincial Public Security Fire Brigade	2015.09.18
46	Wang Yufa	NA	Henan	Deputy Political Commissar, Guangzhou Military Region, Air Force	LG	MR deputy leader	Air Force	Guangzhou	2015.09.30
47	Zhou Guotai	Zhou Linhe	Jilin	Deputy Director, Materiel and Fuel Supply, General Logistics Department	MG	Corps deputy leader	Army	General Logistics Department	2015.10.21
48	Wang Yu	NA	Hubei	Director, Armaments Department, PLA Navy South Sea Fleet (dismissed from post in September 2015)	MG/ RADM	Corps leader	Navy	Guangzhou; South Sea Fleet; Armaments/CMC EDD	2015.11.03

Appendix continued

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
49	Zhang Genheng	NA	NA	Commander, Xinjiang Border Security Unit	MG	Corps deputy leader	PAP	Lanzhou	2015.11.03
50	Yin Zhishan	NA	NA	Deputy Director, Ministry of Public Security, People's Armed Police	MG	Corps deputy leader	PAP	Beijing	2015.11.03
51	Ma Dewen	NA	Jilin	Commander, Jiangsu Provincial Fire Brigade	MG	Corps deputy leader	PAP	Nanjing	2015.11.03
52	Wu Ruizhong	NA	NA	Deputy Political Commissar, Second Artillery Corps, Engineering University	MG	Corps deputy leader	Artillery (Rocket Force)	Beijing	2015.11.13
53	Qu Mutian	NA	Hubei	Deputy Commander, People's Armed Police, Traffic Headquarters	MG	Corps deputy leader	PAP	Lanzhou	2015.11.13
54	Shen Tao	NA	Anhui	President, People's Armed Police, Engineering University	MG	Corps deputy leader	PAP	PAP 93rd Division 253rd Regiment; PAP 38th Division; PAP Beijing; PAP Henan	2015.11.26
55	Yang Hai	NA	Liaoning	Commander, People's Armed Police, Fujian Province	MG	Corps deputy leader	PAP	Nanjing	2015.11.27

Appendix continued

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
56	Dong Youxin	NA	Henan	Deputy Director, General Staff Department, Informatization Department	MG	Corps deputy leader	Army	General Staff Department; GSD Mobile Communications Engineering and Construction Office; GSD Communications Department Scientific and Technical Directorate	2015.11.27
57	Li Mingquan	NA	Hebei	Director, General Equipment, General Armaments Department	MG	Corps leader	Army	General Armaments Department / CMC EDD	2015.12.10
58	Zhu Hongda	NA	Shanghai	Director, General Logistics, PLA Air Force	MG	Corps leader	Air Force	Lanzhou	2016.03.31
59	Tian Xiushi	Guo Boxiong	Henan	Political Commissar, PLA Air Force	G	MR leader	Air Force	Lanzhou; Chengdu	2016.07.09
60	Yu Tiemin	NA	Beijing	Commander, People's Armed Police, Jiangsu Province (retired in 2015)	MG	Corps deputy leader	PAP	Nanjing	2016.07.26

Appendix continued

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
61	Zhang Ming	NA	Liaoning	Chief of Staff, Jinan Military Region	MG	MR deputy leader	Army	General Staff Department; Jinan	2016.08.31
62	Zhou Linhe	NA	Jiangsu	Director, Materiel and Fuel Supply, General Logistics Department	MG	Corps leader	Army	General Logistics Department	2016.09.03
63	Niu Zhizhong	Wang Jianping	Hebei	Deputy Commander, PAP	LG	MR deputy leader	PAP	38 Group Army; PAP Tibet; PAP Guangdong	2016.10.27
64	Wang Dong	NA	Shanxi	Chief of Staff, Tianjin Defense Mobilization	MG	Corps deputy leader	Army	Beijing	2016.12.25
65	Wang Jianping	Zhou Yongkang	Liaoning	Deputy Chief of Staff, CMC Joint Staff Department	G	MR leader	PAP	Shenyang; 40 Group Army Artillery Brigade; PAP 120th Division; PAP Tibet	2016.12.29
66	Hou Xiaogin	NA	Shanxi	Deputy Director, Political Department, People's Armed Police (disqualified from 12th CPPCC in 2017)	MG	Corps leader	PAP	PLA Xinjiang Independent 2nd Regiment; PAP Xinjiang Regiment logistics department	2017.02.23
67	Wang Xibin	Xu Caihou	Heilongjiang	President, PLA National Defense University (retired in 2013)	G	MR leader	Army	38 Group Army; 27 Group Army; Beijing	2017.02.24

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
68	Yang Shiguang	Xu Caihou	Zhejiang	Director of political work department, PLA Navy	LG/ VADM	MR deputy leader	Navy	Naval Aviation Engineering Institute; South Sea Fleet Aviation Corps; East Sea Fleet; Political Department (PLA Navy)	2017.04.05
69	Wang Jiurong	Xu Caihou	Beijing	Deputy Commander, Second Artillery Corps, (resigned from 12th NPC in 2014)	LG	MR deputy leader	Artillery (Rocket Force)	Second Artillery Corps; Base 54 (Luoyang); Base 56 Unit 96351	2017.06.27
70	Li Zhijian	NA	Henan	former Commander, People's Armed Police, Hebei Province (until June 2017)	MG	Corps deputy leader	PAP	Xinjiang Production and Construction Corps	2017.07.03
71	Liu Shengjie	NA	Shaanxi	Deputy Political Commissar and Discipline and Inspection Commission Secretary, GLD; member, CDIC	MG	MR Deputy leader	Army	General Logistics Department	2017.10.09
72	Zhang Yang	Guo Boxiong	Hebei	Member, CMC	G	CMC member	Army	Guangzhou; 63 Group Army	2017.11.28

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No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
73	Fang Fenghui	Guo Boxiong	Shaanxi	Member, CMC	G	CMC member	Army	Xinjiang; Lanzhou; Guangzhou; Beijing; 21 Group Army	2018.01.09
74	Rao Kaixun	NA	Sichuan	Deputy Commander cum Chief of Staff, PLA Strategic Support Force	LG	MR Deputy leader	Strategic Support Force	Chengdu; 13 Group Army; 14 Group Army; GSD; CMC National Defense Mobilization Department	2019.07.31
75	Qian Weiping	NA	Jiangsu	Deputy Director, CMC EDD	MG	Corps leader	Army	Beijing Institute of Tracking and Communications Technology; CMC EDD Information System Bureau; Mission Control System for Manned Spacecraft	2019.07.24
76	Xu Xianghua	NA	Jiangsu	former Deputy Commander, Western Theater Command Army	MG	Corps leader	Army	74 Group Army	2019.08.26

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No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
77	Ye Qing	NA	Hebei	former Political Commissar, Hainan Military District (until 2019)	MG	Corps leader	Army	General Staff Department General Office; CMC General Office; Shanxi Military District; 35 Group Army	2019.09.03
78	Meng Zhongkang	NA	Zhejiang	former Political Commissar, Jiangsu Military District (until 2019)	MG	Corps leader	Army/ Artillery (Rocket Force)	Artillery brigade in Beijing MR; 38 Group Army; Beijing Military District joint logistics department; Eastern Theater Command Army; 12 Group Army	2019.09.03
79	Song Xue	NA	Shandong	Deputy Chief of Staff, PLA Navy	MG/ RADM	Corps leader	Navy	PLA Navy armament department; aircraft carrier landing and takeoff testing	2021.04.29

Appendix continued

No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
80	Liu Yazhou	Li Xiannian	Zhejiang (Ancestry: Anhui)	Political Commissar, National Defense University	G	MR leader	Air Force	63 Division (Army); PLA Air Force Political Department; CMC General Office; Beijing MR Air Force; Chengdu MR Air Force; PLA Air Force	NA
81	Li Shangfu	Zhang Youxia	Sichuan (Ancestry: Jiangxi)	former member, CMC; former Minister of National Defense	G	CMC member	Army/ Artillery (Rocket Force)	Xichang Satellite Launch Center; Jiuquan Satellite Launch Center; GAD; PLA Strategic Support Force; CMC EDD	2023.10.24

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No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
82	Ding Laihong	Xu Qiliang	Zhejiang	Commander, PLA Air Force (until September 2021)	G	MR leader	Air Force	24th Fighter Aviation Division; PLA Air Force Fuzhou Base; Air Force Command College; Chengdu MR Air Force; Shenyang MR Air Force; Shenyang MR; Northern Theater Command	2023.12.29
83	Zhou Yaning	NA	Hebei	Commander, PLA Rocket Force (until January 2022)	G	MR leader	Army/ Artillery (Rocket Force)	Second Artillery Corps Base 52; Second Artillery Corps Base 53	2023.12.29

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No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
84	Li Yuchao	NA	Henan	Commander, PLA Rocket Force (until July 2023)	G	MR leader	Army/ Artillery (Rocket Force)	Second Artillery Corps Base 56 Unit 96351; Rocket Force University of Engineering; Second Artillery Corps Base 53; PLA Rocket Force Base 53; PLA Rocket Force Base 63	2023.12.29
85	Zhang Zhenzhong	NA	Shaanxi	Deputy Chief of Staff, CMC JSD	LG	MR deputy leader	Artillery (Rocket Force)	Jiuquan Satellite Launch Center; Xichang Satellite Launch Center; Wenchang Space Launch Site; PLA Rocket Force	2023.12.29
86	Zhang Yulin	NA	Shaanxi	Member, Financial and Economic Commission, NPC; Deputy Director, CMC EDD (until 2018)	LG	MR deputy leader	Artillery (Rocket Force)	Space Engineering University; Jiuquan Satellite Launch Center; Manned Space Engineering Launch Site System; National University of Defense Technology; GAD	2023.12.29

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No.	Name	Patron-client ties	Birthplace	Appointment	Rank	Grade	Branch	MR affiliation	Confirmed
87	Li Chuanguang	NA	Shandong (Qingzhou)	Deputy Commander, PLARF	LG	MR deputy leader	Artillery (Rocket Force)	Second Artillery; Unit 96301 (Base 55)	2023.12.29
88	Ju Xinchun	NA	Shandong (Qingzhou)	Commander, Southern Theater Command Navy; Deputy Director, CMC EDD (until February 2023)	LG/ VADM	MR deputy leader	Navy	Harbin Type 052 destroyer (Pennant No. 112); South Sea Fleet armament department South Sea Fleet; China Manned Space Program	2023.12.29
89	Rao Wenmin	NA	NA	Deputy Director, CMC EDD	LG	MR deputy leader	NA	Armaments/CMC EDD	2023.12.29
90	Lü Hong	Li Shangfu	NA	Director, Armament Department, PLA Rocket Force	MG	Corps leader	NA	CMC EDD Research Subscription Bureau; Central Theater Command Army	2023.12.29

EXECUTIVE SUMMARY

This chapter examines recent efforts in China to improve the personnel of the PLA by identifying what PLA leaders' most important goals are for the force's personnel, outlining how they are attempting to achieve those goals, and analyzing how successful those efforts have been.

MAIN ARGUMENT

The PLA has long realized that, in order to become a truly world-class military, the health, skills, organization, education, and loyalty of its officers and noncommissioned officers would all need to improve. Those efforts have taken a variety of forms over the years, but loyalty and skill levels currently most concern the PLA's leadership. To ensure loyalty, the PLA has redoubled its commitment to political work, in addition to implementing a range of policies designed to make military life easier and more rewarding. To increase skill levels, it has improved training exercises and assessments, expanded educational offerings, and deepened its partnerships with civilian institutions. Despite these efforts, the PLA continues to face challenges in sustaining morale, in helping the force adjust to major organizational reforms, and in developing its officers' skills to match the fast-changing operational and technological needs of the force.

POLICY IMPLICATIONS

- If assessments of the PLA's capabilities do not carefully consider personnel issues, in addition to factors such as equipment and funding, they will likely overestimate the effectiveness of China's military on the battlefield.
- The PLA leadership is keenly aware of the limitations in its officers' capabilities, which could instill caution about becoming involved in open conflict with another world-class military like the U.S. If U.S. officials need avenues through which to convince China's civilian leaders that conflict is not in their interests, PLA interlocutors might merit consideration.
- In order to gain a clearer picture of the PLA's capabilities, observers should devote resources not just to identifying initiatives to do so but also to gaining a broader sense of how those initiatives are playing out in PLA officers' lives across the entire force.

Gaining the Upper Hand in Future Wars? Developing the Personnel of the PLA

Eric Hundman

The People's Republic of China (PRC) has had remarkable successes in pursuit of its goal of developing the People's Liberation Army (PLA) into a world-class military. However, outside observers still have, at best, a partial understanding of how effective the PLA is likely to be in conflict because we know relatively little about the capabilities of the personnel that compose China's military. Many analyses of China's military capabilities focus on "hardware" capabilities: defense spending, equipment, technology, and formal organization. We know less about the "software" of China's military: characteristics of the personnel that are crucial to how effectively the PLA can bring its hardware to bear, such as morale, civil-military relations, training, health, education, and culture.

We do know, however, that PRC and PLA leadership both view personnel as one of the most important areas for improvement in the PLA. As Xi Jinping himself noted in November 2021, personnel "talent holds the key to advancing the high-quality development of the Chinese armed forces, achieving victory in military competition, and gaining the upper hand in future wars."¹ That same year, the Xinhua news agency argued prominently that "command personnel skilled in joint operations have become the key to victory," and in 2024 the *PLA Daily* noted a set of specific personnel

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¹ Kenneth W. Allen et al., "Personnel of the People's Liberation Army," BluePath Labs, prepared for the U.S.-China Economic and Security Review Commission, November 3, 2022, https://www.uscc.gov/sites/default/files/2022-11/Personnel_Peoples_Liberation_Army.pdf.

problems “such as weak basic combat skills, inadequate training support, and a shortage of urgently needed skilled personnel.”²

In support of this volume’s broader goal of assessing how much progress China has made in achieving its own goals for the PLA, this chapter updates and expands our understanding of the PLA’s personnel. In order to do so, it investigates three key questions. First, what are China’s goals for its military personnel? Second, how are China’s leaders pursuing those goals? Third, how successful have those pursuits been?

The chapter finds that the PLA’s leadership is currently most interested in making its personnel more loyal and more skilled. It is pursuing those goals in a variety of ways. To ensure loyalty, the PLA has redoubled its commitment to political work, in addition to implementing a range of policies designed to make military life easier and more rewarding. To increase skills, the PLA has focused on continuing to improve training exercises and assessments, improving educational offerings, and expanding its partnerships with civilian institutions. Broadly speaking, while the PLA sees clear progress for itself in terms of improving physical health, reducing corruption, and deepening the commitment of its personnel, it continues to face challenges in supporting morale, in helping the force adjust to major organizational reforms, and in developing its officers’ skills to match the fast-changing operational and technological needs of the force.

In order to answer those questions for the PLA as a whole, three constraints on the scope of this analysis are necessary. First, this chapter focuses only on the officer and noncommissioned officer (NCO) corps. While efforts to improve the quality of China’s conscripts are also important, and many personnel policies apply to them as well as officers and NCOs, conscripts are not directly examined here. Second, the chapter focuses on the national level and the force in the aggregate. Space constraints prevent a deeper dive into issues such as local-level preferential policies for veterans or interservice differences. Third, because previous work has comprehensively reported the state of PLA personnel up to around 2022, this chapter focuses

² “强军之道 要在得人——全军在习近平强军思想指引下推进人才工作创新发展综述” [People Are the Way to Strengthen the Military—a Review of the Military’s Innovative Development of Talent Work under the Guidance of Xi Jinping’s Thoughts on Strengthening the Military], Xinhua, November 25, 2021, https://www.moj.gov.cn/pub/sfbgwapp/jryw/202111/t20211127_442549.html; and Yu Xairi, “以党委领战力带动提升部队战斗力” [Enhance the Combat Effectiveness of the Troops by Using the Party Committees’ Military Strength], *PLA Daily*, March 19, 2024, <http://www.mod.gov.cn/gfbw/jmsd/16294935.html>.

on data from 2019 to 2024.³ The data used here relies as much as possible on official documents and state media—especially the *PLA Daily*—but is supplemented where necessary by Chinese-language commercial media and commentary in other nonauthoritative sources.

There can be little doubt that the personnel of the PLA has improved on a number of metrics since the late 1990s, when it was full of “semiliterate peasants serving short tours of duty.”⁴ Education levels have risen, skills have improved, training exercises have become more realistic, and corruption has become less pervasive. Still, China’s leadership, both civilian and military, is clearly not yet satisfied with the state of PLA personnel. PRC leaders have been explicit that their goals for the PLA’s personnel are driven by the need to modernize and improve the capability to fight and win actual wars. In China, this goal plays out in two ways. First, PLA personnel must be loyal to the Chinese Communist Party (CCP), committed to their military obligations, and enthusiastic about serving. That entails a renewed emphasis on military political work and a range of efforts to make life as an officer or NCO easier and more rewarding. Second, PLA personnel must become more skilled. This has involved improvements in training, reforms to professional military education (PME) institutions, targeted recruitment of science and technology majors, and partnerships with civilian institutions. The following sections consider each of these two broad priorities in more detail.

Efforts to Improve the Loyalty of PLA Personnel

While it is impossible to know for sure how loyal PLA personnel are to the CCP, there have been indications in recent years that military leadership is concerned to some degree, for instance, about resistance to service among the troops and about competition for talent with increasingly lucrative private-sector jobs.⁵ For party leadership, the key to achieving deeper loyalty and a more cohesive, obedient PLA is political work. As the *PLA Daily* emphasized in 2021, “history has repeatedly proved that...political

³ For analysis of the state of PLA personnel up to 2022, see, in particular, Allen et al., “Personnel of the People’s Liberation Army”; and Roy D. Kamphausen, ed., *The People of the PLA 2.0* (Carlisle: U.S. Army War College Press, 2021), <https://press.armywarcollege.edu/cgi/viewcontent.cgi?article=1940&context=monographs>.

⁴ Michael O’Hanlon, “Why China Cannot Conquer Taiwan,” *International Security* 25, no. 2 (2000): 51–86.

⁵ Allen et al., “Personnel of the People’s Liberation Army”; and Eric Hundman, “Fearing Hardships and Fatigue? Refusals to Serve in China’s Military, 2009–2018,” *Journal of Contemporary China* 32, no. 142 (2022): 559–85.

excellence is the fundamental guarantee for the people's military to withstand hardship and continuously seize victory.”⁶ Contrary to the consensus among scholars of military organizations that political imperatives can distract from more important priorities in the military, PRC analysts are very clear that they believe military personnel in China must be “both red and expert” (又红又专).⁷ In fact, for the PLA, “redness” developed through political work is the key to being effective on the battlefield: it provides China's military “with inexhaustible strength to defeat powerful enemies and difficult obstacles.”⁸

By at least 2014, PRC leadership appears to have considered political work in the PLA to be of insufficient impact. A whole-military political work conference was held that year in Gutian, a city in Fujian Province, to discuss this problem, and the major reforms to the PLA a little under two years later addressed many of the problems identified at the conference. For example, the overall authority of military party committees was strengthened.⁹ The Central Military Commission (CMC) has also issued prominent calls to “restore the prestige of political work in the PLA” and to rely on the “majesty and prestige” of such work to improve the PLA's grassroots personnel.¹⁰ More concretely, new regulations on political work issued in 2021 made political commissars equal in authority to the operational commanding officers of their units.¹¹

There has not been another such high-level political work conference since Gutian, but a similarly themed whole-military party-building conference was held in July 2023. While this conference highlighted the achievements of Gutian, it also indicated that political work in the PLA

⁶ Chen Anran, “透视军队人才建设发展历史之实践进程——我军人才建设的发展跨越” [Perspectives on the Practical Process of the History of Developing the Construction of the Military's Personnel—the Leap in Development of our Military's Construction of Personnel], *PLA Daily*, October 28, 2021, http://www.qstheory.cn/qshyjx/2021-10/28/c_1128004513.htm.

⁷ Cai Weibin, “政治标准是我军人才第一位的标准” [Political Standards are the First Priority for Our Military Personnel], *PLA Daily*, April 3, 2022, <http://www.mod.gov.cn/gfbw/jmsd/4908263.html>.

⁸ “习近平强军思想学习问答⑧” [Xi Jinping's Thought on Strengthening the Military Study Q&A 8], *PLA Daily*, August 28, 2023, https://tjrsjw.beijing.gov.cn/tztz/tzjyhd/xxfw/xxwd/202308/t20230828_3231976.html.

⁹ Allen et al., “Personnel of the People's Liberation Army.”

¹⁰ “关于建设对党绝对忠诚、聚焦打仗有力、作风形象良好政治机关和政治干部队伍的意见” [Opinions on Building the Ranks of Political Organs and Political Cadres with Absolute Loyalty to the Party, a Focus on Fighting, and a Good Workstyle Image], *Xinhua*, April 19, 2015, https://www.gov.cn/xinwen/2015-04/19/content_2849245.htm; and Sang Linfen, “锻造坚强过硬的政治干部队伍” [Forging a Team of Strong Political Cadres], *PLA Daily*, October 8, 2022, <http://www.mod.gov.cn/gfbw/jmsd/4922720.html>.

¹¹ “新修订的《军队政治工作条例》颁布” [The Newly Revised “Regulations on Military Political Work” Were Promulgated], *PLA Daily*, February 19, 2021, <http://www.mod.gov.cn/gfbw/fgwx/flfg/4879353.html>.

still needed to be improved.¹² Official outlet China Military Online noted some specific problems, such as “loose and soft” (宽松软) management of the party, a lack of tenacity in dealing with difficult challenges, and a “lack of endurance in daily supervision” (对日常监督缺乏耐力).¹³ Even though there do not appear to have been notable national-level regulatory changes focused on military political work since 2021, officials have continued to emphasize it at the highest levels. Xi Jinping has repeatedly reiterated the central importance of political work in improving the PLA and its personnel, PLA academic institutions heavily emphasize ideological and political coursework, and even training exercises in recent years have begun to emphasize the contributions of political commissars down to the level of individual units.¹⁴

In addition to re-emphasizing the role of political work, the PLA has also expanded its use of incentives to keep its personnel happy and producing their best work. One area in which this effort has been particularly prominent is in policies supporting military families. This has been a long-standing source of frustration for PLA personnel, who typically must secure their units’ approval to get married, cannot initially live with their spouses, and struggle to find appropriate housing. However, a widespread effort to improve treatment of military families appears to be underway. Multiple provinces and municipalities have implemented programs to support military dependents by, for instance, providing more generous subsidies for spousal separation or childcare, easing regulations on family visits to bases, and offering support for job searches or school applications.¹⁵ As one commentator on the National Defense Education Network put it, one of the

¹² “习近平对全军党的建设会议作出重要指示” [Xi Jinping Issued Important Instructions to the Whole-Military Party-Building Conference], Xinhua, July 21, 2023, https://www.thepaper.cn/newsDetail_forward_23938177.

¹³ “开创我军党的领导和党的建设工作新局面” [Create a New Situation in the Party’s Leadership and Party Building Work in Our Military], Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era Research Center, August 4, 2023, <http://dangjian.people.com.cn/n1/2023/0804/c117092-40050152.html>.

¹⁴ Eric Hundman, “Joint Training in the PLA: Continuity and Change since 2012,” unpublished manuscript, 2023; and “古田会议永放光芒,习近平擘画新时代政治建军方略” [The Gutian Conference Will Always Shine, Xi Jinping Outlines the New Strategy of Building the Army Politically in the New Era], Xinhua, June 21, 2019, <http://m.news.cctv.com/2019/12/28/ARTIoZHzx0E4G5nbC6nvAFk191228.shtml>.

¹⁵ Chai Minyi, “国防部:军人父母赡养补助和配偶荣誉金8月起发放” [Ministry of National Defense: Military Parents’ Support Allowance and Spousal Honorariums Will Be Issued Starting in August], *Paper*, July 29, 2021, https://www.thepaper.cn/newsDetail_forward_13797892; and Cheng Xianglu and Zhang Kejin, “全军推动军人家属子女社会优待工作走深走实” [Military-Wide Efforts to Promote Preferential Treatment for Children of Military Dependents Deepen and Become More Practical], *PLA Daily*, June 27, 2023, http://www.81.cn/js_208585/16233365.html.

biggest military policy changes in 2022 was that support for military families had become “more complete and comprehensive” (更加完善全面).¹⁶

On a similar note, the PLA has been working to streamline a range of other procedures that had previously generated headaches for its personnel. While PLA commentators have highlighted the progress in this system— noting for instance that it is becoming “even more perfect” (更加完善)—the flurry of rule changes since 2021–22 indicates that many objectives have not yet been realized. Examples include the following:

- Standardization of policies for managing professional and technical officers.¹⁷
- Improvements to the officer hierarchy, focused on institutional support such as the management of officer classification, career development, and salary guarantees.¹⁸
- Clarification of regulations for officers’ ongoing education and training—sometimes in an explicit attempt to address the “five incapables” (五个不会) and “two inabilities” (两个能力不够), staple phrases that have for years been used to highlight the PLA’s concerns about its personnel quality.¹⁹
- Clarification of military housing standards, in part by updating them to reflect the new rank and grade structure for officers.²⁰

¹⁶ “军属依法享受权益,随便数数就有6条” [Military Families Enjoy Rights and Benefits in Accordance with the Law, Here Are Six Random Provisions], National Defense Education Network, January 26, 2023, <http://www.xn--vcs074a3julibi48c.com/show-55-5267-1.html>.

¹⁷ “建设高素质创新型专业技术军官队伍——认真学习贯彻‘专业技术军官管理暂行规定’” [Building a High-Quality, Innovative Team of Professional Technical Officers—Conscientiously Studying and Implementing the “Interim Regulations on the Management of Professional and Technical Officers”], *PLA Daily*, January 18, 2021, http://81rc.81.cn/zgks/zczd_210263/10154766.html.

¹⁸ “经中央军委主席习近平批准 中央军委印发‘现役军官管理暂行条例’及相关配套法规” [Approved by Xi Jinping, Chairman of the Central Military Commission, the Central Military Commission Issued the “Interim Regulations on the Management of Active-Duty Officers” and Related Supporting Regulations], *Xinhua*, January 1, 2021, http://www.xinhuanet.com/2021-01/01/c_1126937255.htm.

¹⁹ “不断开创军官专业化培养新局面” [Continuously Create a New Situation in the Professional Training of Officers], *PLA Daily*, January 11, 2021, http://www.qstheory.cn/qshy/jx/2021-01/11/c_1126968599.htm; and “不断开创军官专业化培养新局面” [Continuously Create New Situations in the Professional Training of Military Officers], *PLA Daily*, January 11, 2021, <http://www.mod.gov.cn/gfbw/jmsd/4876908.html>.

²⁰ “中央军委办公厅印发‘关于明确軍隊安置住房面積標準及有關問題的通知’” [The General Office of the Central Military Commission Issued the “Notice on Clarifying Local Standards for Military Resettlement Housing and Related Issues”], *PLA Daily*, April 2, 2021, http://www.mod.gov.cn/gfbw/qwfb/jwbgt_214033/16102877.html.

- Unification of regulations on military training materials.²¹
- Centralization of collection and payment of funds for military personnel.²²
- Clarification of roles and benefits for civilian PLA personnel, reportedly with a focus on equalizing access to education, training, and benefits with military PLA personnel.²³
- Implementation of new standards for end-of-year assessments of officers.²⁴

While this list only draws from national-level policy changes and is unlikely to be comprehensive even at that level, it is nonetheless likely to be representative of the PLA's priorities for personnel-related regulatory reforms in recent years. The degree to which they have succeeded in achieving deeper commitments to the force, however, remains unclear given their recency.

The third major way in which the PLA is working to make military life easier and more rewarding focuses on increasing the prestige of military service. In 2021, for example, for the first time the PRC promulgated legislation focused on protecting the status, rights, and interest of military personnel. The *PLA Daily* noted explicitly that this law was intended to address persistent concerns about the troops' stress levels, happiness, and morale.²⁵ Localities, too, have begun implementing a range of preferential policies and benefits for military personnel. In Liaoning Province's Tieling City, for example, discussions are ongoing about implementing policies such as guaranteed civilian government positions for merit awardees or NCOs who have served for twelve or more years, allowances for resettling with a spouse rather than returning to one's home *hukou* after retiring from service, and the issuance of "honor plaques" (光荣牌) to veterans and

²¹ Zhang Jie and Wu Xu, "軍隊軍事訓練教材工作規定頒發" [Regulations on the Work of Military Training Teaching Materials] Issues], *PLA Daily*, February 17, 2022, <http://www.mod.gov.cn/gfbw/qwfb/jwxlgblb/16034875.html>.

²² "中央军委办公厅印发《军队资金集中收付工作暂行规定》" [The General Office of the Central Military Commission Issued the "Interim Regulations on the Centralized Collection and Payment of Military Funds"], *PLA Daily*, May 18, 2022, http://www.81.cn/jfjbmap/content/2022-05/18/content_315780.htm.

²³ "中国人民解放军文职人员条例" [Regulations on Civilian Personnel of the Chinese People's Liberation Army], State Council and Central Military Commission, December 10, 2022, https://www.gov.cn/zhengce/content/2023-01/04/content_5734967.htm.

²⁴ Qian Zongyang and Luo Yang, "强军之道,要在得人" [The Way to Build a Strong Military Is to Win People], *PLA Daily*, October 11, 2022, http://www.81.cn/jfjbmap/content/2022-10/11/content_325526.htm.

²⁵ Ibid.

their families.²⁶ In Shanxi Province in 2022, 40 companies reportedly worked with 26 provincial-level government departments to generate a list of 209 preferential treatment measures for military personnel, military dependents, and veterans. These measures involve everything from transportation and financial services to medical examinations and cultural tourism.²⁷

Efforts to Improve the Skill of PLA Personnel

Given its origins as a revolutionary peasant army and its many years of relative weakness, the PLA has long held as a primary goal improving the technical skills of its personnel. As the funding, equipment, and technology available to the PLA have expanded—in the PLA’s own terms, as it has achieved mechanization and works to progress from informatization (信息化) to intelligitization (智能化)—the education and skill levels of PLA personnel have needed to improve in order to take full advantage of the force’s new resources and generate the maximum possible fighting power. For China, this goal has often meant focusing on the recruitment of college-educated officers and NCOs. Yet it also involves broader efforts to ameliorate “talent gaps” (人才缺口) using on-the-job training, vocational training, online resources, partnerships with civilian institutions, and personnel exchanges.²⁸ Broadly speaking, the PLA is currently pursuing four changes in hopes of improving the skills levels of its officers: training improvements; PME improvements; expanded recruitment of college graduates in science, technology, engineering, and medicine (STEM) majors; and partnerships with civilian educational institutions.

Training

Training exercises in the PLA were long notorious for being scripted affairs that had little relation to the actual battlefield needs China might encounter, so improving them has been among the highest priorities

²⁶ “铁岭市退役军人局政策简明问答” [Tieling City Veterans Affairs Bureau Policy Brief Questions and Answers], Tieling Veterans Affairs Bureau, May 9, 2023, <https://web.archive.org/web/20230520043448/http://www.tieling.gov.cn/tieling/ywdt/rdzt/d17j515zwwgkr/qzntgkd/styrsjw/2023051316532920664/index.html>.

²⁷ “山西发布军人家属退役军人和其他优抚对象二级优待清单” [Shanxi Releases a List of Secondary Preferential Treatment for Military Personnel, Military Dependents, Veterans, and Other Preferential Treatment Recipients], China National Radio, March 1, 2022, https://www.cnr.cn/sx/sdps/20220301/t20220301_525754154.shtml.

²⁸ Scientific Research Center for Military Talents, “加快推进军事人员‘三个全面转型升级’” [Accelerating the “Three Full Transformations and Upgrades” of Military Personnel], *Guangming Daily*, March 3, 2024, https://news.gmw.cn/2024-03/03/content_37180327.htm.

for the force. At the individual level, training can include everything from military theory education and the teaching of operational skills to participation in battlefield exercises and individualized online coursework. At the force level, cultivating the ability to effectively conduct joint operations has been the biggest priority in recent years, so broad efforts are ongoing to combine multiple service branches in realistic joint training exercises and to expand cross-training of officers across both the command colleges and operational units.²⁹

At the highest level, a number of the PLA's standards for training have been updated or adjusted in recent years, including the "Military Training Regulations" in 2018, the "Military Physical Education Training Outline" in both 2018 and 2023, and the "Army Military Training Syllabus" in 2024.³⁰ Broadly speaking, these changes have been aimed at bringing training into line with emerging needs such as new equipment and technologies, as well as adjusting "dry and dull" (枯燥) training content to better engage participants. While official reporting about the new standards has been largely positive, some personnel have reportedly found the content "difficult to understand" (难以很好理解).³¹

As new standards like these are promulgated and gradually implemented throughout the force, the PLA is also working to improve methods for assessing how much its personnel are improving. As of 2020–21, training evaluations—which are conducted at both the individual level and the unit level—did not appear uniform, with calls for national-level assessment standards persisting.³² As one PLA Air Force officer in the Central Theater

²⁹ Hundman, "Joint Training in the PLA"; and Zhang Xin and Zhang Yujin, "習主席在中央軍委人才工作會議上的重要講話在全軍引起熱烈反響" [Chairman Xi's Important Speech at the Central Military Commission's Talent Work Conference Has Aroused Heated Responses throughout the Military], *PLA Daily*, November 30, 2021, http://www.mod.gov.cn/gfbw/qwfb/yw_214049/4899997.html.

³⁰ "全軍部隊新年度軍事訓練拉开帷幕" [The New Year's Military Training of All Troops Kicks Off], CCTV, January 5, 2024, <https://military.cctv.com/2024/01/05/ARTIsnyFRNIJQBHJHwTnMb8L240105.shtml>; Guo Wenmiao and Wu Xu, "軍事體育訓練大綱基礎體能調整和新增內容解讀:輔助練習" [Military Physical Education Training Outline Basic Physical Fitness Adjustments and New Content Explanation: Auxiliary Exercises], *PLA Daily*, June 14, 2023, <http://www.mod.gov.cn/gfbw/qwfb/16231062.html>; and "中央军委主席習近平簽署命令 發布新修訂的《中國人民解放軍軍事訓練條例（試行）》" [Chairman of the Central Military Commission Xi Jinping Signed an Order to Issue the Newly Revised "Military Training Regulations of the Chinese People's Liberation Army" (Trial Implementation)], *Xinhua*, December 29, 2017, http://www.xinhuanet.com/politics/leaders/2017-12/29/c_1122187420.htm.

³¹ Guo and Wu, "軍事體育訓練大綱基礎體能調整和新增內容解讀."

³² Kevin McCauley, "Cultivating Joint Talent: PLA Education and Training Reforms," Foreign Military Studies Office, Foreign Perspectives Brief, February 2023, <https://fmso.tradoc.army.mil/2023/2023-02-10-cultivating-joint-talent-pla-education-and-training-reforms-kevin-mccauley>; and "解放軍報: 選人用人, 讓制度成為最好的'伯樂'" [PLA Daily: Selecting and Employing People, Let the System Become the Best "Bo Le"], *Paper*, undated, https://m.thepaper.cn/wifiKey_detail.jsp?contid=1803773&from=wifiKey#.

Command put it, the “establishment of a talent selection system requires principle-based guidance and more detailed and quantitative operability measures.”³³ Repeated updates to national regulations for assessment of PLA personnel also indicate that the force remains unsatisfied on this front.³⁴

There have, however, been indications of progress. Until recently, units often appeared to be on their own in attempting to improve their internal assessment procedures, but in some cases higher-level organizations now appear to play a larger role. For example, a brigade of the PLA Army in the Northern Theater Command “actively opened channels for mass supervision, built a multi-faceted supervision platform, established an officer selection and appointment accountability system, and accepted the supervision of the Discipline Inspection Commission throughout the assessment and selection process.”³⁵

The least developed and integrated component of training in the PLA appears to be the expanding “military vocational education” online resource offerings—including access to online courses and academic journal articles—which are targeted at helping individual servicemembers learn and improve. According to the *PLA Daily* in early 2024, this approach to training “breaks the limitations of space and time, guiding officers and soldiers to learn flexibly and independently.”³⁶ It is not yet clear how widely utilized or how useful these types of vocational education offerings are, but it is clear that they are a priority for the PLA and are expanding quickly.

As of 2017, at least three versions of the military vocational education platform were available—mobile, web, and WeChat—offering access to more than 3,300 courses and 1.2 million journal articles through educational companies such as Tsinghua Xuetang Online, Peking University Chinese MOOC, and Baidu Encyclopedia.³⁷ Based on the sheer number of offerings, it is unlikely that a large proportion of these courses are specific to military needs. However, at least some are produced by faculty at PLA educational institutions such as the Army Engineering University. As of early 2024,

³³ “解放军报.”

³⁴ Qian and Luo, “强军之道,要在得人.”

³⁵ Zhang Dongpan and Li Xingchao, “培养更多‘战场多面手,’第78集团军某旅强化一专多能训练” [Cultivating More “Battlefield Versatility,” a Brigade of the 78th Group Army Strengthens Multi-Skilled Training], *PLA Daily*, March 29, 2024, http://www.81.cn/yw_208727/16297347.html.

³⁶ Zhang Kejin, Liu Min, and Li Weixin, “軍隊代表委員熱議深入實施新時代人才強軍戰略” [Military Representatives Discussed the Implementation of the Strategy of Strengthening the Military with Talents in the New Era], *PLA Daily*, March 9, 2024, <http://www.mod.gov.cn/gfbw/qwfb/16292417.html>.

³⁷ Li Yun and Wu Xu, “军事职业教育互联网服务平台测试运行” [Military Vocational Education Internet Service Platform Test Run], *PLA Daily*, November 17, 2017, http://www.81.cn/201311jxjyh/2017-11/17/content_7830266.htm.

more specialized military vocational education platforms such as the Strong Military Network (强军网) and the Military Career Online (军职在线) have reportedly become very popular among officers.³⁸

Professional Military Education

As part of its eleventh force-size reduction, the PLA conducted a major reorganization of its officer and NCO academic institutions in June 2017. The number of officer academic institutions was reduced from 63 to 34, and the number of standalone NCO institutions was reduced from 4 to 3. While this change was intended to consolidate resources and facilitate the improvement of PLA academic offerings, even as recently as 2022 “PLA academic institutions [were] still widely marred by problems such as outdated curriculums, corruption, poor management, and poor coordination with operational units.”³⁹ Only one of these institutions, the PLA National Defense University, offers truly joint education for officers.⁴⁰ Even the world’s best militaries, however, find it challenging to effectively implement jointness. For example, while joint components in the U.S. PME system are much more broadly implemented than China’s are on paper, the Department of Defense in 2020 assessed that many had “stagnated” into mere credit-earning exercises.⁴¹

Efforts to reform and improve the PLA’s educational institutions, therefore, continue. One prominent area of focus in these efforts is the push for more exchanges between educational institutions and operational units to better connect “the supply side of talent training and the demand site of future battlefields.”⁴² Both the PLA National Defense University and the Army Command College, for instance, encourage faculty members to

³⁸ Kejin et al., “軍隊代表委員熱議深入實施新時代人才強軍戰略”; and Li Youzhi, “陆军工程大学政治理论教员王晶:‘三颗心’赢得众人心” [Wang Jing, Political Theory Instructor at the Army Engineering University: “Three Hearts” Wins the Hearts of the People], *PLA Daily*, September 6, 2022, http://www.81.cn/jx_208569/jdt_208570/10183018.html.

³⁹ Allen et al., “Personnel of the People’s Liberation Army.”

⁴⁰ Kenneth Allen and Mingzhi Chen, “The People’s Liberation Army’s Academic Institutions,” China Aerospace Studies Institute, June 11, 2020, <https://www.airuniversity.af.edu/CASI/Display/Article/2216778/the-peoples-liberation-armys-academic-institutions>.

⁴¹ “Professional Military Education: Programs are Accredited, but Additional Information Is Needed to Assess Effectiveness,” U.S. Government Accountability Office, February 20, 2020, <https://www.gao.gov/products/gao-20-323>.

⁴² Chen Jichen and Hong Dapeng, “國防大學政治學院探索‘院校+部隊’人才培养協作模式” [The College of Political Science at the National Defense University Explores the “Academy + Unit” Collaborative Talent Training Model], *PLA Daily*, March 14, 2024, http://www.mod.gov.cn/gfbw/gfjy_index/jsyxgfs/16293731.html.

serve temporarily with operational units in order to “enhance their teaching abilities” (提升执教能力).⁴³

The extent and success of these efforts, however, remain unclear. Despite claims that such exchanges are new, military educators in China have been calling for them for over a decade, perhaps indicating that there was resistance or the exchanges have not yet made the impact that PLA leaders had hoped.⁴⁴ Interestingly, no All-Military Academic Institution Conference (全军院校会议) has been held since 2011, despite clear ongoing concerns about the quality of military education and expert predictions that another such conference would be held around 2020.⁴⁵ This might be because disagreement persists about the best ways to reform the system, or because the leadership has judged that the PLA needs more time to adjust to the reforms initiated in 2015.

Another key ongoing focus of PME reforms has been the quality of teaching. In PLA reporting, this is often linked to the oft-referenced need to make education and training more similar to combat needs. A 2024 article by authors affiliated with China’s Naval Aviation University, for instance, explicitly notes that a major problem with instruction of PLA personnel is instructors’ insufficient ability to meet new standards for combat-relevant teaching.⁴⁶ Part of the challenge in improving teaching quality to meet the needs of modern combat is that, as PLA observers put it, the “battlefield space” (战场空间) is rapidly changing as it expands toward new arenas like space, networks, intelligence, the deep sea, and biology.⁴⁷ As a result, PME institutions in China are working to adjust their curricula by, for instance, increasing the “training indicators for talents in disciplines related to new

⁴³ Yu Guoqiang and Chen Weifeng, “陆军指挥学院多措并举提升教员执教能力” [The Army Command College Takes Multiple Measures to Improve Instructors’ Teaching Abilities], Sina, June 10, 2018, <https://mil.sina.cn/2018-06-10/detail-ihcufqif4946044.d.html>.

⁴⁴ Fu Guangming and Liu Weidong, “院校与部队联教联训创新模式研究” [Research on the Innovative Model of Joint Education and Training between Schools and Units], *Journal of Higher Education Research* 36, no. 1 (2013): 42–44; and Zhang Ying et al., “Joint Education and Joint Training—a New Way to Educate People Together” [联教联训——合力育人新途径], *Innovation and Practice in Teaching Methods* 4, no. 24 (2021): 74–75.

⁴⁵ Kenneth Allen and Brendan Mulvaney, “Changes in the PLA’s Military Education,” in Kamphausen, *The People of the PLA 2.0*, 167–204.

⁴⁶ Zhao Jianzhong et al., “军队院校教员队伍分类培养模式研究” [Research on the Classification Training Model of Military Academy Teachers], *Defense Industry Conversion in China* 7 (2024).

⁴⁷ Zhang Yiming, “设计人才培养的‘预留接口’” [A “Reserved Interface” for Designing Talent Training], *PLA Daily*, October 31, 2022, <http://www.mod.gov.cn/gfbw/jmsd/4924664.html>.

combat capabilities” and developing new undergraduate majors in areas such as big data and unmanned equipment engineering.⁴⁸

Recruitment of STEM Graduates

In addition to improving education within the military system, the PLA has also been focused on recruiting more college graduates from civilian universities that major in STEM disciplines. As of January 2024, for example, the PLA offered at least 56 benefits to STEM graduates for enlisting in the military, including easier relocation to top-tier cities after leaving service, bonus points when taking the civil service examination after demobilizing if they wish to enter government, priority purchase of tickets for rail travel, and the option for their family to display a “glory plaque” recognizing their service in the PLA.⁴⁹

The PLA also offers two paths for STEM majors to enter the PLA as NCOs. The first is direct recruitment (直招军士) of civilians with needed technical training who can bypass the junior enlisted ranks. The second path is made-to-order NCOs developed through targeted training (定向培养) programs that begin in high school and continue at civilian polytechnic or vocational colleges prior to entering the PLA.⁵⁰

Targeted-training NCOs appear to be in high demand by operational units because trainees are viewed as capable of easily adapting to military life and becoming the technical experts so many units appear to desperately need. This capability is reportedly the result of the “quasi-militarized management” trainees experience during their time in the program.⁵¹ The services also appear to like the program because it allows them to prioritize specific needs and quickly develop talent to fill gaps. As of late 2023,

⁴⁸ Qian Zongyang and Luo Yang, “强军之道,要在得人” [The Way to Build a Strong Military Is to Win People], *PLA Daily*, October 11, 2022, http://www.81.cn/jfjbmap/content/2022-10/11/content_325526.htm.

⁴⁹ “大学生参军, 56项优待优惠政策汇总” [Summary of 56 Preferential Treatment Policies for College Students Joining the Military], 163.com, January 27, 2024, <https://m.163.com/dy/article/IPG1ORH00534EUC3.html>.

⁵⁰ Allen et al., “Personnel of the People’s Liberation Army.”

⁵¹ Daniel Salisbury and Kenneth Allen, “‘Made-to-Order’ NCOs: The PLA’s Targeted Training NCO Program,” China Aerospace Studies Institute, February 2022, <https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/CASI%20Articles/2022-02-28%20Targeted%20Training%20NCO%20Program.pdf>.

48 schools reportedly had developed targeted-training NCOs. This program appears to be expanding, with 4 new schools added recently.⁵²

Direct recruitment of NCOs from civilian schools is also a large program. As of late 2023, the PLA reportedly directly recruited NCOs from 42 technical colleges.⁵³ This was a slight decrease from 2022, when 44 schools reportedly participated in the direct recruitment program. Because full lists of schools are not available from 2021 or 2025 in open sources, it is not clear whether this is a typical fluctuation or the beginning of a trend.

STEM degrees are, of course, valued in officers. While graduates of officer academic institutions make up the majority of officers in the PLA, the force also prioritizes directly recruiting graduates of civilian colleges with STEM degrees to serve as officers.⁵⁴ For example, “the CMC announced in March 2022 that it would directly recruit more than 3,600 new college graduates...as officers, with a focus on majors in science, technology, and other needed disciplines.”⁵⁵ The status of these directly recruited civilian college graduates in the PLA is unclear based on available sources. According to one analysis of promotion patterns, however, they appear to be intended to fill needed technical gaps rather than to join military leadership.⁵⁶ In 2024, general direct recruitment efforts for officers were mainly focused on recruiting 2,800 science, engineering, and construction graduates from “double first-class” (双一流) universities.⁵⁷ The PLA Navy, for example, specified that it would focus on directly recruiting officers from majors such as underwater acoustic engineering, weapons science and technology, and minor languages.⁵⁸

National-level policy reinforces the PLA’s focus on attracting and retaining high-level STEM talents. In 2022 the CMC released the “Decision

⁵² “2024年直招士官院校名单, 分数线比想象中低, 学生记得点赞收藏” [List of Academies for Direct Recruitment of Noncommissioned Officers in 2024. The Needed Scores Are Lower Than Expected. Students Remember to Like and Save], Sohu, December 2, 2023, https://www.sohu.com/a/740849359_120933394.

⁵³ “2024年直招士官院校名单.”

⁵⁴ Ibid.

⁵⁵ Allen et al., “Personnel of the People’s Liberation Army.”

⁵⁶ Joel Wuthnow, “Gray Dragons: Assessing China’s Senior Military Leadership,” China Strategic Perspectives, Institute for National Strategic Studies, September 2022, <https://ndupress.ndu.edu/Portals/68/Documents/stratperspective/china/china-perspectives-16.pdf>.

⁵⁷ “2024年上半年军队直接选拔招录军官工作全面展开” [The Direct Selection and Recruitment of Military Officers Will Be Fully Launched in 2024], Military Talent Network, March 16, 2024, <http://81rc.81.cn/sy/gzsd/16294317.html>.

⁵⁸ Wu Shenghao, “2024年海军直接选拔招录普通高等学校应届毕业生” [The Navy Will Directly Recruit Fresh Graduates from Ordinary Colleges and Universities in 2024], University of Electronic Science and Technology of China, March 20, 2024, <https://jiuye.uestc.edu.cn/career/news/newDetail.html?id=1345>.

on Strengthening Military Talent Work in the New Era” and “Several Measures on Further Stimulating Scientific and Technological Personnel’s Ability to Innovate.”⁵⁹ The former document reportedly incentivizes several improvements, including increasing the supply of needed talents and making the human resources system more responsive to changing needs. Few details are available about the science- and technology-specific measures. One *PLA Daily* report about a unit at a naval research institute, however, indicates these measures are targeted at improving information and project management in order to free scientifically skilled personnel of their “cognitive burdens” (思想包袱) and let them focus on their research.⁶⁰

Partnerships with Civilian Institutions

In the hope of speeding up the improvement of military personnel, the PLA is also pursuing a range of partnerships with civilian institutions, such as joint-training and dual-enrollment programs. NCO training is a particular focus of these efforts to pursue joint-training and talent-training agreements. As the *PLA Daily* noted in 2021, “the importance of the competence of the NCO corps is becoming more and more evident.”⁶¹ The PLA hopes to increase its reliance on NCOs, but problems with the NCO corps such as a “weak sense of responsibility” (责任心不强) and “insufficient recognition of learning” (学习认清不够) appear to have been challenging to overcome.⁶² As the NCO-to-officer ratio in the PLA continues to increase, the need for flexible, specialized training to improve NCO technical skills has expanded apace.⁶³ Viewed in comparison with the U.S. system for developing NCOs, which draws on PME training for enlisted personnel, the PLA’s choice to

⁵⁹ “经中央军委主席习近平批准中央军委印发‘关于加强新时代军队人才工作的决定’” [Approved by Xi Jinping, Chairman of the Central Military Commission, the Central Military Commission Issued the “Decision on Strengthening Military Talent Work in the New Era”], Xinhua, January 26, 2022, https://www.gov.cn/xinwen/2022-01/26/content_5670581.htm.

⁶⁰ Liuxin Wangyu, “海軍研究院某所減負釋能激發科研人員干事創業活力” [Reducing Burdens and Releasing Energies at a Certain Institute of the Naval Academy to Stimulate the Entrepreneurial Capabilities of Scientific Researchers], *PLA Daily*, July 5, 2023, <http://www.mod.gov.cn/gfbw/gffw/16235132.html>.

⁶¹ Chen Shuwen et al., “士官+’突破‘楚河汉界’” [“NCO+” Breaks Through “the River that Divides Chu and Han”], *PLA Daily*, August 6, 2021, http://www.81.cn/jfjbmap/content/2021-08/06/content_295838.htm; and Jun Zhengbing, “打造高素质新型士官人才方阵” [Build a New Type of High-Quality Noncommissioned Officer Talent Team], *PLA Daily*, August 21, 2020, <https://m.yunnan.cn/system/2020/08/21/030902573.shtml>.

⁶² Tan Lei, “士官胜任素质评价体系构建” [Construction of a Competency Evaluation System for NCOs] (master’s thesis, Nanjing Normal University, 2017), <https://d.wanfangdata.com.cn/thesis/Y3310649>.

⁶³ Marcus Clay and Dennis J. Blasko, “People Win Wars: The PLA Enlisted Force, and Other Related Matters,” War on the Rocks, July 31, 2020, <http://warontherocks.com/2020/07/people-win-wars-the-pla-enlisted-force-and-other-related-matters>.

partner with civilian institutions appears to be an attempt to move more quickly to expand their NCOs' capabilities.⁶⁴

In 2012, for example, the PLA Air Force established a “dual-enrollment program” with Tsinghua University, Peking University, and Beihang University. Through the program, science or engineering students pursued three years at the civilian university before transferring to the Air Force Aviation University in their fourth year.⁶⁵ Starting around the same time, a number of civilian schools began signing cooperation agreements focused on talent development with PLA organizations. For example, in 2013 the Lanzhou Military Region and Tsinghua University signed an agreement to create a software developer training course.⁶⁶ In 2024 the CMC Logistics Support Department and the Central University of Finance and Economics focused on training department personnel in business and finance.⁶⁷

Higher-level coordination between civilian and military institutions on talent development also continues to develop. The PLA coordinates with both the Ministry of Education and local government offices in, for instance, the recruitment of high school graduates into military universities and course accreditation. In Sichuan Province in 2023, political assessments of applicants to military universities involved coordination between the relevant military districts, recruitment offices, public security organizations, military service agencies, education departments, and individual high schools.⁶⁸ A leading group for talent work has also been established to coordinate such efforts, and the CMC has formed the Cadre Evaluation Committee to improve assessment and promotion procedures.⁶⁹

⁶⁴ “Understanding the Roles of the Military Officers and Enlisted Service Members,” Military Onesource, August 19, 2024, <https://www.militaryonesource.mil/military-basics/new-to-the-military/military-officer-and-enlisted-service-members-roles>.

⁶⁵ Qian and Luo, “强军之道，要在得人。”

⁶⁶ Wu Yi and Jia Baohua, “兰州军区与清华大学签订人才战略合作协议” [Lanzhou Military Region and Tsinghua University Signed a Strategic Talent Cooperation Agreement], *PLA Daily*, July 12, 2013, <https://www.tsinghua.edu.cn/info/1182/36230.htm>.

⁶⁷ “军委后勤保障部与国内高校签订联合培养框架协议” [The Logistics Support Department of the Central Military Commission Signed a Joint Training Framework Agreement with Domestic Universities], *PLA Daily*, March 28, 2024, <https://weibo.com/2280198017/O76f34uuP>.

⁶⁸ “四川：关于做好2023年军队院校在川招收普通高中毕业生工作的通知” [Sichuan: Notice on the 2023 Military Academy Recruitment of High School Graduates from Sichuan], Sichuan Provincial Education Examination Authority, June 20, 2023, <https://gaokao.chsi.com.cn/gkxx/zc/ss/202306/20230620/2293094074.html>.

⁶⁹ Yin Yanqi et al., “习近平关于人才强军重要论述论析” [Analysis of Xi Jinping's Important Exposition on Strengthening the Military with Talented People], *Front of Thought and Theory* 9, no. 2 (2023): 21–27.

Progress in Developing the PLA's Personnel

Broadly speaking, the simple fact that disruptive changes to the PLA's personnel system continue indicates that China's leadership remains unsatisfied with progress on this front. Especially viewed in the context of recent corruption-related upheavals in the PLA Rocket Force—which a Department of Defense report claims have been serious enough to make civilian leadership less confident in the PLA's overall capabilities—the content of the changes identified in this chapter indicates that the PLA more specifically is most concerned with the commitment of its personnel and their skill levels.⁷⁰

The PLA has likely had some success in improving on both of those fronts. The upheaval in the PLA Rocket Force notwithstanding, while official PLA reporting indicates the need to remain vigilant against corruption, the force in recent years has begun making claims that the “anti-corruption struggle has achieved an overwhelming victory and has been fully consolidated.”⁷¹ To the extent this is true, it has likely improved servicemembers' experience in the military and their perception of the force and its leadership. While the PLA's redoubled emphasis on political work could have negative impacts on operational readiness by taking up valuable training time, political officers in the PLA also perform a wide range of services for personnel that often tangibly improve their lives. Combined with the broad range of improved policies and support for military families detailed above, as well as the concrete actions China is taking to increase the prestige of military service, it seems likely that PLA officers' commitment to the force will have increased as their treatment has improved.

With regard to skill, improvement has also been evident. The PLA has substantially increased the realism of its training exercises and, as detailed above, has made progress in both improving standards for assessment and standardizing them. The proportion of college-educated personnel in the PLA steadily increased to around 57% in 2020, and incentives detailed in this chapter may have increased that figure even further since then.⁷² While direct comparisons are difficult to interpret because of differences in command structures, force demographics, and educational quality,

⁷⁰ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2024* (Washington, D.C., December 2024), <https://media.defense.gov/2024/Dec/18/2003615520/-1/-1/0/MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA-2024.PDF>.

⁷¹ Zhou Junjie, “思想战线 | 纵深推进正风肃纪反腐” [Ideological Front: Deepen the Fight against Corruption], *PLA Daily*, May 13, 2024, http://www.81.cn/yw_208727/16307883.html.

⁷² Allen et al., “Personnel of the People's Liberation Army.”

in the “2022 Demographics Profile of the Military Community” the U.S. Department of Defense reported that 23.5% of U.S. military personnel held undergraduate or higher degrees.⁷³ While the impacts of expanded vocational training offerings, continued PME reforms, and deepening partnerships with civilian institutions are less clear, there is no question that PLA personnel have additional options for developing their skills.

Nonetheless, this chapter also highlights at least four persistent problem areas for the PLA. First, and perhaps most prominently, adjustment to organizational reforms is ongoing. Career paths have been disrupted, responsibilities changed, and new skill requirements imposed, for instance. This disruption has been evident at least since the PLA’s extensive reorganization initiated in late 2015, and the dissolution of the Strategic Support Force that was announced in early 2024 is likely to have exacerbated the issue.⁷⁴ A political work official from the Academy of Military Sciences was explicit about this problem in late 2023, noting that in addition to needing to implement general improvements in military human resources, the PLA still needed to “adapt to the reconstruction of the military’s organizational form.”⁷⁵ While this commentator spoke mostly of adjusting higher-level personnel structures such as ranks and entry/exit ratios, others have noted in official media that “post adjustments” (崗位調整) and “job exchanges” (任職交流) have become commonplace for PLA personnel since these reorganizations.⁷⁶ While some of the changes detailed above, such as moving subsidies and retraining offerings, could help mitigate these impacts, it is not clear how effective they have been. The relatively basic improvements to training and assessment being emphasized in official media also highlight the extent to which the PLA is still working to adjust to the major organizational changes it continues to experience.

Second, problems persist with matching the supply of skilled personnel to the specific (and fast-changing) needs of the force. This is evident, for instance, in the expansion of NCO-specific programs for targeted training and direct recruitment discussed above. A commentator from the Military

⁷³ U.S. Department of Defense, “2022 Demographics Profile of the Military Community,” November 2023, <https://download.militaryonesource.mil/12038/MOS/Reports/2022-demographics-report.pdf>.

⁷⁴ Brendan S. Mulvaney, “The PLA’s New Information Support Force,” China Aerospace Studies Institute, April 22, 2024, <https://www.airuniversity.af.edu/CASI/Display/Article/3749754/the-plas-new-information-support-force>.

⁷⁵ Zhang Qianrong and Zhang Jie, “以六大转变为抓手培养新型军事人才” [Cultivating New Military Talents with Six Transformations], *Guangming Daily*, October 15, 2023, https://news.gmw.cn/2023-10/15/content_36893533.htm.

⁷⁶ Zhang Kejin et al., “軍隊代表委員熱議深入實施新時代人才強軍戰略” [Military Representatives Discussed the Implementation of the Strategy of Strengthening the Military with Talents in the New Era], *PLA Daily*, March 9, 2024, <http://www.mod.gov.cn/gfbw/qwfb/16292417.html>.

Talent Science Research Center at the PLA National Defense University expanded on this problem in March 2024, arguing that sources of recruits needed to be diversified and that structural talent problems in the force such as “clustering” (扎堆) and “fault lines” (断层) still needed to be resolved.⁷⁷ Even as the PRC’s defense industries speed ahead to produce cutting-edge weapons, sensors, and communications technologies for the military, concerns about how effectively the PLA’s personnel will be able to use them appear to persist.

Third, the PLA is still working to resolve the tensions raised by strengthening and standardizing assessment programs for promotion and retention. These efforts have been something of a double-edged sword. On the one hand, they help the force gain more control over promotions and, in an ideal world, help fight against corruption by applying consistent standards for talent. On the other hand, new requirements can also interrupt careers that servicemembers had counted on under previous systems. At one PLA Rocket Force base, for instance, the director of the human resources department missed several opportunities to serve as brigade political commissar because he had no grassroots service experience (基层任职经历), which was required for such posts under the new rules.⁷⁸ While the reporter conveying this story claimed the individual’s commitment to service remained strong because he was aware of the benefits of the new system to the force overall, it is unlikely that all PLA personnel would be so magnanimous about having their career paths interrupted.

Fourth, the expansion of incentives to keep personnel happy in the PLA also indicates that military leaders are concerned with morale and retention in general. Competition for the best talent is fierce. While in some cases compensation for highly educated PLA personnel is now close to the averages for top-tier cities, in many cases it is still substantially lower than in the private sector.⁷⁹ In 2018, for instance, a new PLA cyber expert might have earned around 84,000 renminbi per year, whereas with a bonus for technical skills the monthly starting salary for a cyber expert at Alibaba was almost an order of magnitude higher, at more than 50,000 renminbi per month.⁸⁰

⁷⁷ Li Wenxuan and Chen Anran, “加快推进军事人员‘三个全面转型升级’” [Accelerate the “Three Comprehensive Transformations and Upgrades” of Military Personnel], *Guangming Daily*, March 3, 2024, https://news.gmw.cn/2024-03/03/content_37180327.htm.

⁷⁸ “Selecting and Employing,” *Paper*, 2024.

⁷⁹ Allen et al., “Personnel of the People’s Liberation Army.”

⁸⁰ Joel Wuthnow and Philip C. Saunders, “A New Step Forward in PLA Professionalization,” Jamestown Foundation, China Brief, March 15, 2021, <https://jamestown.org/program/a-new-step-forward-in-pla-professionalization>.

In 2023 the PLA Air Force was reportedly offering around 144,000 renminbi per year to those with a graduate degree entering professional and technical roles—an improvement to be sure, but still not competitive with private-sector salaries.⁸¹ While additional financial support for military families and preferential treatment from localities will help, implementation of these incentives appears to be just beginning, and it is unclear how widespread they will turn out to be.

Conclusion

The PLA remains a force in transition. After many years of focusing on mechanization and the basic needs of its personnel, it now appears to have the bandwidth—and inclination—to devote substantial energy to improving the experience of personnel in the force. While complaints from PLA personnel evidently remain widespread, military leaders appear both aware of these issues and willing to work to address them. Civilian leaders and institutions, too, often appear eager to cooperate with the PLA to offer benefits to military personnel and assist in enhancing the human resources available to China's military. The goal of improving the PLA's human resources, though, will for the foreseeable future need to compete with a still relatively attractive private sector in China, as well as with the demands of ongoing major reorganizations to the force. While the PLA appears cognizant of its own limitations on this front, it remains unclear whether senior CCP leadership views the personnel-related weaknesses of the PLA as sufficient to instill caution in involving the force in conflict.

⁸¹ Aadil Brar, "China Is Desperately Trying to Fill Its Military Ranks," *Newsweek*, November 13, 2023, <https://www.newsweek.com/china-peoples-liberation-army-recruitment-shortfall-benefits-1842992>.

EXECUTIVE SUMMARY

This chapter examines the role of artificial intelligence (AI) in the new revolution in military affairs by the PLA and the current and future applications of AI-enabled technologies.

MAIN ARGUMENT

Owing to the wide variety of applications, the PLA has prioritized AI as part of the new revolution in military affairs. It is not possible to accurately quantify or qualify the level of integration of various AI applications through the military's current forces due to the lack of systematic and reliable access to information. The PLA does benefit from a robust civilian AI industry. Beyond current observable applications of AI in areas such as unmanned systems, PLA researchers identify AI-enabled battlefield command and control (C2) as the next development on the (albeit distant) horizon, which will be of central importance for intelligentized warfighting. Further developing AI-enabled simulation technology will serve the dual purpose of training PLA forces that lack warfighting experience and adding to training data for an eventual "command brain." However, political risk, bias, and reliability issues, in addition to a lack of trustworthy data sets and talent, are seen as significant obstacles to making progress in developing and integrating AI-enabled C2 applications.

POLICY IMPLICATIONS

- If the PLA continues to be plagued by corruption in its high ranks, particularly in services of strategic importance to its key missions, then the PLA leadership could seek AI-enabled C2 as a means to overcome potential disloyalty.
- If researchers observe the successful development and integration of related civilian AI-enabled decision-making applications in China, then such technology could be used as a proxy measurement of the PLA's likely progress toward a military application of AI-enabled C2.
- If the PLA does move toward AI-enabled C2, then the risk of escalation will likely increase owing to a lack of understanding in how decisions are formed within the PLA's structures and on what data these automated decisions are based.

AI and the PLA's New Revolution in Military Affairs: Moving from Weapons Applications toward a Battle Brain

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The objective of this chapter is to interrogate existing literature and research on the integration of artificial intelligence (AI) by the People's Liberation Army (PLA) across its services by 2024 and to update these findings through original research where necessary and possible. The chapter seeks to understand the following issues: (1) what the PLA's assessments reveal about the current and future uses of AI across the military and its operations, with a particular focus on the use of AI for command and control (C2) in modern and future conflict, (2) whether PLA debates reflect Western understanding of China's goals in the integration of AI for the battlefield or whether the PLA is experimenting with AI applications in novel and innovative ways that are not aligned with Western views, and (3) what PLA literature reveals about China's relative risks and weaknesses with respect to achieving these goals. The chapters argues that while it is difficult to observe the full extent of China's progress in integrating a wide variety of AI applications throughout the PLA, current scholars linked to the country's military and defense institutions are already examining the next step in potential AI application: the development of a "command brain" and the use of AI for C2 in an era of intelligentized warfare.

The PLA's Views of an Ongoing Revolution in Military Affairs

In 2015 the Chinese government published a new military strategy in its defense white paper that noted the changes in modern warfare, specifically

that new domains and technologies have heightened strategic competition.¹ At the 19th Party Congress in 2017, Xi Jinping set a timeline for PLA modernization that included goals for achieving basic mechanization and improving informationization by 2020, achieving military modernization by 2035, and transforming the PLA into a world-class military by the mid-21st century.² Xi has instructed the PLA to transform through mechanization, informatization, and finally intelligentization. Mechanization refers to the standardization of modern platforms and equipment across the PLA, while informatization refers to the creation of a networked PLA that can access and share data across the military. Intelligentization refers to the integration of emerging technologies across the PLA. In 2020, however, Xi indicated that all three of these developments should progress simultaneously in order to achieve a new goal by 2027.

Ultimately, achieving these goals is vital for the PLA to keep pace within the ongoing revolution in military affairs and the changing character of warfare. This requires the PLA to also modernize its warfighting concepts. If warfare in the past was characterized as a contest between conventionally armed forces in which a military's superior numbers of personnel, equipment, and weapons were key in its ability to achieve effects on the battlefield, "systems confrontation" is one whereby a military achieves victory in conflict by attacking its adversary's networked systems through "systems destruction warfare." The PLA's concept of "multidomain precision warfare" is in ongoing development.

AI, in particular, is considered to be a vital area of PLA modernization for systems destruction and future warfighting. The heightened pace of war and enlarged battlefield will require the shortening of OODA-loops (observe, orient, decide, act). The speed required for successful future warfighting exceeds human abilities and therefore requires additional computational power. As such, the focus in this chapter will be on Chinese exploration and analysis of the current and potential future applications of AI-enabled technologies central to C2 and battlefield decision-making. This includes the application of AI to enhance the collection, processing, and decision-making of battlefield big data, as well as the use of AI-enabled simulation technologies for personnel and program training purposes. While the

¹ State Council Information Office of the People's Republic of China (PRC), *China's Military Strategy* (Beijing, May 2015), https://english.www.gov.cn/archive/white_paper/2015/05/27/content_281475115610833.htm.

² Xi Jinping, "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," Xinhua, October 18, 2017, http://www.xinhuanet.com/english/download/Xi_Jinping's_report_at_19th_CPC_National_Congress.pdf.

integration of AI across the PLA is ongoing, categories of applications have been identified in existing research. These include intelligent and autonomous vehicles; intelligence, surveillance, and reconnaissance (ISR); predictive maintenance and logistics; information and electronic warfare; simulation and training; C2; and automated target recognitions.³

Until now, the PLA has predominantly used AI in its weapons systems and in battlefield functions and support. With regard to the former, the PLA has benefited from China's large civilian drone industry. According to the U.S. Department of Defense's 2023 China Military Power Report, the PLA is "pursuing greater autonomy for unmanned aerial, surface, and underwater vehicles to enable manned and unmanned teaming, swarm attacks, optimized logistic support and distributed intelligence, surveillance and reconnaissance, among other capabilities."⁴ Jacob Stokes identifies civilian drone swarming activities as one area that could benefit the military through relatively quick spin-on effects.⁵ Nonetheless, he judges that China has not yet developed fully autonomous lethal systems. Regarding battlefield functions and support, the anecdotal evidence suggests that the PLA is already likely to use or start using AI for predictive maintenance and logistics systems, given their similarities to commercially available technologies. Stokes also judges that the PLA is likely already using basic forms of AI for some ISR tasks and that AI could be useful in the future to integrate and sift through large amounts of data from various types of sensors.

The role of humans in future warfighting C2 continues to be an area of interest for Chinese researchers. Most acknowledge that the speed of decision-making will eventually remove humans from the loop.⁶ This

³ Jacob Stokes, Alexander Sullivan, and Noah Greene, "U.S.-China Competition and Military AI," Center for a New American Security, July 2023, <https://s3.us-east-1.amazonaws.com/files.cnas.org/documents/FINAL4.pdf>; Alex Barker, "Giving Precision Munitions 'Eyes' and a 'Brain': The State of PLA Research on Military Target Recognition," Jamestown Foundation, China Brief, June 2, 2021, <https://jamestown.org/program/giving-precision-munitions-eyes-and-a-brain-the-state-of-pla-research-on-military-target-recognition>; and Elsa B. Kania and Ian Burns McCaslin, "Learning Warfare from the Laboratory: China's Progression in Wargaming and Opposing Force Training," Institute for the Study of War, September 2021, <https://www.understandingwar.org/sites/default/files/Learning%20Warfare%20from%20the%20Laboratory%20ISW%20September%202021%20Report.pdf>.

⁴ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023* (Washington, D.C., October 2023), 97.

⁵ Jacob Stokes, "Military Artificial Intelligence, the People's Liberation Army and the U.S.-China Strategic Competition," testimony before the U.S.-China Economic and Security Review Commission, February 1, 2024, https://www.uscc.gov/sites/default/files/2024-02/Jacob_Stokes_Testimony.pdf.

⁶ Kevin Pollpeter and Amanda Kerrigan with Andrew Ilachinski, "The PLA and Intelligent Warfare: A Preliminary Analysis," CNA, October 2021, <https://www.cna.org/reports/2021/10/the-pla-and-intelligent-warfare-preliminary-analysis>; and Elsa Kania, "Artificial Intelligence in Future Chinese Command Decision Making," in *Artificial Intelligence, China, Russia, and the Global Order*, ed. Nicholas D. Wright (Maxwell AFB: Air University Press, 2019), 153–61, <https://www.jstor.org/stable/pdf/resrep19585.26.pdf>.

scenario, however, remains unlikely for the time being. Chinese scholarly writing for the most part still argues that humans will remain the most decisive factor in war and that machines will not be able to substitute for human creativity and flexibility.⁷

As with the PLA's other modernization goals, intelligentization, too, is represented in earlier PLA writings as a response to U.S. and Russian investment in AI-enabled technologies. According to experts like Shi Haiming, an associate professor at the National University of Defense Technology and deputy director of the Youth Workers Committee of the China Command and Control Society, by 2017 the United States had "deployed relevant research projects on artificial intelligence and future warfare in all fields to seize the commanding heights of military competition," while "Russia [had] also accelerated its pace in this field and started to make strategic arrangements."⁸ Chinese authors affiliated with China's National University of Defense Technology also point to the investments made by the governments of Japan and Australia more recently for examples of how to apply AI to air, land, and sea combat.⁹

AI-enabled warfare is an area where Chinese leaders hope to gain an advantage. Though China still has some weaknesses in the development of AI, which will be discussed later in this chapter, the inputs into its AI innovation ecosystem are growing. The Organisation for Economic Co-operation and Development (OECD) estimates that investment in AI-related sectors in China is \$91 billion. This falls behind the total U.S. investment of \$300 billion, but ahead of the European Union's investment of \$45 billion.¹⁰ China's private-sector AI firms are also growing, spurred by Beijing's efforts to support the expansion of AI.¹¹ Though concrete figures are difficult to confirm, some estimates show that the value of China's AI industry reached \$81 billion in 2023, up 13.9% year-on-year, with over

⁷ Pollpeter et al., "The PLA and Intelligent Warfare," 12.

⁸ Zhang Qiang, "专家:军事智能化绝不仅仅是人工智能" [Expert: Military Intelligence Is More Than Just Artificial Intelligence], *Science and Technology Daily*, December 6, 2017, https://digitalpaper.stdaily.com/http_www.kjrb.com/kjrb/html/2017-12/06/content_383423.htm?div=-1.

⁹ Jia Zhenzhen, Ding Ning, and Chen Fangzhou, "智能化战争加速到来" [Intelligent Warfare Is Accelerating], *PLA Daily*, March 27, 2022, <http://www.81.cn/jfjbmap/content/1/2022-03/17/11/2022031711.pdf.pdf>.

¹⁰ OECD, *OECD Digital Economy Outlook 2024 (Volume 1): Embracing the Technology Frontier* (Paris: OECD Publishing, 2024), https://www.oecd-ilibrary.org/science-and-technology/oecd-digital-economy-outlook-2024-volume-1_a1689dc5-en.

¹¹ Rebecca Arcesati, "China's AI Development Model in an Era of Technological Deglobalization," Mercator Institute for China Studies, May 2, 2024, <https://merics.org/en/report/chinas-ai-development-model-era-technological-deglobalization>.

4,500 AI firms registered.¹² According to Shan Zhongde, the vice minister of industry and information technology, China boasts 421 national-level demonstration factories featuring intelligent manufacturing and over 10,000 provincial-level digital workshops and smart factories.¹³

Research in recent years has questioned whether the Chinese government is outspending the U.S. government in AI research and development.¹⁴ The 2017 State Council's New Generation AI Development Plan spurred an increase in domestic AI-related research and investment.¹⁵ While the quality and quantity of AI-related research publications are important factors to consider when using academic publication figures to measure innovation in AI research, the OECD in 2024 stated that since 2022 the share of high-impact AI research publications in the United States has declined.¹⁶ By contrast, China's share of high-impact AI research publications has steadily risen and in 2019 overtook the United States and EU.¹⁷ The field-weighted citation impact of Chinese research on AI has also steadily increased since 2010.¹⁸

China's progress in AI development and adoption provides the PLA with a growing R&D base in AI and with private-sector companies with which to partner or from which to acquire commercial off-the-shelf technology through the military-civil fusion strategy. For example, China's AI-augmented gaming companies are achieving international reach, in part due to the domestic crackdown on Chinese gaming. However, the same companies developing their international gaming products could provide opportunities to further develop AI-enabled simulation technology or wargaming.¹⁹

¹² "China's AI Boom Sees New Wave of Applications," Xinhua, October 26, 2024, <https://english.news.cn/20241026/2b782d414ebd412eab6f61e6c4f02b45/c.html>.

¹³ Ibid.

¹⁴ Ashwin Acharya and Zachary Arnold, "Chinese Public AI R&D Spending: Provisional Findings," Center for Security and Emerging Technology (CSET), December 2019, <https://cset.georgetown.edu/publication/chinese-public-ai-rd-spending-provisional-findings>.

¹⁵ "新一代人工智能发展规划的通知" [Notice of the Development Plan of the New Generation of Artificial Intelligence], State Council (PRC), July 20, 2017, https://www.gov.cn/zhengce/content/2017-07/20/content_5211996.htm.

¹⁶ OECD, *OECD Digital Economy Outlook 2024 (Volume 1)*.

¹⁷ Ibid.; and OECD, "Artificial Intelligence," <https://www.oecd.org/en/topics/policy-issues/artificial-intelligence.html>.

¹⁸ Daniel Castro, Michael McLaughlin, and Eline Chivot, "Who Is Winning the AI Race: China, the EU or the United States?" Center for Data Innovation, August 2019, <https://www2.datainnovation.org/2019-china-eu-us-ai.pdf>.

¹⁹ Gerui Wang, "Games Gone Global: How China's AI Augmented Games Found Internet Success," China Story, September 3, 2024, <https://www.thechinastory.org/games-gone-global-how-chinas-ai-augmented-games-have-found-international-success>; and Kania and McCaslin, "Learning Warfare from the Laboratory," 18.

Methodological Considerations and Existing Research

The research presented in this chapter is based on existing research and the introduction of new Chinese secondary source literature on AI integration across the PLA. With respect to the existing research utilized, significant work has already been produced on specific topics such as China's exploration of AI technologies for nuclear and non-nuclear command, control, and communications (C3); investment in intelligent and autonomous vehicles; and ISR.²⁰ Yet, the methodological limitations in researching China's integration of AI are also worth noting. Most existing literature has revolved around access to Chinese primary or secondary sources such as academic publications, PLA-linked publications, online news articles, company registration data, or procurement information. These studies are normally conducted within specific parameters, such as a length of time or a specific AI application. This chapter has taken a similar approach, combining Chinese media sources such as the *PLA Daily* and academic literature from Chinese institutions to update current understanding of how Chinese authors are exploring the application of AI to decision-making in the PLA. The limitations of this approach are that articles published in the *PLA Daily* may be authored by researchers linked to PLA-affiliated institutions but reflect their personal views rather than current research ongoing within the PLA. Selection bias is another potential limitation of relying on academic literature, as access to Chinese academic databases has become progressively restricted in recent years.²¹ While some databases still provide access, researchers should note that a significant body of research is likely not accessible to foreign researchers.

Existing secondary research documents the various different applications—both current and aspirational—of emerging technologies, and AI in particular, across the PLA.²² At the level of capabilities, the current literature suggests that the integration of AI across the PLA remains a work in progress. In the short to medium term, analysts believe that most of

²⁰ See Pollpeter et al., “The PLA and Intelligent Warfare”; Elsa B. Kania, “Emerging Technologies, Emerging Challenges: The Potential Employment of New Technologies in Future PLA NC3,” Technology for Global Security, September 5, 2019, https://securityandtechnology.org/wp-content/uploads/2020/07/kania_-_emerging_technologies_emerging_challenges_IST_nc3.pdf; and Ryan Fedusiak, Jennifer Melot, and Ben Murphy, “Harnessed Lightning: How the Chinese Military Is Adopting Artificial Intelligence,” CSET, October 2021, https://securityandtechnology.org/wp-content/uploads/2020/07/kania_-_emerging_technologies_emerging_challenges_IST_nc3.pdf.

²¹ Pak You, “China to Slash Foreign Researchers’ Access to Academic Database,” *Financial Times*, March 27, 2023, <https://www.ft.com/content/93051bff-5af8-4841-8e1f-8c9ab0cbd3fe>.

²² Elsa B. Kania, “Artificial Intelligence in China’s Revolution in Military Affairs,” *Journal of Strategic Studies* 44, no. 4 (2021): 515–42.

the AI-related changes in the PLA will be incremental and narrow, while revolutionary changes will likely only come in the medium to long term.²³

Measuring the level of integration of emerging technologies and AI across the PLA remains a challenge. To date, existing literature on the subject is able to qualify the various areas of application and provide case studies of work, but it is unable to provide a systematic understanding of the extent of AI-enabled technologies across the PLA's various service branches. For example, a 2021 study by the Center for Security and Emerging Technology (CSET) examined AI-related procurement data as a proxy measurement for AI applications across the PLA. The CSET study found that AI-related equipment and system procurement only represents 1.9% of public PLA procurement contracts awarded between April and November 2020.²⁴ The contracts were categorized into seven areas of application: intelligent and autonomous vehicles, ISR, predictive maintenance and logistics, information and electronic warfare, simulation and training, C3, and automated target recognition. The study found that the number of AI-related equipment contracts does not correlate with the portion of public contracts related to AI from the total number of equipment contracts awarded. As shown in **Table 1**, the awarding of a high number of contracts did not necessarily mean that the majority of contracts awarded were AI-related. Second, the study was

TABLE 1 Proportion and number of AI-related contracts per PLA service branch

	% of AI-related contracts of total per service	Number of AI-related contracts
Ground Force	8.5%	58
Air Force	5.0%	10
Rocket Force	5.8%	4
Navy	4.6%	51
Strategic Support Force	3.9%	65

SOURCE: Margarita Konaev et al., “U.S. and Chinese Military AI Purchases: An Assessment of Military Procurement Data between April and November 2020,” CSET, August 2023, <https://cset.georgetown.edu/wp-content/uploads/CSET-U.S.-and-Chinese-Military-AI-Purchases-1.pdf>.

²³ Stokes, Sullivan, and Greene, “U.S.-China Competition and Military AI,” 5.

²⁴ Margarita Konaev et al., “U.S. and Chinese Military AI Purchases: An Assessment of Military Procurement Data between April and November 2020,” CSET, August 2023, <https://cset.georgetown.edu/wp-content/uploads/CSET-U.S.-and-Chinese-Military-AI-Purchases-1.pdf>. The original data set is no longer accessible.

able to provide a breakdown per service branch of specific AI applications sought by each service branch, as shown in **Table 2**. This research shows, however, that while the PLA continues to develop its conventional military capability, there is ongoing interest and experimentation in AI applications across the PLA’s services.

TABLE 2 PLA service branch contracts according to types of AI-application

	Strategic Support Force	Ground Force	Navy	Air Force	Rocket Force
Intelligent / autonomous vehicles	X	X	X	X	X
ISR	X		X		
Predictive maintenance and logistics	X	X			X
Information and electronic warfare	X	x		x	
Simulation and training	X			X	
C3				X	X
Automated target recognition	x		X		

SOURCE: Konaev et al., “U.S. and Chinese Military AI Purchases.”

AI for Command and Control in the PLA

PLA-linked publications or Chinese research institutes provide insight into how the PLA is currently thinking about the use of AI technology for C2 and how this is evolving over time as R&D in this technology develops. Authors such as Yang Xiaodan of the PLA National Defense University argue that the potential application of AI for PLA C2 is broad, even though at the moment the technology is not yet mature enough for full-scale implementation.²⁵ The following discussion will focus on two specific

²⁵ Yang Xiaodan, “海军人工智能技术的应用策略研究” [Research on the Application Strategy of Naval Artificial Intelligence Technology], *Journal of Naval University of Engineering* 16, no. 1 (2019).

applications of C2: the development of an intelligent battlefield command system and simulation technology. These two applications address two current weaknesses in the PLA: battlefield decision-making and a lack of combat experience.

AI for Intelligent Battlefield Command Systems

Between 2017 and 2024, the PLA literature focused on the development of “intelligent command.” While earlier Chinese literature examined foreign military developments in these areas, more recent PLA-linked publications have explored in greater detail what autonomous decision-making might look like in a PLA-specific context. However, it is important to note that academic literature indicates that this technology is still in its infancy.²⁶

Existing literature finds that the PLA seeks to employ intelligent battlefield command systems for similar purposes as the U.S. and other militaries. The starting point for most articles is an examination of the problems posed by high-intensity warfare in an era of network-centric warfare and competition for information dominance. As the ability of militaries to obtain data is increasing, so also has the pressure increased on military commanders to make decisions based on large amounts of information under immense time pressure. An article by authors from the Ningbo University of Science and Technology, the PLA Navy, and the subsidiary company Ship Cloud of the China Shipbuilding Industry Corporation stated that “any delay in the upper ring [of command] will prolong the combat cycle of the lower ring, and directly affect the subjective initiative of decision-makers in the lower ring,” thus causing a butterfly effect that will be amplified step by step.²⁷

PLA writings about intelligent battlefield command systems portray these systems as “vital to the success or failure of system confrontation, and key to winning a complete victory.” While existing research does not find many examples of the procurement of this category of AI-enabled technology, current PLA literature argue that “decision-making confrontation” has become a core issue for the PLA’s technological advancement. Any advantage in this area could help disrupt or block the enemy’s own decision-making

²⁶ Zhang Zhao et al., “A Brief Discussion and Prospect of the Military Metaverse,” *Journal of System Simulation* 35, no. 7 (2023): 1421–37.

²⁷ Lu Xiaobin, Zhao Shuqian, and Li Fulin, “智能化指挥控制新范式” [OPA: A New Paradigm for Intelligent Command and Control], *PLA Daily*, September 9, 2021, http://www.81.cn/jfjbmap/content/2021-09/09/content_298628.htm.

advantage and help “achieve goals of small battles or defeating the enemy without fighting.”²⁸

The battlefield command system (also referred to as a combat management system) refers to “the command information system used to support combat management activities, including intelligence collection, information transmission, target identification, threat assessment, weapon allocation, and mission planning.”²⁹ An intelligent battlefield command system will act as the central nervous system of future intelligent C2, using AI to improve the effectiveness of military command for situational judgment, command decision-making, automatic planning, and control of command objects.³⁰ An intelligent battlefield command system would complete combat command tasks to efficiently implement C2.³¹ *PLA Daily* articles indicate that initial efforts would maintain human participation in the loop, while in the future intelligent battlefield command systems could potentially act independently and automatically. Intelligent battlefield command systems would use technology to process large amounts of heterogenous data streams obtained from multiple sources, extract useful battlefield intelligence, observe and analyze changes happening in real time on the battlefield, and enable the PLA to transition from information advantage to battlefield advantage.

Some PLA authors argue that the military’s decision-making can become more flexible and “self-organizing” by flattening the command system.³² As one article explains, widespread deployment of intelligent weapons and equipment and use of edge computing will greatly change

²⁸ Wang Xiaobo, “为联合作战体系涡轮增压” [Turbocharging the Joint Operations System], *PLA Daily*, May 14, 2020, http://www.81.cn/jfjbmap/content/2020-05/14/content_261380.htm.

²⁹ Yang Lianzhen, “作战管理系统:现代化作战体系核心” [Combat Management System: The Core of Modern Combat System], *PLA Daily*, April 22, 2022, http://www.81.cn/jfjbmap/content/2022-04/22/content_314186.htm. The author is the deputy director and professor of the Training Management Department of the Armed Police Command Academy.

³⁰ Li Jianping, Ji Fengzhu, and Li Lin, “浅析智能化指挥信息系统发展” [A Brief Analysis on the Development of Intelligent Command Information System], *PLA Daily*, August 9, 2022, http://www.81.cn/jfjbmap/content/2022-08/09/content_321593.htm. The authors include the deputy director of the Forecasting Research Center and Key Laboratory of Big Data Mining and Knowledge Management of the Chinese Academy of Sciences and a researcher at the Department of Electrical Engineering of the Army Engineering University of the PLA (formerly the Ordnance Engineering College of the PLA).

³¹ Yan Ke, Shi Tongbo, and Yang Kuo, “加强智能化指挥系统发展评估” [Strengthen the Evaluation of the Development of Intelligent Command Systems], *PLA Daily*, April 12, 2022, http://www.81.cn/jfjbmap/content/2022-04/12/content_313461.htm. The authors are from the University of Science and Technology of China and the National Defense University’s Joint Operations College.

³² Shi Haiming and Pei Shuai, “认清智能化战争的制胜根本” [Identify the Characteristics of Intelligent Transformation of Command and Control], *PLA Daily*, March 17, 2022, http://www.81.cn/jfjbmap/content/1/2022-03/17/11/2022031711_pdf.pdf.

the style of future warfare.³³ Shifting the focus of operations forward will require allocating and transferring decision-making power to intelligent node terminals away from the center and toward the edge. Edge C2 will enhance the PLA's ability to respond immediately to data and situational changes.³⁴ As a result, C2 will become more distributed and linked through cloud brains or command brains.³⁵ Researchers from the National University of Defense Technology are already studying the requirements for different data information distribution systems, depending on the type of activity conducted at the center through cloud computing, or when that is not possible, along the edge (nodes that collect intelligence, circulate intelligence, or act on intelligence, such as attack nodes).³⁶

Building an AI-enabled intelligent command brain will involve deep coupling of human-machine intelligence—for example, through brain-computer interfaces that rely on the employment of machine learning and deep neural networks.³⁷ This command brain is envisioned by some PLA authors to be used at the strategic, campaign, and tactical C2 levels. In the future, PLA writings suggest tactical-level operations such as air defense will fall firmly within intelligent C2 systems, as human reaction time will be too slow. An exception remains tactical tasks with “high political sensitivity, special purposes and complex combat environments which will need to be directly commanded and controlled by humans, such as special operations.”³⁸ Part of the campaign command will also be transferred to AI, such as the timing of launching and ending campaigns and the right to appoint and remove campaign-level commanders, decide the direction of campaigns, allocate combat groups and tasks, control important technical weapons, choose targets, and allocate combat resources.³⁹ As durations of

³³ Wang Xiaobo, “为联合作战体系涡轮增压” [Turbocharging the Joint Operations System], *PLA Daily*, May 14, 2020, http://www.81.cn/jfbmap/content/2020-05/14/content_261380.htm.

³⁴ Yang Dongsheng and Zhang Weiming, “The Rise of the Edge: Analysis of the Background, Concept and Model Mechanism of Edge C2,” *Journal of Command and Control* 6, no. 2 (2020).

³⁵ Shi and Pei, “认清智能化战争的制胜根本.”

³⁶ Li Yue et al., “Research on Information Communication Support Force Requirement of Combat Network Based on OODA Optimization,” *Command, Control and Simulation* 45, no.4 (2023): 145–53; and Zhang Zhao et al., “Military Metaverse: Key Technologies, Potential Applications and Future Directions,” *Journal of System Simulation* 35, no. 7 (2023): 1421–37.

³⁷ Lu et al., “智能化指挥控制新范式.”

³⁸ Yuan Yi, Gao Dongming, and Zhang Yujun, “也谈智能化指挥‘自主决策’” [Also on the “Autonomous Decision-Making” of Intelligent Command], *PLA Daily*, April 18, 2019, http://www.81.cn/jfbmap/content/2019-04/18/content_231979.htm. The authors are from the Institute of War Studies of the Academy of Military Science.

³⁹ Yuan et al., “也谈智能化指挥‘自主决策’”

war campaigns are expected to be shortened, the transformation of these decisions to AI systems will be necessary.

However, strategic command will continue to be firmly controlled by humans. This includes the appointment or removal of strategic commanders, the timing of launching or ending wars, the allocation of strategic resources, and the control of weapons of mass destruction (nuclear, biological, and chemical weapons). Authors from the Institute of War Studies of the Academy of Military Science argue that these strategic decisions often involve political, economic, diplomatic, and other factors and are high risk. AI will thus only be allowed to play an auxiliary role in decision-making, “while strategic command must be firmly in the hands of humans and will not be transferred to artificial intelligence.”⁴⁰

The different approaches to the three levels of warfare suggest that researchers view the benefits of using an intelligent battlefield command system for a commander’s C2 differently depending on the situation. In less strategic situations, commanders will be assisted or potentially replaced by these systems to be able to quickly make decisions. However, in situations that are of strategic importance, it seems that even if intelligent systems are not given a role in decision-making, commanders will be able to use such systems and the large and diversified data sets on which they are based to explore potential options. However, it is not yet clear how developed this thinking is, or how the authors view the potential interaction between these three layers of decision-making. For example, the authors in question do not seem to have considered in their writing how a tactical or campaign-level decision might have a strategic impact, and if so, how automation could or should be limited or promoted.

The development of an intelligent battlefield command system also requires the development of an evaluation system ahead of time to ensure the accuracy and logic of the system. This will require building a dedicated professional evaluation cadre, though there is still a question of who would ultimately hold responsibility for evaluation. One article argues the evaluation team should comprise three types of professionals to meet both the needs of command evaluation and the technical evaluation of the intelligent system: expert evaluators who determine indicators, design evaluation plans, organize evaluation implementation, and draw evaluation conclusions; a team that implements confrontation evaluations; and a team that provides technical

⁴⁰ Yuan et al., “也谈智能化指挥‘自主决策.’”

support for the platform, data collection and analysis for quantification, and visualization of evaluation charts.⁴¹

According to one article by authors linked to the Automated Target Recognition Key Laboratory of the National University of Defense Technology and the Computer Network Information Center of the Chinese Academy of Sciences, intelligent battlefield command systems will improve not only the PLA's own battlefield decision-making but also its offensive decision-making confrontation against enemy militaries throughout an entire combat process. Some detail is provided about how the PLA would seek to attack an enemy in order to gain an advantage during conflict. By using big data analysis, the PLA could explore and compare anomalies in enemy data and quickly act on opportunities presented by confusion, errors, or weaknesses.⁴² This includes four types of warfare: data warfare, computing-power warfare, algorithm warfare, and brain-control warfare.⁴³ Data warfare seeks to disrupt, weaken, or destroy an enemy's ability to gain access to data sources so that its combat system starts to fail and responds incorrectly. Next, by launching computing-power warfare, the PLA would seek to destroy and paralyze an enemy's cloud-computing nodes and networks in order to reduce their data-computing and -processing capabilities. Third, the PLA would seek to exploit the loopholes in an enemy's algorithm and program and action strategy. Little detail is provided on this. Finally, the PLA would seek to conduct brain-control warfare through using cyber, electromagnetic, and biological technologies to influence the cognitive judgment of enemy commanders, disrupt their decision-making, and disintegrate their will to resist.

Simulation Technology

In order to address a second weakness (the lack of real combat experience), the PLA is already exploiting simulation technology to practice warfighting. Authors from the Strategic Support Force Information Engineering University explore the logic and future development of simulation technology for battlefield command. For example, by using behavioral logic modeling, intelligent image synthesis, natural language processing, and other technologies, historical battles can be recreated to

⁴¹ Yan et al., “加强智能化指挥系统发展评估.”

⁴² Zhou Guohui, Liu Wenshu, and Zhang Jian, “加快人工智能融入现代指挥决策，推动军事指挥决策水平提升” [Accelerate the Integration of Artificial Intelligence into Modern Command and Decision-Making, and Promote the Improvement of Military Command and Decision-Making Level], *PLA Daily*, June 30, 2022, http://www.81.cn/ll_208543/10167799.html.

⁴³ Ibid.

review key decisions taken in the past and improve battlefield decision-making in the future. By using wargaming simulation technology, commanders can verify combat concepts, practice tactics and processes, and identify strengths and weaknesses. One PLA article hints that this can take place prior to, after, or during campaign operations or during major exercises, which suggests the use of digital twins. Indeed, another article discusses the realization of “virtual and real integration.”⁴⁴ Prewar simulations, blue-red teaming exercise simulations, and postwar reviews based on data collection and imagery analysis can provide independent answers and analysis for commanders.⁴⁵

Some articles argue that by conducting large numbers of command training simulations, commanders are able to solidify a process. One article published by an author affiliated with the National University of Defense Technology in 2021 argues that this will improve coordination between various departments and levels within a theater command, cooperation between theater commands, and cooperation between theater commands and services. By practicing in simulations, commanders can test this command process, assessing the “correctness” of their calculations and their reasoning behind decision-making and optimizing the process depending on their respective roles in a war.⁴⁶ However, this would indicate that command processes remain a work in progress in the PLA following organizational reforms.

Simulations will also seek to help train intelligent battlefield command systems. According to one PLA source, by “building a virtual battlefield environment and competing with humans, the algorithm of the AI system will be upgraded and iterated.” In fact, “the degree of understanding of the intelligent command system by the commander is directly related to

⁴⁴ Nie Xiaoli, “洞悉智能化指挥控制新变化” [Gain Insights into New Changes in Intelligent Command and Control], *PLA Daily*, October 26, 2023, http://www.81.cn/szb_223187/szbqxq/index.html?paperName=jfjb&paperDate=2023-10-26&paperNumber=07&articleid=917941.

⁴⁵ Lu Xiaobin, “把准指挥控制智能化变革特征” [Identify the Characteristics of Intelligent Transformation of Command and Control], *PLA Daily*, May 25, 2021, http://www.81.cn/jfjbmap/content/2021-05/25/content_290178.htm. The author is from the Strategic Support Force Information Engineering University. Wang Yuxiang, Jinling, and Hu Jianwen, “构建形神兼备的智能蓝军” [Building an Intelligent Blue Team with Both Form and Spirit], *PLA Daily*, May 24, 2022, http://www.81.cn/jfjbmap/content/2022-05/24/content_316259.htm. The authors are affiliated with the National University of Defense Technology.

⁴⁶ Dong Shengli, “探究智能化作战指挥训练机理” [Explore the Mechanism of Intelligent Combat Command Training], *PLA Daily*, November 9, 2021, http://www.81.cn/jfjbmap/content/2021-11/09/content_302673.htm. The author is a professor at the School of Computer Science at the National University of Defense Technology.

the depth and breadth” of this training. Generative AI will be particularly important in this effort.⁴⁷

AI for C2 and Future Warfighting

The PLA plans to integrate AI across the military by its 2035 and 2049 modernization milestones. However, the specific details of goals for these timelines remain vague. A March 2022 article in the *PLA Daily* by authors from the PLA National Defense University argues that information warfare is still developing and that intelligent warfare is beginning to emerge.

Open-source literature does not link any further development of AI for PLA C2 with military modernization goals set out by President Xi Jinping. Although timelines for the PLA’s development and integration of an intelligent battlefield command system are not identified, *PLA Daily* articles suggest that these applications appear to be aspirational. One article references a timeline for the United States’ development of an intelligent combat system on which the system is initially established by 2035 and fully integrated into the U.S. military for C2 by 2050. The article predicts that by 2050 the United States’ approach to C2, information systems, and combat platforms will be sufficiently advanced to be fully intelligent and remove humans from the loop.⁴⁸ In addition to warfare being intelligent in nature, the future combat space will be expanded to biospace and nanospace. As this author argues, in order to seize the commanding heights of future war, “it is crucial to strengthen the tracking and research of the military of developed countries, gain insight into the characteristics of the evolution of future war forms, keep up with the development of the world’s new technological revolution, and accelerate the advancement of the military’s information combat capability.”⁴⁹ Given how closely the PLA looks at U.S. timelines for the development of capabilities, they likely inform the PLA’s own timelines for the development of a intelligent battlefield command system.

⁴⁷ Hua Rui, Yang Longxiao, and Yang Ruxin, “當生成式人工智能走向戰場” [When Generative AI Goes to the Battlefield], *PLA Daily*, December 1, 2023, http://www.81.cn/szb_223187/szbqxq/index.html?paperName=jfjb&paperDate=2023-12-01&paperNumber=11&articleid=920574.

⁴⁸ Liu Dan, “管窺美軍智能化轉型特點” [A Glimpse into the Characteristics of the U.S. Military’s Intelligent Transformation], *PLA Daily*, July 12, 2022, http://www.81.cn/jfjbmap/content/1/2022-07/12/07/2022071207_pdf.pdf. The author is affiliated with the North University of China’s School of Electrical and Control Engineering and has participated in the National Key Technologies R&D 973 Program and the Military Science and Technology Commission’s 173 Program.

⁴⁹ Ibid.

Some detail about what future development of AI is needed for the PLA's intelligent battlefield command systems to become operational appears to be available. Some authors, for example, posit that such systems require human-machine intelligence interfaces to connect directly with commanders at all states of consciousness—preconsciousness, subconsciousness, and deep consciousness. This will enable commanders to coordinate command while awake but also link with intelligent command systems to command when resting and sleeping.⁵⁰ Other future developments include brain-computer interfaces through neural probes in order to visualize human brain activity and drive operations in the physical domain.⁵¹ This technology could also be developed to translate brainwaves into words and sentences to be applied on the battlefield in the future.

Risks and Weaknesses

While Chinese authors spend considerable effort in examining the potential role for AI-enabled C2 and simulation technologies for the PLA, they also discuss in detail the potential risks that these technologies pose to the PLA and future warfighting. Furthermore, these technologies remain relatively nascent, and significant challenges must still be overcome before they can be developed to a satisfactory standard for integration across the force. Importantly, Chinese researchers still seem to lack consensus on some areas of development of these technologies.

Risks

PLA-linked authors acknowledge the risks of AI systems in their writings. These include uncertainty in algorithm development and output, the potential introduction of biases into AI training data sets, the susceptibility of vital intelligent battlefield command systems to cyberattack and disruption, and potential complications from the gradual removal of humans from decision-making cycles in the future.

Uncertainty of algorithms. AI systems are described as black boxes with blind spots that humans cannot predict. Machine learning based on big data and neural network algorithm models is viewed as particularly risky. As one article notes, “the higher the machine’s autonomy, the higher the

⁵⁰ Lu et al., “智能化指挥控制新范式.”

⁵¹ Ibid.

potential risks.”⁵² Ethical and governance principles for AI that have been proposed in recent years are yet to be tested, and the introduction of AI into the battlefield could generate unprecedented uncertainty: “if a large number of war operations occur between unmanned systems, the potential risks are immeasurable and difficult to control.”⁵³

Introduction of biases. One article describes the susceptibility of AI to inherent data biases or the lack of high-quality training data as “garbage in, garbage out.” The PLA thus seemingly still needs to improve the integrity of the data required for intelligentized decision-making and increase the accuracy of training data.⁵⁴

Susceptibility to cyberattacks and disruption. Just as PLA authors have explored the potential use of intelligent battlefield command systems to disrupt, degrade, or destroy an enemy’s battlefield command system, they have also examined the PLA’s own risk from this threat. “Human-machine collaboration and human-in-the-loop” will trigger a profound change in combat style. In the future, “the party without the support of cutting-edge intelligent technology will not be able to seize the initiative on the battlefield, and the command and control system that is highly dependent on data security will become the Achilles heel of the entire combat system.”⁵⁵ Inadequate levels of cybersecurity thus pose a potential risk. Chinese researchers argue that the PLA needs to formulate and improve its network-protection strategies, intrusion-detection capabilities, and authentication and identification methods to curb information attacks. According to a study by the International Institute for Strategic Studies, China ranks as a second-tier cyber power because its “core cyber defences remain weak compared with those of the United States, and cyber-resilience policies for its critical national infrastructure are only in the early stages of development.”⁵⁶

Removal of humans from the decision-making loop. The authors of the articles examined for this chapter do not yet seem to agree on the extent to which humans will remain in the loop in intelligent battlefield command systems.⁵⁷ Some authors argue that AI will never surpass human knowledge

⁵² Li Shihua, Zhang Zhichang, and Cao Xinhui, “警惕智能化作战新挑战” [Beware of New Challenges in Intelligent Warfare], *PLA Daily*, May 18, 2021, http://www.81.cn/jfjbmap/content/2021-05/18/content_289571.htm. The authors are affiliated with the National Defense University.

⁵³ *Ibid.*

⁵⁴ Zhou et al., “加快人工智能融入现代指挥决策，推动军事指挥决策水平提升。”

⁵⁵ Shi and Pei, “认清智能化战争的制胜根本。”

⁵⁶ International Institute for Strategic Studies, “Cyber Capabilities and National Power: A Net Assessment,” June 2021, https://www.iiss.org/globalassets/media-library---content--migration/files/research-papers/cyber-power-report/cyber-capabilities-and-national-power---a-net-assessment____.pdf

⁵⁷ Lu et al., “智能化指挥控制新范式。”

and “humans will still be the supreme rules of the battlefield” until general AI is achieved.⁵⁸ Too much human participation, they argue, will lead to failures in high-end intelligentized warfare, but too little participation risks unpredictable outcomes: “Only by ensuring that people are in the loop can we press the pause key on the intelligent system in an emergency.”⁵⁹ However, this has not stopped some authors from prescribing that the PLA advance beyond the use of machine learning toward supervised learning and reinforcement learning.⁶⁰

Weaknesses

Lack of accurate training data for algorithms. The PLA’s lack of accurate and military-relevant training data for military-relevant algorithm development to support future intelligent battlefield management systems was cited by almost all the authors of research papers and articles that were consulted for this chapter. This suggests that the PLA and Chinese researchers have yet to overcome this particular challenge.

In general, researchers have noted existing language divides within global open-access AI data sets. English is the language of 57% of data sets, while only 6% of the information is in Chinese.⁶¹ When comparing Chinese and Western generative AI systems, Chinese researchers in particular lamented that only 0.1% of ChatGPT training data sets are made up of Chinese data, and that ChatGPT reportedly spends most of its data-cleaning and debugging time on English data. This, they contend, means that the English output of ChatGPT is more logical and accurate, which increases the machine cognitive failure or loss of control in generative AI decision-making when the program is used in Mandarin. However, given that Beijing has reportedly already clamped down on access to ChatGPT in China, it is unclear why its lack of Chinese-language training data is a concern for the PLA.⁶²

Notwithstanding ChatGPT’s lack of Chinese-language data, Chinese researchers suggest that Baidu’s Wenxin, as well as Huawei’s and Alibaba’s

⁵⁸ Mao Weihao, “从ChatGPT看人工智能的军事应用” [The Military Application of Artificial Intelligence from ChatGPT], *PLA Daily*, April 13, 2023, http://www.81.cn/jfjbmap/content/1/2023-04/13/07/2023041307_.pdf.pdf.

⁵⁹ Lu et al., “智能化指挥控制新范式.”

⁶⁰ Zhou et al., “加快人工智能融入现代指挥决策，推动军事指挥决策水平提升.”

⁶¹ OECD, *OECD Digital Economy Outlook 2024 (Volume 1)*.

⁶² Helen Davidson, “‘Political Propaganda’: China Clamps Down on Access to ChatGPT,” *Guardian*, February 23, 2023, <https://www.theguardian.com/technology/2023/feb/23/china-chatgpt-clamp-down-propaganda>.

own generative AI programs that are currently under development, still lag far behind ChatGPT's level of intelligence.⁶³ The release of DeepSeek's R1 reasoning model is perhaps too recent to gain a reliable understanding of its potential application for the PLA. Unsurprisingly, Chinese news sources have predominantly written about the model's success and the international attention paid to it as a sign that China has closed the gap with Western alternatives, despite U.S. export restrictions on China.⁶⁴ Recent reporting has called into question how truly "indigenous" DeepSeek's development has been, including reports that it was created by distilling OpenAI's ChatGPT and was built on Western technology.⁶⁵ Reporting suggests that DeepSeek has quickly been adopted by users across China. Baidu's founder Robin Li has criticized DeepSeek's model for its higher propensity for incorrect hallucinations, comparatively slower speed, and higher cost than domestic alternatives.⁶⁶ Initial testing by Western think tanks has revealed that political biases seem to be baked into DeepSeek. For example, responses to foreign policy-related queries, particularly those that involved Western countries, tended to recommend more hawkish and escalatory responses.⁶⁷ This raises a general question about the potential challenges posed by the use of large language models for C2 in the future in the event that DeepSeek is used as a decision-support tool for the PLA if recommendations are not aligned with the strategic objectives of the Chinese Communist Party (CCP).

Political control. The PLA remains a political organization and any move toward the automation of C2 through intelligent battlefield command systems will require that the decisions taken by these systems remain in line with the CCP's priorities and objectives. The data sets used for training AI algorithms also pose some political challenges. Cognitive biases introduced

⁶³ Yang Dongsheng et al., "Application and Challenges of Super Large Pre-trained Models in Command and Control," *Journal of Command and Control* 9, no. 2 (2023).

⁶⁴ Guo Shuang, "中国AI快速发展美国打压尽显尴尬" [China's Rapid Development of AI Makes the U.S.'s Suppression Embarrassing], *Xinhua*, January 24, 2025, <http://www.xinhuanet.com/mrdx/20250126/7eaa78f6d495413585d26fed366f9d14/c.html>.

⁶⁵ Cristina Criddle and Eleanor Olcott, "OpenAI Says It Has Evidence China's DeepSeek Used Its Model to Train Competitor," *Financial Times*, January 29, 2025, <https://www.ft.com/content/a0dfedd1-5255-4fa9-8ccc-1fe01de87ea6>; and Demetri Sevastopulo and Michael Acton, "U.S. House Panel Probes Whether DeepSeek Used Restricted Nvidia Chips," *Financial Times*, April 16, 2025, <https://www.ft.com/content/04512d41-70a7-4b53-8b50-0c9d28c7b80e>.

⁶⁶ Eleanor Olcott, "Baidu Founder Highlights 'Shrinking' Demand for DeepSeek's Text-Based AI," *Financial Times*, April 25, 2025, <https://www.ft.com/content/c462fbd1-1672-4d8f-bd91-c3aa185d2418>; and Eleanor Olcott and Wenjie Ding, "DeepSeek Spreads across China with Beijing's Backing," *Financial Times*, February 27, 2025, <https://www.ft.com/content/5684fb1f-1a84-4542-8fe9-2fcae9653f87>.

⁶⁷ Ian Reynolds, Benjamin Jensen, and Yasir Atalan, "Hawkish AI? Uncovering DeepSeek's Foreign Policy Biases," Center for Strategic and International Studies, April 16, 2025, <https://www.csis.org/analysis/hawkish-ai-uncovering-deepseeks-foreign-policy-biases>.

in data sets could lead Chinese users to be exposed to “preset political stances” from other political systems or cultures provided by algorithms.⁶⁸ One article argues that cultural differences between the East and West will result in the development of two different “super large pre-trained models” for C2. This means that the competition of confrontational C2 systems for military use will be a question not only of technological development but also of which cultural heritage cultivates the most effective model for combat.⁶⁹ Articles consulted for this chapter do not yet provide any indication of whether PLA researchers consider the “Eastern model” superior or inferior.

Infrastructure and technology restrictions. Analysts have pointed to the potential challenges that the United States’ export restrictions on AI semiconductors and related talent and software pose to the PLA’s ability to develop intelligent battlefield command systems.⁷⁰ However, this was not echoed in PLA-linked or Chinese research collected for this chapter. This could be due to the political sensitivities around these issues in China.

Other problems that are mentioned by Chinese and PLA-linked researchers include issues such as inconsistent standards for data sharing and use and the difficulty in sharing data due to connectivity issues and privacy protection.⁷¹ Large data centers that will be required for future warfare also face issues such as load balancing and maintenance of stable operations. Data ownership laws require further clarification as well. The PLA envisions that it will need to leverage military-civil fusion to work with private-sector data contractors. In order to guarantee the security and controllability of data, “military project-related data should belong to the military, not the data contractors.”⁷²

Military infrastructure remains uneven across the PLA and also requires further upgrading and standardization for the seamless use of AI across the military. In the maritime domain, reliance on radio and data links for use of AI systems will pose a problem as well and increase financial costs.⁷³

⁶⁸ Shi and Pei, “认清智能化战争的制胜根本.”

⁶⁹ Yang et al., “Application and Challenges of Super Large Pre-trained Models.”

⁷⁰ Stokes, “Military Artificial Intelligence”; and Ryan Fedusiak, Jennifer Melot, and Ben Murphy, “Harnessed Lightning: How the Chinese Military Is Adopting Artificial Intelligence,” CSET, October 2021, <https://cset.georgetown.edu/wp-content/uploads/CSET-Harnessed-Lightning.pdf>.

⁷¹ Shi and Pei, “认清智能化战争的制胜根本.”

⁷² Yang, “海军人工智能技术的应用策略研究.”

⁷³ Ibid.

Some research articles have already explored how 5G could help facilitate the use of AI for intelligent C2 in the military.⁷⁴

Impacts of a longer-term economic slowdown. Some authors caution about the financial costs of pursuing the intelligentization of the military. One article on the application strategy of naval AI technology argues that collecting data is expensive due to the costs of the equipment, systems, and communications technology required.⁷⁵ The author notes that “the funds currently available to our military are still extremely limited.” Rather than jumping on bandwagons, the author suggests that the PLA should purposefully formulate an “ocean data collection plan” that serves the PLA Navy’s development strategy, define what data is relevant to naval AI systems, and determine the cost of data before weighing costs and benefits.

Highly skilled talent across the services. An article by an author from the Joint Operations College of the PLA National Defense University has highlighted the demands that multidomain and hybrid warfare makes on commanders.⁷⁶ As a result, the scientific and technological literacy of commanders requires upskilling. Technological changes are forcing commanders to possess technological literacy, and thus the quantity and quality of high-tech knowledge must increase and modern warfare application courses for commanders must improve. The author argues that experts on new domains should be invited to participate in wargaming exercises and to deliver training at defense colleges. Conversely, commanders should participate more in science and technology conferences and academic forums. Scientific and technological literacy should also be incorporated into commander selection and weighed during their assessments. The author also recommends turning operational commanders into mini-battlefield scientists by creating a mechanism that allows them to apply cutting-edge science and technology research on the battlefield. Lastly, the author encourages building a “commander + scientist” team to carry out research to improve multidomain joint operations in hybrid warfare.

⁷⁴ Wang Feiyue et al., “C2M and 5G: Intelligent Command and Control in the Connected and Smart Age,” *Journal of Command and Control* 5, no. 2 (2019).

⁷⁵ Yang, “海军人工智能技术的应用策略研究.”

⁷⁶ “混合战争视野下的联合作战指挥人才培养” [Training of Joint Operations Command Talents under the Perspective of Hybrid Warfare], *PLA Daily*, July 12, 2022, http://www.81.cn/jfjbmap/content/1/2022-07/12/07/2022071207_pdf.pdf. The author is affiliated with the China Aerospace Engineering University.

Conclusion

This chapter has sought to understand in greater detail how scientific and PLA-linked researchers in China currently measure the strengths of Chinese AI to advance the PLA's capabilities and warfighting advantage. It has examined in what areas the PLA has integrated AI and other technologies and concepts relating to a new revolution in military affairs into its capabilities and doctrine. Finally, it has considered how the PLA assesses its own progress in a new revolution in military affairs in general and in AI in particular relative to other leading militaries such as the U.S. military.

To better understand how Chinese researchers envision the PLA using AI-enabled technologies to assist C2, the chapter conducted case studies of AI application to two areas: (1) intelligent battlefield command systems and (2) simulation technologies. These areas were chosen due to the PLA's self-identified weaknesses in wartime C2 and lack of real-world combat experience. Analysis of open-source literature showed that the development of intelligent battlefield command systems is now viewed by Chinese experts as vital to future combat success and victory. As war becomes increasingly intelligentized, PLA commanders will be under greater pressure to synthesize vast quantities of data for their command decision-making at a high pace. China is not unique in this respect, as other countries are developing similar AI applications for C2. Chinese researchers remain up to date on foreign development of these technologies.

The PLA's development of an intelligent battlefield command system remains nascent. Timelines for the development of this technology are not provided, and the challenges reported by Chinese researchers are still extensive. It can therefore be assumed that the PLA will not be in a position to operationalize this technology in the near term. Nevertheless, the literature examined for this chapter does provide greater insight into how Chinese researchers think this technology can, will, or should be operationalized in the future. One important conclusion relates to how these technologies might assist or detract from PLA commanders' decision-making. Current literature seems to suggest that the role of intelligent systems in C2 will depend on the situation. In less strategic situations, commanders will be assisted, or potentially in the future replaced, by these systems to be able to quickly make decisions. However, in situation that are of strategic importance, it seems that commanders will be allowed to take more time and access large and diversified data sets before making decisions.

Chinese researchers have noted the United States' rough timelines and related goals for the development of an intelligent battlefield command system. China will likely seek to achieve a first-mover advantage in this domain. Although PLA AI-enabled simulation development is more mature and already in use for command training and wargaming, Chinese researchers note specific challenges, such as relevant and accurate data sets for algorithmic training.

As with other AI technologies, Chinese strengths in developing civilian applications have helped spin-on efforts to transfer these technologies to the PLA. While it is significantly more difficult to observe the integration of AI technologies in the PLA than the procurement of new platforms, it is possible to examine the extent to which civilian applications in AI-enabled decision support are progressing in China as a proxy. One proxy measurement for intelligent battlefield C2 could be the development of AI-assisted decision-making software in China's healthcare system.⁷⁷ Likewise, a proxy measurement for AI-enabled simulation technology could be the development of China's civilian AI-enabled gaming technology sector.

Further research would benefit from a qualitative analysis of Chinese research on intelligent battlefield command systems and how it matches more updated PLA procurement records. This would not only help measure the potential integration of these technologies across the PLA but also help identify targets for future U.S. trade restrictions on military end-use technologies.

⁷⁷ See, for example, Mengting Ji et al., "Status of AI-Enabled Clinical Decision Support Systems Implementation in China," *Methods of Information in Medicine* 60, no. 5/6 (2021): 123–32.

EXECUTIVE SUMMARY

This chapter examines the evolution of China's military-civil fusion (MCF) strategy and its subordination into the broader concept of the national strategic system and capabilities (NSSC).

MAIN ARGUMENT

Since around 2017, there has been a shift in Chinese Communist Party (CCP) discourse from the language of MCF to the language of an integrated NSSC. The NSSC is a concept in Chinese official discourse for mobilizing all state resources to achieve national goals and build comprehensive power. It includes sub-strategies like development and MCF and focuses on key areas such as cyber, space, and maritime. The CCP has transitioned from discussing the party's national-level strategy to building the system the MCF strategy was designed to perfect. The elevation of the NSSC concept in official Chinese policy discourse represents the intensification of CCP efforts to integrate all available state resources to pursue national goals and increase China's comprehensive national power. The elevation of the NSSC concept in party doctrine affirms the successful implementation of the MCF strategy and is reflected in organizational developments and major achievements advancing the party's goal of building a world-class military and positioning China as a global leader.

POLICY IMPLICATIONS

- Although China's MCF strategy has now evolved into the NSSC, it remains a significant threat to U.S. and allied commercial and national security interests. If policymakers mistake rhetorical shifts for a decrease in the strategy's importance, they will be unprepared to contend with fundamental asymmetries in the U.S.-China rivalry.
- Based on metrics that are crucial for U.S. interests—namely, maintaining leadership in vital technologies and prevailing in potential conflicts—the party is building an advantage through its pursuit of “deep fusion,” which refers to the party's goal of promoting deep development of MCF in the defense industry.
- If U.S. policymakers wish to mount a robust defense against MCF, a re-evaluation of current policies will be required. This includes reassessing research security, technology collaboration frameworks, export controls, and investment-screening programs.

System by Design: The Evolution of China's Military-Civil Fusion Strategy

Liza Tobin, Addis Goldman, and Katherine Kurata

Since 2018, the military-civil fusion (MCF) strategy of the Chinese Communist Party (CCP) has garnered significant attention among U.S. policymakers and analysts. MCF is a national-level strategy that was first elevated in 2007 by then general secretary Hu Jintao and subsequently raised to prominence under the leadership of Xi Jinping as general secretary and chairman of the Central Military Commission.¹ The strategy aims to systematically break down barriers between military and civilian sectors in the People's Republic of China (PRC) by reorganizing the Chinese science and technology (S&T) enterprise to align the CCP's security and development strategies. The strategy harnesses dual-use technologies and other resources of the state, from universities and research institutes to private companies and state-owned enterprises, to ensure that new innovations simultaneously advance China's economic development and military modernization.² The ultimate goal is to transform the People's Liberation Army (PLA) into the most advanced military in the world by 2049—or, in the words of Xi, a “world-class military.”³

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¹ Hu first used the term military-civil fusion (军民融合) in 2007, but the related concept of military-civil integration (军民结合) dates back much earlier. See Alex Stone and Peter Wood, *China's Military-Civil Fusion Strategy: A View from Chinese Strategists* (Montgomery: China Aerospace Studies Institute, 2020), 88, https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/Other-Topics/2020-06-15%20CASI_China_Military_Civil_Fusion_Strategy.pdf.

² U.S. Department of State, “Military-Civil Fusion and the People's Republic of China,” May 2020, <https://www.state.gov/wp-content/uploads/2020/05/What-is-MCF-One-Pager.pdf>.

³ Christopher Ford, “Huawei and Its Siblings, the Chinese Tech Giants: National Security and Foreign Policy Implications,” USC U.S.-China Institute, September 11, 2019.

Since the founding of the PRC in 1949, CCP leaders have sought to integrate national security and economic development priorities.⁴ From the early 1980s through the mid-1990s, Chinese leaders encouraged military-civil integration (MCI), focusing on addressing “acute economic, structural, and organizational problems through a concerted attempt to convert military factories over to manufacturing civilian products.”⁵ As reflected in the 10th Five-Year Plan (2001–5), the PRC’s approach to MCI evolved at the turn of the 21st century, with the CCP promoting the cultivation of “integrated dual-use industrial systems capable of developing and manufacturing both defense and military goods.”⁶ During the 17th Party Congress in 2007, then general secretary Hu, in a sign of apparent satisfaction with MCI efforts, declared that the PRC was “emerging on the road toward military-civil fusion, with Chinese characteristics.”⁷

Coinciding with the 11th Five-Year Plan (2006–10), CCP leaders deliberately replaced the concept of MCI with the concept of MCF (although both terms continued to be used). According to U.S. Defense Department analysts, this shift in conceptual rhetoric indicated a substantial shift in attitudes in Beijing regarding the need to further “bridge the PRC’s economic and social development with its security development.”⁸ These discursive developments coincided with the rise of Chinese popular nationalism, the “statist turn” in CCP political governance, the “interventionist turn” in Chinese industrial policymaking, and the “strident turn” in Chinese foreign policy in the same period.⁹ In short, by the mid to late 2000s, the CCP seemed increasingly “willing to subordinate economic imperatives in

⁴ For a primer on the defense industrial policy of the PRC during the reform era, see Evan A Feigenbaum, *China’s Techno-Warriors: National Security and Strategic Competition from the Nuclear to the Information Age* (Stanford: Stanford University Press, 2003).

⁵ Richard A. Bitzinger, “China’s Shift from Civil-Military Integration to Military-Civil Fusion,” *Asia Policy* 16, no. 1 (2021).

⁶ Ibid.

⁷ See Hu Jintao, “胡锦涛在党的十七大上的报告” [Hu Jintao’s Report to the 17th Party Congress], Xinhua, October 24, 2007, <https://news.sina.com.cn/c/2007-10-24/205814157379.shtml>. See also Patrick Besha, “Civil-Military Integration in China: A Techno-Nationalist Approach to Development,” *American Journal of Chinese Studies* 18, no. 2 (2011): 97.

⁸ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023* (Washington, D.C., October 2023), 29, <https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTSINVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>.

⁹ On the rise of Chinese popular nationalism, see Lei Guang, “Realpolitik Nationalism: International Sources of Chinese Nationalism,” *Modern China* 31, no. 4 (2005): 487–514. On the “interventionist turn” in Chinese industrial policymaking, see Ling Chen and Barry Naughton, “An Institutionalized Policy-Making Mechanism: China’s Return to Techno-Industrial Policy,” *Research Policy* 45, no. 10 (2016): 2138–52. On the “strident turn” in Chinese foreign policy, see Suisheng Zhao, “Foreign Policy Implications of Chinese Nationalism Revisited: The Strident Turn,” *Journal of Contemporary China* 22, no. 82 (2013): 535–53.

the interest of long-term technological autonomy and national security,” laying the groundwork for the intensification of MCF and adjacent techno-industrial policy efforts.¹⁰

From MCF to National Strategic System and Capabilities

The Institutionalization of MCF

As a codified doctrine, MCF is primarily associated with the tenure of Xi Jinping.¹¹ His first term (2012–17) saw the deepening institutionalization of MCF as a national-level strategy, shaping organizational and strategic culture across the party-state apparatus.¹² Analysts note that MCF has “been part of nearly every major strategic initiative” launched by the CCP since Xi took power.¹³ The comprehensive operationalization of the strategy has become increasingly apparent since his second term (2017–22), indicated by a rhetorical shift in the discourse surrounding the strategy and ongoing institutional reforms designed to accelerate MCF efforts.¹⁴

Over time, Xi’s rhetoric has positioned MCF as an increasingly all-encompassing concept: an indispensable feature of “socialism with Chinese characteristics,” inextricably bound up in China’s quest to build comprehensive national power. Shifts in China’s strategy tend to evolve gradually as the party experiments with key concepts and terminology, some of which eventually become expressions of CCP orthodoxy with the power to drive policy implementation.¹⁵ Already in 2013, Chinese policymakers closed ranks on Xi’s general drive toward statist developmentalism, with the CCP calling for policies designed to encourage “cross holding by, and mutual

¹⁰ Yu Zhou, “State and Commercial Enterprises in China’s Technical Standard Strategies,” *China Review* 6, no. 1 (2006): 39.

¹¹ A 2017 amendment to the CCP constitution lists MCF as one of several key national strategies. Others include rejuvenating the country through science and education, strengthening the country through talent, pursuing innovation-driven development, revitalizing rural areas, promoting coordinated regional development, and achieving sustainable development. For the Chinese text of the constitution, see <https://www.12371.cn/2022/10/26/ART11666788342244946.shtml>.

¹² See, for example, Bitzinger, “China’s Shift from Civil-Military Integration to Military-Civil Fusion”; and Stone and Wood, *China’s Military-Civil Fusion Strategy*.

¹³ Lorand Laskai, “Civil-Military Fusion: The Missing Link Between China’s Technological and Military Rise,” Council on Foreign Relations, January 29, 2018, <https://www.cfr.org/blog/civil-military-fusion-missing-link-between-chinas-technological-and-military-rise>.

¹⁴ James T. Aredy and Brian Spegele, “China’s Balloon Program Combines Commercial and Military Capabilities,” *Wall Street Journal*, February 16, 2023, <https://www.wsj.com/articles/chinas-balloon-program-combines-commercial-and-military-capabilities-b4dfe2aa>.

¹⁵ David Dorman, “China’s Plan for Digital Dominance,” War on the Rocks, March 28, 2022, <https://warontherocks.com/2022/03/chinas-plan-for-digital-dominance>.

fusion between, state-owned capital, collective capital, and non-public capital.”¹⁶ In 2014, Xi urged party colleagues to make “all-out efforts to make further progress in MCF development,”¹⁷ and in 2015, he elevated the MCF development strategy to the status of a national strategy, signaling its importance in the hierarchy of CCP priorities.¹⁸

In speeches to the National People’s Congress in 2016, Xi emphasized the importance of MCF, but with a growing focus on its role in shaping China’s R&D and techno-industrial innovation ecosystem. The 13th Five-Year Plan, which was issued in the same year, called for the CCP to “promote the development of the military-civil fusion industry.”¹⁹ In a significant move, in January 2017 Xi established and was appointed to lead the Central Commission for Integrated Military and Civilian Development, a new body reporting directly to the Politburo and the Politburo Standing Committee.²⁰ Reinforcing this major institutional development, in a March 2017 speech addressed to the PLA delegation to the 12th National People’s Congress, Xi called for accelerating the establishment of a “military-civil fusion innovation system” to support PLA modernization, cementing MCF’s status as a guiding principle of China’s innovation-driven development strategy.²¹

The 19th Party Congress was a watershed moment in the CCP’s public articulation of its long-term ambitions and further cemented the role of MCF in achieving them. In his work report, Xi declared the party’s goal for China to become a “global leader in terms of comprehensive national power

¹⁶ Margaret M. Pearson et al., *The State and Capitalism in China* (Cambridge: Cambridge University Press, 2023), 29.

¹⁷ Tian Yanhua, “习近平:为实现强军目标提供体制机制和政策制度保障” [Xi Jinping: Providing Institutional Mechanisms and Policy Guarantees for Achieving the Goal of Strengthening the Military], Xinhua, March 11, 2014, <https://news.12371.cn/2014/03/11/ARTI1394545435110594.shtml>.

¹⁸ Huang Xingjie, “习近平出席解放军代表团全体会议” [Xi Jinping Attended the Plenary Meeting of the PLA Delegation], Xinhua, March 12, 2015, <https://news.12371.cn/2015/03/12/ARTI1426166867948757.shtml>.

¹⁹ “国务院关于印发十三五国家战略性新兴产业发展规划的通知” [National 13th Five-Year Plan for the Development of Strategic Emerging Industries], State Council (PRC), November 29, 2016, https://www.gov.cn/zhengce/content/2016-12/19/content_5150090.htm; and Bai Shikang, “习近平在出席解放军代表团全体会议时强调全面实施创新驱动发展战略推动国防和军队建设实现新跨越” [Xi Jinping Emphasized at the Plenary Meeting of the PLA Delegation: Comprehensively Implement the Innovation-Driven Development Strategy and Promote New Leaps in National Defense and Military Construction], Xinhua, March 13, 2016, <https://news.12371.cn/2016/03/13/ARTI1457866387845102.shtml>.

²⁰ “Xi to Head Central Commission for Integrated Military, Civilian Development,” Xinhua, January 22, 2017, http://www.xinhuanet.com/english/2017-01/22/c_136004750.htm.

²¹ Xi Jinping, “加快建立军民融合创新体系为我军建设提供强大科技支撑” [Accelerate the Establishment of a Military-Civil Fusion Innovation System to Provide Strong Scientific and Technological Support for the Construction of Our Military], Xinhua, March 12, 2017, http://www.xinhuanet.com/politics/2017lh/2017-03/12/c_1120613988.htm.

and international influence” (综合国力和国际影响力领先的国家)—a concise encapsulation of the CCP’s midcentury objectives.²² In addition, Xi emphasized the necessity of achieving “the mutual unity of a rich country and a strong military” by “forming a deep pattern of MCF and building an integrated national strategic system and capabilities” (一体化的国家战略体系和能力). As Alex Stone and Peter Wood note, one month later *Guangming Daily*, which is published by the CCP Central Committee, provided further articulation of MCF goals in light of Xi’s speech, stating that “the end goal of military-civil fusion deep development is to build up China’s unified military-civil system of strategies and strategic capabilities.”²³

The concept of the national strategic system and capabilities (NSSC) encompasses component strategies (such as specific development strategies, including MCF, and domain-specific strategies for cyber, space, and maritime). It thus can be conceived as the operational system through which Beijing mobilizes all available state resources (economic, S&T, human, military, and cultural) to pursue its national goals and increase China’s comprehensive national power and strategic competitiveness (增强综合国力和战略竞争力).²⁴

Beyond rhetoric, this period also saw the emergence of an extensive bureaucratic edifice and the proliferation of numerous plans, strategies, regulations, and other forms of guidance to direct actors throughout the Chinese system to pursue MCF goals.²⁵ As Greg Levesque noted in 2021, “almost every provincial and municipal government has formed local-level MCF development committees led by party officials and rolled out development plans.”²⁶ The establishment of regionalized MCF-coordinating mechanisms was accompanied by the intensification of efforts, ongoing

²² 综合国力 is translated as “composite national strength” in the CCP’s English translation of the report. Xi Jinping, “Securing 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,” Xinhua, October 18, 2017, http://www.xinhuanet.com/english/download/Xi_Jinping%27s_report_at_19th_CPC_National_Congress.pdf.

²³ “Deepen the Implementation of the Military-Civil Fusion Strategy,” *Guangming Daily*, November 16, 2017, as cited by Stone and Wood, *China’s Military-Civil Fusion Strategy*, 25.

²⁴ See Huang Chaofeng and Ma Junyang, “一体化的国家战略体系和能力构成与构建研究” [Research on the Composition and Construction of Integrated National Strategic System and Capabilities], *Journal of Northwestern Polytechnical University* (2019), https://jfxz.nwpu.edu.cn/xbwz/xb_pdf/2019_4/14.pdf. This source states that “constructing an NSSC is the goal of MCF.” It has a chart mapping out side by side the national strategic system and the national strategic capabilities and the interrelation between them.

²⁵ Stone and Wood, *China’s Military-Civil Fusion Strategy*, 107.

²⁶ Greg Levesque, “Commercialized Militarization: China’s Military-Civil Fusion Strategy,” National Bureau of Asian Research, interview, June 30, 2021, <https://www.nbr.org/publication/commercialized-militarization-chinas-military-civil-fusion-strategy>.

since 2009, to create national-level MCF demonstration bases (国家级军民结合产业示范基地). These are innovation clusters that the PRC established to develop indigenous capabilities in dual-use sectors.²⁷ Consisting of industrial zones spanning the country, they function to facilitate resource sharing and innovation across China's S&T base and a wide range of dual-use industries, such as aerospace, aviation, advanced equipment manufacturing, new materials, electronics and information technology (IT), new energy, biomedicine, and automotive.²⁸ Leading state-owned defense corporations and their downstream contractors are often present at these bases.²⁹

Is MCF in Retreat?

In recent years, calls to “build an integrated NSSC” have largely superseded and become broadly synonymous with MCF policy discourse, planning, and implementation.³⁰ The 14th Five-Year Plan (2021–25) notably makes no mention of MCF, emphasizing the need to “accelerate national defense and armed forces modernization and achieve the mutual unity of a rich country and a strong military.”³¹ Likewise, Xi's work report to the 20th Party Congress in October 2022 omitted mention of MCF but called for “consolidating and enhancing the NSSC” and “strengthening national defense mobilization.”³² In December 2022 the *PLA Daily* emphasized that the report stressed the need to “greatly enhance the strategic confrontation capability of the *national system*” (emphasis added).³³ Moreover, in a 2023

²⁷ The PRC has established requirements that industrial clusters must meet to be recognized as a national MCF industrial base, such as having 70% output value from MCI products. See “国家级军民融合产业基地实力大比拼 差距超2000亿” [The Strength of National-Level MCF Industrial Bases Is in Great Competition, with a Gap of More Than 200 Billion], March 15, 2017, <https://archive.ph/NxwRI#selection-511.0-511.25>.

²⁸ “产业投资促进系列报告（2018）编撰人员” [Compilation Personnel of the Industry Investment Promotion Series Report], Investment Promotion Bureau of the Ministry of Commerce, November 2018, <https://qccdata.qichacha.com/ReportData/PDF/9f48cc6f78f4e9e719ed5ab02511382c.pdf>.

²⁹ Greg Levesque and Mark Stokes, “Blurred Lines: Military-Civil Fusion and the ‘Going Out’ of China’s Defense Industry,” *Pointe Bello*, December 2016, 11, https://toinformistoinfluence.wordpress.com/wp-content/uploads/2017/07/2613c-062017_pointebello_militarycivildfusionreport.pdf.

³⁰ The authors thank Chad Sbragia for his insights on this shift. See also U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 28.

³¹ “Outline of the People’s Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035,” *Xinhua*, trans. Center for Security and Emerging Technology, March 12, 2021, 130, https://cset.georgetown.edu/wp-content/uploads/t0284_14th_Five_Year_Plan_EN.pdf.

³² Xi Jinping, “高举中国特色社会主义伟大旗帜为全面建设社会主义现代化国家而团结奋斗” [Hold High the Great Banner of Socialism with Chinese Characteristics and Work Together to Build a Modern Socialist Country in an All-Around Way], Report to the 20th Party Congress, October 16, 2022.

³³ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 29–30.

speech to PLA officials, Xi called for “strengthening the orientation of the national defense science and technology industry toward serving the strong military and winning wars,” signaling a growing—and increasingly bellicose—focus on the role of MCF in enhancing PLA combat effectiveness and the PRC’s capacity for whole-of-nation mobilization, in addition to the looming prospect of imminent conflict.³⁴

MCF has become thoroughly inscribed in party doctrine, laying the groundwork for the emergence of the NSSC as a primary strategic concept of the Xi era. Implementing the MCF strategy was always a “prerequisite for building the NSSC,” as Xi suggested in 2018.³⁵ As he had stated in his pivotal MCF speech the previous year, “Fusion should bring into full play one of the key strengths of our socialist system—its efficiency in pooling resources to solve major problems.”³⁶

Evaluating the Effectiveness of MCF

In its pursuit of building a world-class military by midcentury, the PLA has adopted the concept of “contribution rate” (贡献率) as a primary metric for evaluating the effectiveness of MCF policies. This rate purports to assess the impact of various components of the Chinese military, from individual soldiers to advanced equipment, in enhancing the overall combat capability of the PRC military system.³⁷ Optimizing the contribution rate has become

³⁴ Xu Jianwen, “习近平出席解放军和武警部队代表团全体会议并发表重要讲话” [Xi Jinping Attends Plenary Meeting of PLA and Armed Police Force Delegation and Delivers Important Speech], Xinhua, March 8, 2023; and Zhao Wenhan, “习近平在出席解放军和武警部队代表团全体会议时强调统一思想认识强化使命担当狠抓工作落实努力开创一体化国家战略体系和能力建设新局面” [Xi Jinping Emphasizes Unifying Thoughts, Strengthening Sense of Mission, Resolutely Implementing Work, and Striving to Create New Situation for Integrated National Strategic System and Capability Building When Attending Plenary Meeting of PLA and Armed Police Force Delegation], Xinhua, March 8, 2023, https://web.archive.org/web/20240228190756/http://www.news.cn/politics/leaders/2023-03/08/c_1129421490.htm.

³⁵ Arthur Ding and K. Tristan Tang, “Xi Seeks to Reinvigorate Military-Civilian Integration,” Jamestown Foundation, China Brief, April 14, 2023, <https://jamestown.org/program/xi-seeks-to-reinvigorate-military-civilian-integration>.

³⁶ Xi Jinping, “Deeper Civil-Military Integration,” *The Governance of China*, vol. 2 (Beijing: Foreign Language Press, 2017): 448–51.

³⁷ Zhang Wendong and Tang Wenxing, “Forum on Strengthening the Army: Training Focusing on System Contribution Rate,” *PLA Daily*, April 19, 2022. For example, during exercises conducted by the 78th Group Army, choices made not merely for individual speed but for system efficiency led to quicker overall maneuvers and better battlefield outcomes, demonstrating how individual actions are most valuable when they contribute effectively to the group’s strategic goals. See Wang Fen, “向體系練兵要戰鬥力！看這兩個旅如何鍛造尖兵利刃” [Ask the System to Train for Combat Effectiveness! See How These Two Brigades Forge Cutting-Edge Weapons], *PLA Daily*, March 26, 2022, <http://www.mod.gov.cn/gfbw/wzll/lj/4907652.html?big=fan>.

a top strategic priority for Chinese military strategists.³⁸ In his speech at the 90th anniversary of the PLA's founding in 2017, Xi Jinping emphasized the need to enhance the contribution of scientific and technological innovation to military construction and combat effectiveness development.³⁹

The PLA's strategic management organizations (战略管理机构), such as the Academy of Military Sciences, have been at the forefront of researching and implementing initiatives to enhance the contribution rate across various domains.⁴⁰ The Systems Engineering Research Institute, for example, has realigned its priorities to focus on projects with high potential impact on battlefield capabilities, promoting “research for war” (科研为战) to directly boost the contribution of scientific endeavors to military readiness.⁴¹ This strategic shift involves multidisciplinary collaboration, systems innovation, and the alignment of research priorities with actual combat requirements.⁴² For instance, in the realm of military training, the Central Theater Command Army's combined brigade has pioneered a dynamic “rolling scheme repository” (滚动方案库) that continuously updates training content and standards based on real-world combat scenarios, significantly enhancing the practical skills and battlefield readiness of troops.⁴³

The contribution rate has become a guiding principle in the PLA's efforts to integrate new technologies and systems into its operational framework. The strategic management of military assets, such as the optimization of land resources in Hainan, exemplifies this approach.⁴⁴ By realigning poorly managed parcels with strategically valuable resources, such as establishing high-quality training facilities through cooperation between the PLA's Logistics Support Department and local governments, the PLA ensures that its training and readiness are not compromised by

³⁸ Xi Jinping, “Build the People's Army into a World-Class Army,” *Selected Readings from the Works of Xi Jinping*, vol. 2 (Beijing: Foreign Language Press, 2024, 624–29).

³⁹ Ibid.

⁴⁰ Zhang Long and Shao Longfei, “军事科学院系统工程研究院:科研为战,常态化服务重大演训” [Scientific Research for War, Regular Service for Major Exercises], *PLA Daily*, May 3, 2022, http://www.mod.gov.cn/gfbw/gfjy_index/jsyxgfs/4910186.html.

⁴¹ Kang Zizhan and Wang Yitao, “军事科学院系统工程研究院:向战创新,科研引擎全速发动” [Institute Of Systems Engineering of the Academy of Military Sciences: Innovate for War, and the Scientific Research Engine Starts at Full Speed], *PLA Daily*, October 12, 2020, http://www.mod.gov.cn/gfbw/wzll/yw_214068/4872595.html?big=fan.

⁴² Ibid.

⁴³ Han Cheng and Cheng Chunlei, “中部战区陆军某旅创新基础训练考评方式方法” [Innovative Basic Training Evaluation Methods for a Certain Army Brigade in the Central Theater Command], *PLA Daily*, January 14, 2024, <http://www.mod.gov.cn/gfbw/wzll/lj/16280235.html>.

⁴⁴ Sun Xingwei, Huan Yi, and Chen Xiangsong, “探索新时代军用地保障转型发展新路” [Explore New Ways of Transformation and Development of Military Land Security in the New Era], *PLA Daily*, September 17, 2018, <http://www.mod.gov.cn/gfbw/gfdy/4825100.html>.

logistical inefficiencies, thereby enhancing the overall contribution of these assets to military capabilities.⁴⁵ In the realm of joint operations, the Tibet Military District's synthetic brigade collaborates with aviation forces to conduct land-air drills, illustrating how systemic and integrated training can optimize combat effectiveness beyond the sum of individual components.⁴⁶ The noticeable shift toward frequent and foundational joint exercises, such as the Firepower-2020 exercise featuring multiservice coordination, further reflects the PLA's focus on positioning for modern warfare, where system-level integration across different branches and platforms is crucial for achieving overarching objectives.⁴⁷

Enhancing the contribution rate is not without challenges. The PLA faces structural challenges (结构性矛盾) and systemic obstacles (体制性) within its strategic management systems.⁴⁸ For instance, PLA researchers have identified the lack of a standardized mechanism for generating equipment requirements and the difficulty in designing operational scenarios covering the entire military's weapon systems as key challenges in evaluating the contribution rate of equipment systems.⁴⁹ The PLA's strategic management organizations have been tasked with formulating plans that address these issues and align them better with the overarching governance system and strategic priorities set by the Central Military Commission.⁵⁰ For example, the PLA has been deepening technology system reforms, establishing national integrated platforms, improving transformation evaluation mechanisms, and cultivating industrial ecosystems to promote

⁴⁵ Jiao Guoqing, “创新军用土地资源保障模式探索军事土地融合保障新路” [Innovate the Military Land Resource Security Model and Explore New Ways to Integrate Military Land Security], *PLA Daily*, October 9, 2018, http://www.mod.gov.cn/2018lbbz/2018-10/09/content_4826303_2.htm.

⁴⁶ Yan Liang et al., “1+1>2, 西藏軍區某合成旅攜手陸航部隊開展陸空聯合演練” [1+1>2, a Combined Brigade of the Tibet Military Region Joined Hands with the Army Aviation Force to Conduct a Joint Land and Air Exercise], *PLA Daily*, January 19, 2021, <http://www.mod.gov.cn/gfbw/wzll/4877306.html>.

⁴⁷ Zhang Yaoguang and Yan Wei, “课程体系精准对接部队需求” [Looking at the Hybrid War between the United States and Russia through the Russia-Ukraine Conflict], *PLA Daily*, September 2, 2021, http://www.81.cn/jfbmap/content/1/2021-09/02/07/2021090207_.pdf.pdf.

⁴⁸ Wang Hanshui, “强军要论:不断开创依法治军新局面” [On the Essentials of Strengthening the Army: Continuously Create a New Situation in Running the Army According to Law], *PLA Daily*, March 22, 2024, available at <http://www.mod.gov.cn/gfbw/jmsd/16295832.html>.

⁴⁹ Chen Lixin, “关于装备体系贡献率研究的几点思考” [Some Thoughts about Research on Equipment System-of-Systems Contribution Rate], *Military Operations Research and Systems Engineering* 3 (2018): 37–43, <https://qikan.cqvip.com/Qikan/Article/Detail?id=7001103271>; and Wang, “强军要论.”

⁵⁰ Zhang Mingcang, “为实现党在新时代的强军目标提供有力支撑” [Provide Strong Support to Achieve the Party's Goal of Strengthening the Military in the New Era], *PLA Daily*, June 1, 2018, <http://www.mod.gov.cn/gfbw/jmsd/4815793.html>.

the transformation of dual-use technology achievements.⁵¹ As China continues to pursue its national goals, optimizing the contribution rate through strategic management, technological integration, and structural reforms will remain a critical focus for the PLA in its quest to become a world-class military.⁵²

MCF Case Studies

The MCF strategy has contributed to technology breakthroughs that have resulted in significant military and economic benefits for China. The country's progress is striking across the areas that Beijing refers to as "major security domains"—oceans, space, and cyberspace.⁵³ In each of these areas, Beijing has developed national strategies that seek to build China into a "great power" and develop asymmetric capabilities to counter or leapfrog traditional areas of U.S. military dominance in land, air, and sea.⁵⁴ The PRC's success in cultivating its capacity for indigenous technology development has been striking over the last several years and has eroded long-standing U.S. military and technological advantages. This section considers several case studies to shed light on how far China has come.⁵⁵

Development of a Global Navigation Satellite System

The development of the BeiDou Navigation Satellite System, China's homegrown challenger to the U.S.-designed Global Positioning System (GPS), represents a significant MCF success story. The 14th Five-Year Plan, issued in 2021, called for China to "make breakthroughs in the integration and fusion of communication and navigation technologies...and promote

⁵¹ Xu Ke et al., "生产者视角下军民融合技术成果转化关键问题研究——基于知识网络案例分析" [Key Issues in Transformation of Dual-Use Technology Achievements: A Case Analysis Based on Knowledge Network Model], *Science and Technology Progress and Policy* (2022), <http://www.kjjb.org/CN/abstract/abstract18835.shtml>.

⁵² Xi, "Build the People's Army into a World-Class Army," 624–29.

⁵³ The Chinese term 海洋 can be translated interchangeably as "oceans" or "maritime."

⁵⁴ The Chinese term for great power (强国) can also be translated as "strong country," "strong nation," or "powerhouse." The concept of "domains" in the PRC's MCF strategy has been updated based on the China Aerospace Studies Institute report by Alex Stone and Peter Wood. The report categorizes these domains as "security domains," classifying them into traditional domains, major security domains, nascent technology areas, and "going out of MCF" citing Chinese primary sources. The report highlights the elevation of maritime, space, and cyberspace as "great-power" strategies, also emphasized in China's 2019 defense white paper. For further elaboration, see Stone and Wood, *China's Military-Civil Fusion Strategy*, 28–30, 93, 97–98.

⁵⁵ These are the areas listed in Xi's speech at the first plenary session of the MCF Commission on June 20, 2017. See Xi, "Deeper Civil-Military Integration," 448–51.

the marketization and large-scale application of BeiDou in consumer fields such as onboard navigation, smartphones, and wearable devices.”⁵⁶ As of 2020, BeiDou had already reached full global coverage, and it has since expanded and overtaken GPS to become the world’s largest global navigation satellite system, with 45 operational satellites.⁵⁷

BeiDou enables the vertical integration of China’s technology systems and capabilities, providing the PRC with asymmetric advantages in navigation; intelligence, surveillance, and reconnaissance (ISR); communication; and targeting. Its applications span all three of the CCP’s “major security domains.” BeiDou navigation companies emerged from the Changsha High-Tech Zone, one of several innovation clusters of “national-level military-civil integration industrial demonstration bases” (国家级军民结合产业示范基地).⁵⁸ Like GPS, which was originally developed by the U.S. Department of Defense for military navigation, BeiDou originated as a military system and has served various PLA communications and weapon systems since as early as 2014.⁵⁹ BeiDou has gained significant global market share, with civilian applications in transportation, telecommunications, disaster relief, public safety, and other areas.⁶⁰

The security implications of BeiDou’s growing global reach are significant. As China has expanded its network of satellites around the world, the U.S. military has lost its long-standing monopoly over space-based ISR.⁶¹ According to one analyst, the PRC’s launch of thousands of satellites into low-earth orbit, combined with the pervasive adoption of the BeiDou platform, has rendered it “effectively impossible for the U.S. military

⁵⁶ “Outline of the People’s Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035.”

⁵⁷ See Bitzinger, “China’s Shift from Civil-Military Integration to Military-Civil Fusion,” 18; and Sarah Sewall, Tyler Vandenberg, and Kaj Malden, “China’s BeiDou: New Dimensions of Great Power Competition,” Belfer Center for Science and International Affairs, February 2023, https://www.belfercenter.org/sites/default/files/pantheon_files/files/publication/Chinas-BeiDou_V10.pdf.

⁵⁸ Economic Equipment Mobilization Office (PRC), “Promoting Deep Development of Military-Civil Fusion: Series Report No. 8,” November 2, 2017, <https://fzgg.gansu.gov.cn/fzgg/c113599/202106/67f705ed4f764341ae4d9f383e7a01e4.shtml>.

⁵⁹ Jemina Baar, “BeiDou and Strategic Advancements in PRC Space Navigation,” Jamestown Foundation, China Brief, March 1, 2024, <https://jamestown.org/program/beidou-and-strategic-advancements-in-prc-space-navigation>.

⁶⁰ Bitzinger, “China’s Shift from Civil-Military Integration to Military-Civil Fusion,” 8.

⁶¹ A prime example of MCF going global and eroding previous areas of unrivaled U.S. advantage is China’s space station in Argentina. Although the nominal purpose of the facility is exploration of the Moon and Mars, it is managed by the PLA, and Argentine officials do not have control over activities. See Román D. Ortiz, “Money Alone Is Not Enough: The Future of the China-Argentina Relationship,” Jamestown Foundation, China Brief, November 10, 2023, <https://jamestown.org/program/when-money-is-not-enough-the-future-of-the-china-argentina-relationship>.

to successfully jam them all.”⁶² In the maritime domain, BeiDou has helped meet PLA Navy requirements by providing positioning, navigation, and timing capabilities from space-based satellites to naval vessels. Meanwhile, BeiDou has enabled the PLA to develop sensor-based undersea networks, allowing the PRC to gather seafloor data that is crucial for submarine and antisubmarine warfare operations.⁶³

The dominance of China’s global navigation satellite system has potential implications for U.S. national security. PRC-built networked devices, ranging from smartphones and connected vehicles to Internet of Things (IoT) modules that power critical infrastructure, carry the potential to introduce cybersecurity backdoors into critical infrastructure systems. Based on the proliferation of these devices, analysts have highlighted concerns associated with BeiDou’s growing reach, noting that the system’s two-way communication capabilities could be used in cyberattacks.⁶⁴ Such prospects have attracted scrutiny in light of China’s newfound status as the world’s leading automobile exporter. The prospect of the PRC gaining access to, or even control over, multiple layers of the automotive technology stack is not far-fetched.⁶⁵

Unmanned Aerial Vehicles

China has achieved notable success developing unmanned aerial vehicles (UAVs), thanks in large part to its MCF policies. Xi Jinping’s report to the 20th Party Congress in 2022 called for “speeding up the development of unmanned, intelligent combat capabilities.”⁶⁶ By all measures, Xi’s calls have been heeded. PRC-based firm DJI has captured roughly 70% of the global consumer drone market and up to 90% of the U.S. commercial drone market, counting public safety agencies and critical infrastructure operators

⁶² Baar, “BeiDou and Strategic Advancements in PRC Space Navigation,” 2024.

⁶³ Kathrin Hille and Demetri Sevastopulo, “The Battlegrounds That Could Decide a U.S.-China War over Taiwan,” *Financial Times*, May 19, 2024, <https://ig.ft.com/taiwan-battlegrounds>.

⁶⁴ “Now Operational, BeiDou Could Conceal Cybersecurity Threat,” *Inside GNSS*, August 3, 2020, <https://insidegnss.com/now-operational-beidou-could-conceal-cybersecurity-threat>.

⁶⁵ This is not a theoretical risk. The U.S. government warned in February 2024 that a PRC state-sponsored cyber group known as Volt Typhoon has pre-positioned itself on IT networks for “disruptive or destructive cyberattacks against U.S. critical infrastructure in the event of a major crisis or conflict with the United States.” See “PRC State-Sponsored Actors Compromise and Maintain Persistent Access to U.S. Critical Infrastructure,” *Cybersecurity Infrastructure Security Agency*, February 7, 2024, <https://www.cisa.gov/news-events/cybersecurity-advisories/aa24-038a>.

⁶⁶ “Full Text of the Report to the 20th National Congress of the Communist Party of China,” *Xinhua*, October 25, 2022, <https://english.news.cn/20221025/8eb6f5239f984f01a2bc45b5b5db0c51/c.html>.

as consumers.⁶⁷ The firm has received funding from several MCF (i.e., PLA-linked) entities, despite claims to the contrary, and was added to the U.S. Department of Commerce's Entity List in 2020.⁶⁸

The success of civilian drone manufacturers in the PRC has contributed significantly to the PLA's ability to field a variety of UAV platforms. The GJ-11, a stealthy combat drone developed by the PLA in conjunction with the Shenyang Aircraft Design Institute and Hongdu Aviation Industry Group, represents the pinnacle of China's UAV capabilities. Designed with a focus on low observability and advanced strike capabilities, the GJ-11 benefits from cutting-edge research in materials science and aerodynamics—areas where civil-military collaboration has been particularly fruitful.⁶⁹

China's dominance in this sector has not only enhanced the PLA's operational capabilities but also extended Beijing's strategic influence, presenting significant challenges to U.S. interests abroad and national security at home.⁷⁰ On the international front, DJI drones have played a decisive role in sustaining Russia's incursions into Ukraine since 2022. According to the *Wall Street Journal*, Russia's Wagner Group "has become reliant on DJI drones to plan and execute its operations" in Ukraine.⁷¹ Meanwhile, Ukrainian officials have "called for limiting the use of DJI drones," alleging that "technical glitches in the company's products may have been intentional by DJI to sabotage the country's defense."⁷² On the domestic front, a number of U.S. policymakers and analysts have raised fears that the pervasive deployment of DJI drones by U.S. public safety agencies and critical infrastructure operators presents significant risks to national security, opening the door for espionage and sabotage.⁷³

⁶⁷ Brian Harrell and Travis Moran, "The Pressing Threat of Chinese-Made Drones Flying Above U.S. Critical Infrastructure," *Cyberscoop*, March 23, 2023, <https://cyberscoop.com/chinese-drone-threat-dji-regulation-critical-infrastructure>.

⁶⁸ Cate Cadell, "Drone Company DJI Obscured Ties to Chinese State Funding, Documents Show," *Washington Post*, February 1, 2022, <https://www.washingtonpost.com/national-security/2022/02/01/china-funding-drones-dji-us-regulators>.

⁶⁹ Tim McMillan, "China Offers First Close-Up View of Its Secretive GJ-11 'Sharp Sword' Stealth Drone," *Debrief*, October 3, 2022, <https://thedebrief.org/china-offers-first-close-up-view-of-its-secretive-gj-11-sharp-sword-stealth-drone>.

⁷⁰ David Hambling, "DJI's New Drone Could Change War—but It's Not Supposed to Be a Weapon," *Forbes*, January 16, 2024, <https://www.forbes.com/sites/davidhambling/2024/01/16/djis-new-drone-could-change-war-but-its-not-supposed-to-be-a-weapon/?sh=1589a3c12b56>.

⁷¹ Benoit Faucon and Ian Talley, "Chinese Drones Still Support Russia's War in Ukraine, Trade Data Show," *Wall Street Journal*, February 18, 2023, <https://www.wsj.com/articles/chinese-drones-still-support-russias-war-in-ukraine-trade-data-show-cd39d40b>.

⁷² Heather Somerville, "Ukraine Sounds Alarm on Chinese Drones, Opening Skies to U.S. Startups," *Wall Street Journal*, April 22, 2022, https://www.wsj.com/articles/ukraine-sounds-alarm-on-chinese-drones-opening-skies-to-u-s-startups-11650619800?mod=article_inline.

⁷³ Harrell and Moran, "The Pressing Threat of Chinese-Made Drones."

Shipbuilding

Over the past few decades, the PRC has cultivated outsized shipbuilding production capacity, enabling the country to field the largest blue water navy on earth and providing it with growing asymmetric advantages in the maritime domain.⁷⁴ China has vaulted from producing merely 5% of merchant tonnage in 1999 to becoming the world's leading producer of both military and commercial hulls in 2023.⁷⁵ According to the Office of Naval Intelligence, China's shipbuilding capacity is 232 times that of the United States,⁷⁶ and a single dual-use Chinese shipyard near Shanghai (Jiangnan Shipyard) outproduces all U.S. shipyards combined.⁷⁷

The CCP has leveraged all the levers of state power to cement its advantages as part of its strategy to transform China into a maritime great power.⁷⁸ China's dominance in shipbuilding and the maritime sector more broadly is a direct product of MCF policies. According to an exhaustive report from the Office of the U.S. Trade Representative, under China's MCF policies "firms that produce commercial ships [in China] also produce military vessels, allowing for the utilization of advanced civilian technologies in the production of ships for China's Navy, and ensuring sufficient capacity to ramp up military construction when required."⁷⁹

China's shipyards have become illustrative of Xi Jinping's desire to accelerate "the fusion of infrastructure, key facilities, and resources based on essential requirements."⁸⁰ China's third and most capable aircraft carrier, the *Fujian*, shares assembly facilities with commercial hulls, including for foreign clients,⁸¹ while a number of China's MCF demonstration bases

⁷⁴ Ronald O'Rourke, "China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress," Congressional Research Service, CRS Report to Congress, RL33153, January 30, 2024, <https://sgp.fas.org/crs/row/RL33153.pdf>.

⁷⁵ Matthew P. Funairole, "The Threat of China's Shipbuilding Empire," Center for Strategic and International Studies (CSIS), May 10, 2024, <https://www.csis.org/analysis/threat-chinas-shipbuilding-empire>.

⁷⁶ Cathalijne Adams, "China's Shipbuilding Capacity Is 232 Times Greater Than That of the United States," Alliance for American Manufacturing, September 18, 2023, <https://www.americanmanufacturing.org/blog/chinas-shipbuilding-capacity-is-232-times-greater-than-that-of-the-united-states>.

⁷⁷ Ibid.

⁷⁸ See Liza Tobin, "Underway—Beijing's Strategy to Build China into a Maritime Great Power," *Naval War College Review* 71, no. 2 (2018): 16–48.

⁷⁹ Elizabeth Drake et al., "Petition for Relief Under Section 301 of the Trade Act of 1974, as Amended: China's Policies in the Maritime, Logistics, and Shipbuilding Sector," Office of the U.S. Trade Representative, March 12, 2024, 4, <https://ustr.gov/sites/default/files/Section%20301%20Petition%20-%20Maritime%20Logistics%20and%20Shipbuilding%20Sector.pdf>.

⁸⁰ Xi, "Deeper Civil-Military Integration," June 20, 2017, 448. The English translation uses the term "integrated use" for the Chinese term "fusion" (融合).

⁸¹ Funairole, "The Threat of China's Shipbuilding Empire."

include a focus on shipbuilding.⁸² One firm, China State Shipbuilding Corporation, accounts for a quarter of the worldwide commercial market, while also producing vessels for the PLA Navy.⁸³ Meanwhile, the PRC has forged technical cooperation agreements with shipbuilding firms in Japan, South Korea, and Germany, which have provided access to advanced designs and technologies, contributing to significant upgrades in the capabilities of the PLA Navy's warships. Going beyond foreign technology transfer, actors within the Chinese shipbuilding industry—with demonstrated links to the PLA—have stolen intellectual property from major Western maritime companies, such as Trelleborg Offshore.⁸⁴

"New" and "Future" Industries

PRC officials and theorists see a major role for MCF in helping China compete and innovate in "new technology domains" (新科技领域) and "future industries" (未来产业) for PLA modernization. While these sectors—including biology and biotechnology, new materials, new energy, artificial intelligence (AI), future IT, and advanced manufacturing—have clear civilian applications, the CCP strategically develops them with an eye toward military usage.⁸⁵ This approach exemplifies how MCF enables the PLA to harness cutting-edge civilian innovations for military advantage. The following examples of how the PLA is working to adapt and deploy these emerging technologies for military purposes demonstrate the concrete military applications of China's dual-use industrial base.

Biology/biotechnology. The PRC has long prioritized biotechnology as a strategic emerging industry, with the PLA viewing it as a critical domain for military transformation.⁸⁶ As AI enables more capable manipulation of biological building blocks, the military aims to leverage these developments

⁸² This finding draws on the authors' data set on MCF demonstration bases.

⁸³ Funairole, "The Threat of China's Shipbuilding Empire."

⁸⁴ Drake et al., Petition for Relief Under Section 301 of the Trade Act of 1974."

⁸⁵ Scholars note that in addition to "major security domains" (maritime, space, and cyber), Chinese officials and theorists categorize "new" (or "nascent") technological areas that are MCF priorities as biology, new energy, and AI. Stone and Wood, *China's Military-Civil Fusion Strategy*, 101. What is considered "new" evolves over time. For example, in February 2024 the PRC released a document that identified "future industries" in six areas—manufacturing, IT, materials, energy, space, and health—as priorities for China's industrial policy. See "Implementation Opinions of Seven Ministries Including the Ministry of Industry and Information Technology on Promoting the Innovative Development of Future Industries," trans. by Center for Security and Emerging Technology, 2024, <https://cset.georgetown.edu/publication/future-industry-implementation-opinions>.

⁸⁶ Sunny Cheung, Arran Hope, and Peter Mattis, "Red Genes: Assessing WuXi Apptech's Ties to the Party-Army-State," Jamestown Foundation, Chian Brief, February 9, 2024, <https://jamestown.org/program/red-genes-assessing-wuxi-apptecs-ties-to-the-party-army-state>.

to create asymmetric advantages in future conflicts. This aligns with the broader trend of the PRC seeking to exploit dual-use technologies for military purposes.

PLA writings emphasize several key areas where biotechnology could transform warfare. A major focus is bioengineered human enhancement, with efforts aimed at achieving “directional functional modification or programmable reversal of species’ genomes, biological perceptual functions, physical abilities, and other advantageous traits.”⁸⁷ This could lead to soldiers with enhanced physical and cognitive abilities, significantly altering combat performance. Another critical area is the development of brain-machine interfaces, aiming to “achieve direct brain control over biological or physical targets,” potentially enabling neural control of weapon systems, enhanced battlefield awareness, or direct communication between soldiers.⁸⁸ Synthetic biology is also a key focus, with discussions of “synthetic organisms with defense application value such as strategic monitoring and autonomous control,” which could be used for environmental sensing, novel materials production, or intelligence gathering.⁸⁹ Most concerning is the research into precision biological agents, including genetically targeted bioweapons designed for “targeted attacks to destroy a race, or a specific population group, or a specific person,” introducing a new and highly selective paradigm in biological warfare.⁹⁰

The WuXi Group, a major Chinese biotech conglomerate, exemplifies how the PRC is operationalizing these biotechnology goals through MCF. WuXi Biologics actively engages in CCP activities, with approximately 5% of its employees joining the party’s internal organization as of 2023.⁹¹ The company participates in the Biopharmaceuticals Union of Party Committees, which promotes cooperation between the CCP and biotech firms.⁹² WuXi AppTec has at least twenty party branches, and over 1,000 of

⁸⁷ See Wang Ping, “美国生物防御战略分析” [Analysis of the U.S. Biodefense Strategy], *Strategic Defense Studies* (2022), <https://www.siiis.org.cn/updates/cms/old/UploadFiles/file/20200907/202005009%20%E7%8E%8B%20%E8%90%8D.pdf>.

⁸⁸ See Yang Hui et al., “The Impact of Modern Biotechnology on Biological Weapons], HansPub.org, 2022, <https://doi.org/10.12677/HJBM.2022.123024>.

⁸⁹ See Wang, “美国生物防御战略分析.”

⁹⁰ See Yang, “现代生物技术对生物武器的影响.”

⁹¹ “生物医药子产业联盟党总支揭牌仪式暨生物医药产业联盟党委首期‘联盟日’活动在我区举办” [Unveiling Ceremony of the Party Branch of the Biomedical Sub-industry Alliance and the First “Alliance Day” Activity of the Biomedical Industry Alliance Party Committee Held in Our District], August 2, 2023, https://www.cmc.gov.cn/xwzx/yw/art/2023/art_7dff0137d5b14bec9335b74aeeef93c7.html.

⁹² Ibid.

its 7,000 employees were CCP members by 2013.⁹³ The company's culture promotes the notion that “party members are the technical backbone” (党员就是技术骨干) of the organization. According to the bipartisan House of Representatives Select Committee on the CCP, WuXi AppTec “has received investment from numerous PLA investment funds, including from organizations with a stated goal of investing in companies directly tied to military-civil fusion,” such as the Aviation Industry Corporation of China Military-Civil Fusion Selected Hybrid Securities Investment Fund.⁹⁴ The group has also collaborated with PLA institutions, including on joint research with the PLA's Second Military Medical University and No. 401 Hospital.⁹⁵ These connections demonstrate how the PRC is leveraging its biotech industry for potential military applications.

Chinese military experts predict these biotechnologies will fundamentally transform warfare, shifting from “hard killing” (硬杀伤) to “soft killing” (软杀伤) that targets human biology and cognition. As one expert ominously notes, “future wars may not necessarily use ‘weapons’ to destroy a country, the key is in the ‘invisible’—invisible infiltration, invisible propaganda, invisible threats.”⁹⁶ This perspective underscores the potential for biotechnology through MCF to reshape not just military capabilities but the very nature of conflict itself, aligning the PRC's broader strategic goals in the biotech domain with its broader military modernization goals.

New materials. Beijing aims to establish a world-class advanced materials industry by 2025 through fostering regional industrial clusters, with multiple MCF demonstration bases dedicated to accelerating R&D in this sector.⁹⁷ The PRC has achieved breakthroughs in areas with dual-use applications, including large-diameter silicon materials (used in semiconductors) and high-temperature titanium alloys for aerospace applications. This success

⁹³ “甘当创新发展‘催化剂’——记药明康德众党员” [Willing to Be the “Catalyst” for Innovative Development—a Record of WuXi AppTec's Many Party Members], *Liberation Daily*, May 25, 2013, <https://news.12371.cn/2013/05/25/ARTI1369462494473961.shtml>.

⁹⁴ “Gallagher, Krishnamoorthi Expose Hidden BGI Subsidiary, Innomics, Operating in the U.S., Call on Pentagon to List Chinese Biotech Firms as ‘Chinese Military Companies,’” Select Committee on the Strategic Competition between the United States and the Chinese Communist Party, April 1, 2024, <https://selectcommitteeontheccp.house.gov/media/press-releases/gallagher-krishnamoorthi-expose-hidden-bgi-subsidiary-innomics-operating-us>.

⁹⁵ “LC-MS/MS 生物分析中重分析失败样本的调查与解决” [Investigation and Resolution of Incurred Sample Reanalysis Failures in LC-MS/MS Bioanalysis], *Chinese Journal of Pharmaceutical Analysis* (2016); and “内窥镜表面醛类消毒剂残留的测定” [The Determination of Aldehyde Disinfectants Residual on the Surface of Endoscopes], *Chinese Journal of Disinfection* (2016).

⁹⁶ See “军事专家热评‘微防’——国之大事” [Military Experts Comment on “Micro Defense—a Major National Affair”], *Xinhua*, April 10, 2024, <https://app.xinhuanet.com/news/article.html?articleId=0cb077c2d96d48843b5b9c4840aed7>.

⁹⁷ This finding draws on the authors' data set on MCF demonstration bases.

in new materials has contributed to growing dominance in another new technology domain. The PRC has surpassed foreign competitors to become the leading global producer of dual-use energy technologies like solar cells and lithium-ion batteries (used in electric vehicles and high-energy weapons). It has done so by leveraging brute force economic tactics to generate vertically integrated supply chains, creating a price advantage, pushing competitors out of the market, and enabling economies of scale, which reinforce global dependence on China.⁹⁸

Future information. PRC strategic documents have long emphasized the importance of IT in both the economic and military domains. An “implementation opinion” (实施意见) issued by seven government ministries in January 2024 prioritizes “future information” for industrial policy.⁹⁹ The document specifically identifies next-generation mobile communications, satellite internet, and revolutionary computing paradigms such as quantum, photonic, and “brain-inspired intelligence.”¹⁰⁰

China’s MCF-enabled achievements in supercomputing are especially notable. While details are murky, teams in the United States and China reportedly completed the world’s first exascale supercomputers in the same period around the early 2020s.¹⁰¹ The Tianhe supercomputer series, developed primarily by the National University of Defense Technology under the 863 Program and located at the National Supercomputer Center in Guangzhou, provides a useful illustration of how MCF works in practice. Tianhe has transitioned into civilian applications, serving as a technology platform for civilian enterprise groups such as CNPC, Sinopec, and BGI.

Dual-use industrial base capacity. At its core, MCF is an industrial strategy. In this light, perhaps nothing testifies to its success more than the mere fact of China’s industrial dominance. Over roughly three decades, the CCP has used all the tools at its disposal, from anticompetitive subsidies to technology transfers, to cultivate unrivaled production and scale up

⁹⁸ Emily de La Bruyère and Nate Picarsic, “Elemental Strategy: Countering the Chinese Communist Party’s Efforts to Dominate the Rare Earth Industry,” Foundation for Defense of Democracies, February 10, 2022, <https://www.fdd.org/analysis/2022/02/10/elemental-strategy-countering-the-chinese-communist-partys-efforts-to-dominate-the-rare-earth-industry>.

⁹⁹ “Implementation Opinions of Seven Ministries.”

¹⁰⁰ The latter paradigm is probably a reference to neuromorphic computing or other forms of computing that draw inspiration from the human brain.

¹⁰¹ Francisco Pires, “Chinese Exascale Supercomputer Faces Frontier in Gordon Bell Prize,” Tom’s Hardware, August 17, 2022, <https://www.tomshardware.com/news/china-oceanlight-supercomputer-competes-for-gordon-bell-prize>; and Jeff Pao, “China Pushes Supercomputing Goal despite U.S. Curbs,” September 23, 2023, <https://asiatimes.com/2023/09/china-pushes-supercomputing-goal-despite-us-curbs>.

capacity across numerous dual-use technology sectors that are critical for both economic competitiveness and the military balance of power.¹⁰²

CCP leaders have consistently placed manufacturing at the core of China's long-term innovation strategy. Made in China 2025, issued in 2015, identified achieving leadership in advanced manufacturing as key to sustaining China's "comprehensive national power."¹⁰³ This strategy explicitly promotes technologies with dual-use potential, such as AI, aerospace, and advanced communications systems, which are integral to the modernization of the PLA. The 13th Five-Year Plan positioned the development of intelligent manufacturing capabilities as "the only way to cultivate new driving forces for China's economic growth."¹⁰⁴ The 14th Five-Year Plan calls for China to "accelerate the construction of a manufacturing powerhouse and a quality powerhouse [质量强国], [and] promote the deep integration of advanced manufacturing and modern service industries," highlighting sectors where civilian innovation can be applied to military needs, particularly through MCF.¹⁰⁵ Recent Chinese policy guidance, in line with efforts to achieve "new industrialization" (新型工业化), has identified manufacturing as "the main battlefield" in strategic competition. Military applications of industrial advances have been prioritized in areas such as unmanned systems, satellite navigation, and robotics.¹⁰⁶

Rather than address structural imbalances in the Chinese economy, the CCP has re-emphasized advanced manufacturing as the critical source of Chinese national power. PRC net lending to manufacturing rose from just \$63 billion in 2019 to over \$680 billion in the first three quarters of 2023.¹⁰⁷ Beijing's aim is not merely to stimulate a weak economy but to upgrade its dual-use industrial base. In a speech in March 2024, Xi Jinping called for

¹⁰² Robert D. Atkinson, "The Hamilton Index: Assessing National Performance in the Competition for Advanced Industries," Information Technology and Innovation Foundation, 2022, <https://itif.org/publications/2022/06/08/the-hamilton-index-assessing-national-performance-in-the-competition-for-advanced-industries>.

¹⁰³ See Wayne M. Morrison, "The Made in China 2025 Initiative: Economic Implications for the United States," Congressional Research Service, In Focus, 2019, <https://crsreports.congress.gov/product/pdf/IF/IF10964/4>.

¹⁰⁴ "Circular of the State Council on Issuing the National 13th Five-Year Plan for the Development of Strategic Emerging Industries," State Council (PRC), November 29, 2016, trans. by the Center for Strategic and Emerging Technology, <https://cset.georgetown.edu/publication/national-13th-five-year-plan-for-the-development-of-strategic-emerging-industries>.

¹⁰⁵ "Outline of the People's Republic of China 14th Five-Year Plan for National Economic and Social Development and Long-Range Objectives for 2035," 19.

¹⁰⁶ "Implementation Opinions of Seven Ministries."

¹⁰⁷ Keith Bradsher, "More Semiconductors, Less Housing: China's New Economic Plan," *New York Times*, November 6, 2023, <https://www.nytimes.com/2023/11/06/business/china-economy-property-crisis.html>.

coordinating “military struggle preparations” and emphasized the need to integrate “new forces of production” (新质生产力) and “new combat forces” (新质战斗力).¹⁰⁸ These terms are associated with Xi’s adaptation of Marxist development theory and refer to using revolutionary technology breakthroughs to upgrade China’s industrial and warfighting capabilities.¹⁰⁹ For example, technologies emerging from the Zhongguancun MCF base, including innovations in AI-driven logistics and autonomous systems, are specifically designed to enhance the PLA’s operational readiness and battlefield coordination.

As of mid-2024, PRC producers were set to flood foreign markets with subsidized advanced industry exports, undercutting firms in the United States and other democratic market economies.¹¹⁰ Creating overcapacity offers the regime in Beijing strategic benefits beyond commercial gains. Specifically, asymmetries in industrial base capacity can be wielded as instruments of statecraft, while excess production capacity can be pressed into service for wartime mobilization.¹¹¹ China’s growing dominance in dual-use sectors—including batteries, electric vehicles, IoT devices, shipbuilding, drones, flat panel displays, and many others—undermines the credibility of U.S. deterrence and the ability to prevail in a protracted conflict. In particular, China’s dual-use technologies, such as AI-powered drones and unmanned naval vessels, serve both commercial and military purposes, strengthening the PLA’s asymmetric capabilities. In another example, the U.S. Department of Defense relies on the PRC for imports of dual-use chemicals used in nearly every weapon on the modern battlefield, from small arms to missiles to munitions.¹¹² According to one series of war games, in a major conflict with the PRC the United States would probably run out

¹⁰⁸ The translation of 新质生产力 as “new forces of production” better captures the Marxist origin of the term than Beijing’s official English translation, “new quality productive forces.”

¹⁰⁹ Xi Jinping, “发展新质生产力是推动高质量发展的内在要求和重要着力点” [Developing New Quality Productivity Is an Inherent Requirement and Important Focus for Promoting High-Quality Development], *Qiushi*, June 1, 2024, http://paper.people.com.cn/rmrb/html/2024-06/01/nw.D110000renmrb_20240601_5-01.htm.

¹¹⁰ Bradsher, “More Semiconductors, Less Housing”; and Camille Boullenois, Agatha Kratz, and Daniel H. Rosen, “Overcapacity at the Gate,” Rhodium Group, March 26, 2024, <https://rhg.com/wp-content/uploads/2024/03/Overcapacity-at-the-Gate.pdf>.

¹¹¹ Jason Douglas, “The World Is in for Another China Shock,” *Wall Street Journal*, March 3, 2024, <https://www.wsj.com/world/china/the-world-is-in-for-another-china-shock-3d98b533>; and Victor D. Cha, “Collective Resilience: Deterring China’s Weaponization of Economic Interdependence,” *International Security* 48, no. 1 (2023): 95–102.

¹¹² Nadia Schadow et al., “Rocket’s Red Glare: Modernizing America’s Energetics Enterprise,” Hudson Institute, October 18, 2022, <https://www.hudson.org/supply-chains/rockets-red-glare-modernizing-americas-energetics-enterprise>.

of some munitions—including long-range, precision-guided munitions—within a week.¹¹³

Covid-19: A Case Study in System Mobilization

MCF has long sought to bridge the gap between the national defense mobilization system and the state emergency management system to ensure that Beijing is able to activate a coordinated response during a crisis, whether military or civilian.¹¹⁴ The Covid-19 pandemic served as a test run for these efforts and for the effectiveness of MCF and the NSSC more broadly.

China's response to the pandemic demonstrated the all-encompassing nature of MCF, going far beyond mixed-market efforts at dual-use technology development and military modernization. According to PLA commentators, the PRC's mobilization of various entities during the pandemic, including military units, government agencies, the united front, and individual companies, showcased the system's ability to effectively harness a diverse array of resources.¹¹⁵ The CCP's integrated approach was evident in tasks such as procuring and distributing masks and vaccines, facilitating economic recovery, and conducting scientific research. Although they acknowledge that obstacles remain, PLA scholars view the Covid-19 response as validation of the "people's war" approach to civil-military unity and as a template for future wartime mobilization. CCP commentators have praised the response as evidence of the effectiveness of the Chinese system, reinforcing the party's broader propaganda efforts to showcase its governance superiority.¹¹⁶ More broadly, the CCP's appraisal of its response to Covid-19 should be viewed as an implicit response to Xi Jinping's calls at the 19th Party Congress for his party colleagues to hold out a "Chinese approach to solving problems facing mankind."¹¹⁷

¹¹³ Seth G. Jones, "Empty Bins in a Wartime Environment: The Challenge to the U.S. Defense Industrial Base," CSIS, January 23, 2023, <https://www.csis.org/analysis/empty-bins-wartime-environment-challenge-us-defense-industrial-base>.

¹¹⁴ Stone and Wood, *China's Military-Civil Fusion Strategy*, 91–92.

¹¹⁵ Zhang Ying, Huang Chaofeng, and Tang Yanhong, "系统论视域下一体化国家战略体系和能力内涵与构建, 科技进步与对策" [The Connotation and Construction of the Integrated National Strategic System and Capabilities from the Perspective of System Theory, Scientific, and Technological Progress and Countermeasures], 2022, <http://www.kjlb.org/EN/10.6049/kjbydc.C202107270>.

¹¹⁶ See, for example, Ye Mengyuan, "The Strategy of Strengthening the Country and the Army Goes First," PLA Daily, September 23, 2023; and You Zhibin, "健全国家应急管理体系提高处理急难险重任务能力" [Improving the National Emergency Management System and Enhancing the Ability to Handle Arduous, Dangerous, and Critical Tasks], *Guangming Daily*, February 18, 2020.

¹¹⁷ Nadège Rolland, "China's Pandemic Power Play," *Journal of Democracy* 31, no. 3 (2020): 25–38, <https://www.journalofdemocracy.org/articles/chinas-pandemic-power-play-2>.

The implications of China's Covid-19 response extend beyond crisis management. The CCP retained features of this mobilized system even after the lockdown, with the party seizing on the politics of emergency and employing techno-authoritarian tactics to blur the lines between wartime and peacetime governance. This approach was exemplified by the ongoing use of community-based surveillance systems—established during the pandemic but still in place as of mid-2024—akin to the Mao-era “Fengqiao model” of community surveillance, heralded by Xi as relevant for social control.¹¹⁸ Additionally, the PLA's use of “robo-dogs” (a technology originally developed for commercial use) to bark orders at residents during the pandemic is a vivid example of techno-authoritarian policing tactics under the umbrella of MCF.¹¹⁹

Conclusion

The elevation of the NSSC concept in official CCP discourse represents an intensification of MCF efforts and signals the party's renewed commitment to achieving global techno-economic dominance by any means necessary. The CCP's ability to direct resources within its system, even at the expense of economic efficiency, means that Beijing's efforts to develop indigenous technology alternatives and apply them for military use will likely continue to be successful.

The NSSC concept serves as a microcosm of the broader rivalry between the United States and China, exposing fundamental disparities between values and governing principles, which Beijing exploits for its strategic advantage. While many countries, including the United States, encourage cooperation between military and civilian sectors, the opaque, unaccountable, and coercive features of the CCP's Leninist approach to governance set the PRC apart. The party intentionally blurs the lines between private enterprise and public direction and uses influence operations and obfuscation to hide its behavior and ensnare foreign individuals and entities.¹²⁰ The NSSC's whole-of-society approach is much more all-encompassing than any equivalent U.S. governance institution. Its

¹¹⁸ Vivian Wang, “Xi Jinping's Recipe for Total Control: An Army of Eyes and Ears,” *New York Times*, May 25, 2024, <https://www.nytimes.com/2024/05/25/world/asia/china-surveillance-xi.html>.

¹¹⁹ Ryan McMorrow, “The Robot Dogs Policing Shanghai's Strict Lockdown,” *Financial Times*, April 14, 2022, <https://www.ft.com/content/5c437146-2d18-466b-84af-24a47b32de59>.

¹²⁰ Emily de La Bruyère, “China's Global Influence and Interference Activities,” testimony before the U.S.-China Economic and Security Review Commission, March 25, 2023, <https://www.uscc.gov/hearings/chinas-global-influence-and-interference-activities>.

sweeping scale—unchecked by democratic features such as the rule of law, civilian control of the military, independent journalism, and an independent judiciary—presents U.S. policymakers with a vexing challenge: how to chart a whole-of-nation response to MCF and outmaneuver Beijing without resorting to its Leninist tactics.

Navigating this gauntlet requires that the United States precisely distinguish what is problematic about the CCP's behavior and adopt a systems rivalry mindset by shifting from a defensive to an offensive posture and actively identifying and exploiting the CCP's vulnerabilities for strategic advantage. Deeper understanding of the PRC's NSSC system and the role it plays in operationalizing the CCP's objectives through party, state, military, corporate, and overseas channels can help analysts and policymakers identify exploitable gaps.

EXECUTIVE SUMMARY

This chapter examines the future trajectory of China's nuclear force as it shifts to a "world-class" nuclear force, including drivers, political objectives, employment, and capability developments.

MAIN ARGUMENT

The PLA is rapidly developing a "world-class" nuclear force, in part due to a perceived increase in the likelihood of a conflict between the U.S. and China and the belief that nuclear weapons will play a key role in constraining U.S. military options. China views nuclear weapons as a key element of "strategically counterbalancing" against the U.S. as competition heightens. In particular, they serve to constrain U.S. intervention in a regional conflict and create space to enable an invasion of Taiwan in fulfillment of China's goals of national rejuvenation. To develop a more diverse nuclear force capable of counterattacking at various scales and levels of escalation against both military and civilian targets, China is pursuing a wide variety of improvements, including regional-range low-yield nuclear weapons, a shift to a launch-on-warning posture, a more survivable nuclear force that can retaliate under any conditions, and a suite of capabilities designed to guarantee that the PLA's nuclear response bypasses any defenses and strikes the intended target.

POLICY IMPLICATIONS

- With future advances to the PRC's nuclear force, the U.S. will have diminished means of credibly executing nuclear threats and few achievable options to counter this change, reducing the coercive utility of nuclear weapons in U.S. national strategy toward China.
- As China grows more confident in its nuclear forces as a means of counterbalancing against U.S. nuclear strength, the risk of a conflict initiated by Beijing rises drastically if the conventional force balance shifts in its favor and the PRC continues to diplomatically isolate Taiwan. The conventional balance of power in the region and U.S. willingness to get involved in a Taiwan conflict will play an outsized role in deterring a PRC-initiated conflict.
- China's no-first-use policy cuts both ways and could limit the ability of its nuclear forces to deter U.S. conventional force. This creates opportunities to lean into a wider range of conventional options in the region, mitigating concerns of China escalating to nuclear use.

The PLA's Strategic Transformation: Forging a World-Class Nuclear Force

Gerald C. Brown

China is undertaking an unprecedented transformation, forging its nuclear forces into a “world-class” strategic force. In 2020 the U.S. Department of Defense’s unclassified China Military Power Report highlighted that the People’s Republic of China (PRC) maintained a force of approximately 200 nuclear weapons.¹ As of 2024 that number had tripled to surpass 600 operational nuclear warheads and was on track to reach a force of over 1,000 nuclear weapons by 2030.² The composition of this force is also changing. China today maintains an active nuclear triad. The ground component comprises a wide range of mobile nuclear forces, including the DF-26 class for regional precision nuclear strikes and the intercontinental-range DF-31 and DF-41 class. This is complemented by silo-based nuclear forces in the DF-5 and DF-31 class. The air-to-air refuellable H-6N bomber provides an air component armed with a nuclear-capable ballistic missile for regional nuclear strikes. The People’s Liberation Army (PLA) Navy also possesses the Type-094 nuclear-powered ballistic missile submarine, equipped with both the JL-2 and JL-3

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¹ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2020* (Washington, D.C., September 2020), 85, <https://media.defense.gov/2020/Sep/01/2002488689/-1/-1/1/2020-DOD-CHINA-MILITARY-POWER-REPORT-FINAL.PDF>.

² U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2024* (Washington, D.C., December 2024), 101–10, <https://media.defense.gov/2024/Dec/18/2003615520/-1/-1/0/MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA-2024.PDF>.

sea-launched ballistic missiles.³ China has developed 320 new solid-fueled missile silos and is implementing an “early-warning counterstrike” posture that can retaliate before an adversary’s nuclear strike impacts the PRC.⁴ It seemingly intends to develop a wide array of new nuclear capabilities, including low-yield nuclear weapons, hypersonic glide vehicles, and fractional orbital bombardment systems.⁵

While alarming, the PRC’s expanding force size on its own should not be the primary driver of concern for the United States.⁶ But it does serve as a vivid representation of the very real threats facing the United States and its partners and allies by a rapidly evolving PLA nuclear force. However, this change has been poorly understood by Western audiences, often projecting their own preconceived notions onto Chinese intentions. There is very little English-language work examining what this emerging Chinese nuclear force will ultimately look like and what roles the PRC imagines a world-class nuclear force should fill.⁷ While Chinese sources examining this are not plentiful, they do exist. This chapter seeks to fill this gap by utilizing Chinese primary sources and looking to a rapidly approaching future to assess how the PRC envisions a world-class nuclear force. Although very few PRC publications explicitly define a world-class nuclear force, several Chinese writings discuss the goals, requirements, missions, and direction of the PLA’s changing nuclear force. By coupling these articles with writings describing the overall direction of the PLA Rocket Force as moving toward a world-class force by midcentury, we can begin to put together an understanding of how the PLA views a world-class nuclear force and what role it envisions this force playing in national strategy.

³ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2024*, 101–10.

⁴ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023* (Washington, D.C., October 2023), 103–13, <https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>; and Decker Eveleth, “People’s Liberation Army Rocket Force Order of Battle 2023,” James Martin Center for Nonproliferation Studies, July 3, 2023, <https://nonproliferation.org/peoples-liberation-army-rocket-force-order-of-battle-2023>.

⁵ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 103–13.

⁶ David C. Logan, “The Nuclear Balance Is What States Make of It,” *International Security* 46, no. 4 (2022): 172–215; and Vipin Narang, “What Does It Take to Deter? Regional Power Nuclear Postures and International Conflict,” *Journal of Conflict Resolution* 57, no. 3 (2012): 478–508.

⁷ Most English-language work has focused on the drivers of PRC nuclear change instead of examining what a future force will look like, though some scholars have begun to bridge this gap. For example, see David C. Logan and Philip C. Saunders, *Discerning the Drivers of China’s Nuclear Force Development: Models, Indicators, and Data*, China Strategic Perspectives 18 (Washington, D.C.: NDU Press, 2023), <https://digitalcommons.ndu.edu/china-strategic-perspectives/1>.

To understand the PRC's vision of a world-class nuclear force, this chapter examines several documents, some of which were previously unexamined in Western scholarship. The first are a series of writings over the last several years describing political guidance and the role of strategic forces. U.S. government reporting provides useful insight into Chinese capability developments, along with Chinese writings describing capability requirements for force development. Additionally, several older writings on nuclear campaigns describe some roles and intentions of the nuclear force that, at the time these documents were written, were probably more aspirational than actual. However, coupled with more recent writings on PLA nuclear developments aligning with these models, it appears that some of these older descriptions of a nuclear force have received the political endorsement that they perhaps lacked at the time. While the latest writings are used whenever available, these older writings provide important context on the direction and intention of the PLA's nuclear force.

This chapter begins by examining the context of changes in China's nuclear forces. The first section explains China's perception that its nuclear forces were inadequate to deter U.S. nuclear threats, particularly in a tense political environment where a U.S.-PRC conflict looks increasingly likely. The second section expands on the political objectives of a world-class nuclear force—namely, the ability to “strategically counterbalance” against the United States and ultimately create space to enable unification with Taiwan. The third section considers the mechanisms that nuclear forces use to accomplish this objective and highlights two long-standing missions of Chinese nuclear forces: deterring nuclear coercion and conducting nuclear counterattacks. While this research found no evidence that the PRC intends to shift from this premise, it does note evolutions. The PRC appears to increasingly view its nuclear force as a means of contributing to deterring conventional intervention alongside adversary nuclear actions. Further, it sees the ability to manage nuclear escalation and engage a wider variety of both military and civilian targets as future requirements. Finally, the chapter concludes by discussing a series of capability objectives, including operating at a higher state of readiness, creating a more survivable nuclear force that can retaliate under any conditions, and bypassing defenses to accurately strike targets.

While no explicit definition of a world-class nuclear force was unearthed, writings discussing the goals, direction, and requirements for future PLA nuclear forces provide a snapshot of what such a force likely is intended to look like. A world-class nuclear force is a survivable force that operates on a higher state of readiness and can respond promptly, employing a diverse

arsenal of sophisticated nuclear forces that can bypass adversary defenses and accurately strike an array of targets. Such a force is intended to serve retaliatory counterstrike and deterrence purposes instead of a shift to a first-strike posture, but also seems to seek the ability to manage nuclear escalation by engaging in limited waves of counterattacks against military and civilian targets as needed. In doing so, the PRC hopes to limit U.S. nuclear options in a conflict over Taiwan, limit the extent of U.S. intervention, and enable the forceful unification of Taiwan with China should the PRC opt to employ military force.

Intensifying Competition and the Need for Nuclear Strength

Beijing has become increasingly concerned that the United States would employ nuclear force against it in a regional conflict.⁸ This is not necessarily a new concern; the origins of the Chinese nuclear program stem from a similar anxiety. Mao Zedong was nonchalant about the capabilities of nuclear weapons until the United States threatened to employ them against the PRC. Realizing that the newly formed PRC was vulnerable to this particular form of coercion, Mao came to see nuclear weapons as a weapon the country must have.⁹ Nonetheless, for many years the PRC believed that a relatively modest arsenal was sufficient for this purpose. While PLA concerns about nuclear escalation are not new, their urgency has seemingly increased as risks of a U.S.-China conflict grow. Beijing perceives a rapidly changing security environment, one in which differences with the United States over Taiwan are irreconcilable and war with the United States looks like an increasingly realistic possibility. It believes that the United States is “rebalancing” to the Asia-Pacific, turning the region into a “focal point in international strategic competition.”¹⁰

⁸ Office of the Director of National Intelligence, “2023 Annual Threat Assessment of the U.S. Intelligence Community,” March 8, 2023, <https://www.dni.gov/index.php/newsroom/reports-publications/reports-publications-2023/3676-2023-annual-threat-assessment-of-the-u-s-intelligence-community>.

⁹ Huang Yingxu, “毛泽东的核战略思想” [Mao Zedong Thought on Nuclear Strategy], *China Military Science* 6, no. 192 (2023): 54–63.

¹⁰ “军报评论:扎扎实实把战略能力搞上去” [Military Daily Commentary: Improve Strategic Capabilities in a Down-to-Earth Manner], *PLA Daily*, September 27, 2016, https://web.archive.org/web/20240323172417/http://www.81.cn/jwgd/2016-09/27/content_7278514.htm; Wang Weidong, “不辱使命,扎扎实实把打赢能力搞上去” [To Fulfill the Mission and Steadily Enhance the Capability to Win], *PLA Daily*, March 10, 2019, https://web.archive.org/web/20240323201255/http://www.81.cn/jfbmap/content/2019-03/10/content_228972.htm; and “砺剑图强开新局” [Sharpening Swords to Open a New Chapter], *Rocket Force News*, October 19, 2022.

PLA experts and commentators have highlighted increased concerns of U.S. employment of nuclear weapons against the PRC during a regional conflict—a concern that has heightened since the U.S. 2018 Nuclear Posture Review.¹¹ Chinese experts appear to believe the United States seeks to use nuclear weapons to compensate for conventional weakness in the theater and it could turn to nuclear employment in a regional conflict. More generally, the PRC sees the United States as relying on its nuclear forces to contain China and its rise, preventing the accomplishment of Chinese political objectives.¹² These concerns are exacerbated by perceptions that the United States is developing additional low-yield nuclear weapons and shifting toward limited nuclear conflict, a threat that the PRC has traditionally not had credible options to respond to proportionally.¹³

Further, the PRC has long-standing concerns about the survivability of its force and its ability to ensure an effective counterattack in the face of U.S. forces and missile defenses. Some Chinese strategists discuss concerns about the PRC's ability for its previously limited nuclear force and nuclear command-and-control apparatus to survive a U.S. counterforce strike, with concern that its remaining nuclear forces would be too few in number to bypass U.S. missile defenses and pose a credible threat.¹⁴ While U.S. missile defenses are limited, they have remained an enduring concern for a future-looking PRC, which views both theater and international missile defenses as part of a global system that could undermine any nuclear counterattack.¹⁵ Missile defenses could also be of concern if the PRC is mounting a limited nuclear counterattack with only a few weapons in an attempt to manage nuclear escalation. This consideration has apparently contributed to PLA requirements to develop enhanced defense penetration technology.¹⁶ In light of these concerns, the PLA has seemingly found its previous force

¹¹ Henrik Stålhane Hiim, M. Taylor Fravel, and Magnus Langset Trøan, "The Dynamics of an Entangled Security Dilemma: China's Changing Nuclear Posture," *International Security* 47, no. 4 (2023): 156–60.

¹² "军报评论:扎扎实实把战略能力搞上去"; and Wang, "不辱使命,扎扎实实把打赢能力搞上去."

¹³ Fang Xiaozhi, "美部署战术核武器暗藏诸多隐患," *PLA Daily*, February 20, 2020, https://web.archive.org/web/20241104230050/http://www.81.cn/jfbmap/content/2020-02/20/content_254551.htm; and Liang Chunhui, "战术核武器缘何引关注" [Why Tactical Nuclear Weapons Draw Attention], *PLA Daily*, June 4, 2024, http://www.81.cn/szb_223187/gfbszbxq/index.html?paperName=zggb&paperDate=2024-06-04&paperNumber=04&articleid=932534.

¹⁴ Ling Shengyin and Peng Aihua, ed., 我国战略威慑能力建设研究 [Research on the Construction of My Country's Strategic Deterrence Capability] (Beijing: People's Press, 2019), 41–50.

¹⁵ Hiim et al., "The Dynamics of an Entangled Security Dilemma," 164–68; and Fiona S. Cunningham and M. Taylor Fravel, "Assuring Assured Retaliation: China's Nuclear Posture and U.S.-China Strategic Stability," *International Security* 40, no. 2 (2015): 7–50.

¹⁶ Xiao Tianliang, ed., 战略学 [Science of Military Strategy] (Beijing: PLA National Defense University Press, 2020), 384–85.

inadequate to deter the types of U.S. nuclear threats it expects to face in a future conflict. In response, it is accelerating development of a world-class nuclear force that is more survivable, operates at a higher state of readiness, and can respond credibly at all levels of nuclear escalation.

The PRC has been moving toward a world-class nuclear force for some time, though the shifting strategic environment has seemingly heightened the urgency of this goal. In the early 2000s China maintained a force of fewer than 45 intercontinental ballistic missiles (ICBMs) that could strike U.S. territory, only about 20 of which could strike the continental United States.¹⁷ When the DF-31 mobile ICBM came online in the late 2000s, this slowly began to change. By 2020, the PRC possessed a force of about 100 ICBMs, and over 200 nuclear weapons in total, including new precise regional-range systems such as the DF-26.¹⁸ Since then, the PLA's nuclear forces have expanded at an unprecedented pace, growing to over 600 operational nuclear warheads as of 2024, many of which are housed on around 400 intercontinental-range ballistic missiles.¹⁹ Previously, the 2013 *Science of Military Strategy* from the Academy of Military Sciences explicitly called for the number of nuclear weapons, in particular intercontinental-range nuclear weapons, to increase. This seems to have been taken seriously.

Since Xi Jinping rose to be general secretary of the Chinese Communist Party (CCP) and chairman of the Central Military Commission in 2012, he has made nuclear force development a priority.²⁰ In 2015, he elevated the Second Artillery Corps to a full service named the PLA Rocket Force, highlighting it as the “core force of strategic deterrence, a strategic buttress to the country’s position as a major power, and an important building block in upholding national security.”²¹ General Secretary Xi’s guidance has demanded that the PLA “accelerate the construction of a high-level strategic deterrent,” “accelerate its strategic transformation,” and “accelerate the improvement of strategic capabilities to defend national sovereignty,

¹⁷ U.S. National Air and Space Intelligence Center, “Ballistic and Cruise Missile Threat,” March 2006, <https://www.nukestrat.com/us/afn/NASIC2006.pdf>.

¹⁸ U.S. National Air and Space Intelligence Center, “Ballistic and Cruise Missile Threat,” April 2009, <https://irp.fas.org/threat/missile/naic/NASIC2009.pdf>; and U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2020*, 85.

¹⁹ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2024*, 101–10.

²⁰ Wei Bing and Li Bingfeng, “火箭军聚焦备战打仗加速推动战略能力提升” [Rocket Force Focuses on Preparing for War and Accelerating the Enhancement of Strategic Capabilities], *PLA Daily*, August 8, 2022, https://web.archive.org/web/20240323201854/http://www.81.cn/jfjbmap/content/2022-08/08/content_321465.htm.

²¹ “China Inaugurates PLA Rocket Force as Military Reform Deepens,” *Xinhua*, January 2, 2016, <https://web.archive.org/web/20240323150421/http://en.people.cn/n3/2016/0102/c90786-8998406.html>.

security, and development interests.”²² According to the PLA Rocket Force, “Chairman Xi’s statements have...promoted a leap forward in the development of strategic nuclear capabilities.”²³

Political Objectives: Strategic Missions a World-Class Force Should Fulfill

As the international situation shifts, the PRC under Xi Jinping has seemingly come to believe that nuclear weapons are an increasingly critical element of achieving its political objectives. It views developing a world-class nuclear force as critical to “strategically counterbalance” the United States and create space to enable unification with Taiwan. The following discussion examines both objectives.

Strategically Counterbalance the United States

During the PLA’s military parade in 2019, the PRC specifically ascribed three missions to the nuclear force: “The DF-41 ICBM is the mainstay of China’s strategic nuclear strength and plays a vital role in ‘strategic decisive victory’ [战略决胜], ‘strategic deterrence and control’ [战略慑控], and ‘strategic counterbalance’ [战略制衡].”²⁴ These missions were hardly noticed at the time, but they have appeared in military publications associated with

²² Liu Shangjing, “为实现建军百年奋斗目标砥砺前行” [Forge Ahead to Achieve the Centenary Goal of the Founding of the Army], *PLA Daily*, December 14, 2020, <https://web.archive.org/web/20240323153601/http://www.mod.gov.cn/gfbw/jmsd/4875402.html>; Chen Xianping and Su Zheng, “高举伟大旗帜阔步时代征途” [Hold High the Great Banner and Stride Forward on the Journey of the Times], *Rocket Force News*, September 27, 2021; and “习近平:牢记历史使命提升战略能力努力建设一支强大的现代化火箭军” [Xi Jinping: Remember the Historical Missions, Enhance Strategic Capabilities, and Strive to Build a Strong Modern Rocket Force], *People’s Daily*, September 27, 2016, <https://web.archive.org/web/20240323185215/http://cpc.people.com.cn/n1/2016/0927/c64094-28742359.html>. The term “strategic capabilities” does not exclusively mean nuclear weapons, but the PLA has made it clear that nuclear forces reign supreme in this context, and these callouts quite regularly consist of a primarily nuclear component. The PLA Rocket Force—the primary nuclear arm of the PLA—is the “core force” of China’s strategic deterrent, with nuclear weapons as “the core and backbone of China’s strategic deterrence.” PLA writings highlight that nuclear weapons “are always the main strategic forces” and “the main strategic weapons used for goals of deterrence.” See Shou Xiaosong, ed., *战略学* [Science of Military Strategy] (Beijing: Academy of Military Sciences, 2013), 227, 229.

²³ “砺剑图强开新局.”

²⁴ Zhang Xuanjie and Li Bingfeng, “东风-41核导弹方队:我国战略核力量的中流砥柱” [China Unveils Advanced Dongfeng-41 Intercontinental Strategic Nuclear Missiles], *Xinhua*, October 1, 2019, <https://web.archive.org/web/20240322184615/http://www.81.cn/zt/2019nzt/qzzhrmghgcl70znyb/ybzf/16142067.html>.

the nuclear force since.²⁵ The PLA seeks a nuclear force that “plays a key role in strategic counterbalance in great-power competition, exerts strategic deterrence and control in the expansion of national interests, and ensures strategic decisive victory in significant military conflicts and future wars.”²⁶

While strategic deterrence is a long-standing objective of the nuclear force that will be discussed in a later section, the control element of this mission is relatively new. The limited writings on it discuss deterring adversaries while stabilizing the periphery.²⁷ Chinese experts highlight that to “ensure we can fight Taiwan, we need to ensure we can deter and control the surrounding area.”²⁸ Strategic decisive victory seems to refer to using proper strategic decision-making to achieve victory in war. The writings highlight that it is critical to see the big picture, and that commanders should organize military engagements in pursuit of securing the overall victory instead of just winning the battle. Wars are seen as being won far from the battlefield, and national leaders should not be afraid to take risks or incur localized losses to achieve the objective of winning the larger war.²⁹ In the nuclear context, this appears to refer to the role nuclear weapons contribute alongside other tools in securing overall victory in the local wars the PLA is preparing to fight. Nuclear weapons are one element of strategic victory that serves to limit adversary nuclear options while enabling conventional operations, thereby playing a critical role in “deterring, stopping, and winning wars.”³⁰

However, since Xi elevated the Rocket Force to a full military service in 2015, strategic counterbalance has frequently been associated with the

²⁵ Chen and Su, “高举伟大旗帜阔步时代征途”; Chen Anran, “军队组织形态现代化的特征、目标与实现路径” [Characteristics, Goals, and Roadmap of the Modernization of Military Organizational Structure], *China Military Science* 3, no. 171 (2020): 11–18; and Wang Xuping, “听党指挥，战略军种阔步前行” [Following the Party’s Command, the Strategic Service Marches Forward], *Rocket Force News*, July 2, 2021.

²⁶ Wang, “听党指挥,战略军种阔步前行.”

²⁷ *Ibid.*

²⁸ Sun Mingfu, “导弹专家:敌人怕啥发展啥瞄准强敌死穴打” [Missile Expert: Develop What the Enemy Fears and Strike the Weak Point of the Strong Enemy], *PLA Daily*, October 11, 2014, <https://web.archive.org/web/20240323172023/https://www.gfbzb.gov.cn/zbbm/gfzs/201502/20150228/1430988518.html>.

²⁹ An Puzhong, Yue Yutong, and Wang Lingshuo, “决战决胜:打出一个新中国” [Decisive Battle, Decisive Victory: Creating a New China], *PLA Daily*, April 27, 2021, https://web.archive.org/web/20240517113926/http://www.81.cn/jfbmap/content/2021-04/27/content_288142.htm; and Guo Fang, “战略致胜要全局在胸” [Strategic Victory Requires Keeping the Overall Situation in Mind], *PLA Daily*, January 15, 2019, https://web.archive.org/web/20240514222018/http%3A%2F%2Fwww.81.cn%2Fjfbmap%2Fcontent%2F2019-01%2F15%2Fcontent_225337.htm.

³⁰ Huo Zhengxuan, “打造世界一流战略军种” [Forging a World-Class Strategic Service], *People’s Daily*, May 21, 2017, <https://web.archive.org/web/20240323185818/http://military.people.com.cn/n1/2017/0521/c1011-29288994.html>; and “砺剑图强开新局.”

nuclear component of the Rocket Force and, importantly, listed as one of its core missions.³¹ Xi called on the Rocket Force to “enhance credible and reliable nuclear deterrence and counterattack capabilities, strengthen intermediate and long-range precision strike forces, and *enhance strategic counterbalance capabilities*, to build a strong and modernized Rocket Force” (emphasis added).³²

Around the same time that the military strategic guidelines changed in the 2019 time frame, the nuclear force and its mission of strategic counterbalance seems to have taken on a greater role as the PLA has grown increasingly concerned about the possibility of conflict with the United States.³³ Writings discussing military strategic guidance highlight an emphasis on enhancing strategic counterbalance, which serves to “achieve the ‘two centenary goals’ and the Chinese dream of the great rejuvenation of the Chinese nation.”³⁴ Shortly after this, the growth of Chinese nuclear forces exploded.

The PLA’s development of its strategic nuclear capabilities directly seeks to “enhance its ability to engage in strategic games and strategically counterbalance military powers.”³⁵ Strategic counterbalance capabilities “enable both deterrence and war,” with nuclear forces “compelling adversaries to always fear and respect us” by “regulating their possible nuclear provocations” in “today’s world of great-power strategic competition.”³⁶ The stronger strategic capabilities are, the “greater guarantee we will have the strength to carry out strategic rivalry with and strategically counterbalance against military powers, and the more support we will have for the strength of safeguarding national sovereignty, security, and development interests.”³⁷ The Rocket Force highlights that “in the era of ‘returning to great-power

³¹ For one example tying this mission directly to the nuclear component outside of the DF-41 parade, see Li Xianrong and Yang Min, “铸造国家安全战略支柱的海外样本” [Overseas Samples of Forging National Security Strategic Pillars], *PLA Daily*, January 30, 2018, https://web.archive.org/web/20240516172958/http://www.81.cn/jfbmap/content/2018-01/30/content_198321.htm.

³² “China Inaugurates PLA Rocket Force as Military Reform Deepens.”

³³ Yan Wenhui, “持续推进军事战略指导创新发展” [Continue to Promote Innovative Development of Military Strategic Guidance], *PLA Daily*, October 1, 2019, https://web.archive.org/web/20240516162701/http://www.81.cn/jfbmap/content/2019-10/01/content_244474.htm; and Joel Wuthnow and M. Taylor Fravel, “China’s Military Strategy for a ‘New Era’: Some Change, More Continuity, and Tantalizing Hints,” *Journal of Strategic Studies* 46, no. 6–7 (2023): 1149–84.

³⁴ *Ibid.*

³⁵ Huo, “打造世界一流战略军种”; and Wang, “不辱使命，扎扎实实把打赢能力搞上去”

³⁶ Su Zheng and Kuang Xiaoqin, “‘战略发展’锻造王牌底牌” [“Strategic Development” Forging Trump Cards], *Rocket Force News*, August 24, 2021; and “砺剑图强开新局”

³⁷ “军报评论：扎扎实实把战略能力搞上去”

competition,' the role of nuclear weapons as the trump card not only remains undiminished but is increasingly prominent."³⁸

Strategic counterbalance is geared directly toward the United States, relating to balancing against U.S. strength as competition intensifies in the region. As the U.S. "rebalances" to Asia, the PRC "strategically counterbalances" against the United States, which seeks to contain China's rise and prevent it from realizing the "China dream."³⁹ Counterbalancing the United States is the "inherent mission" of the Rocket Force to realize "national rejuvenation."⁴⁰ In essence, strategic counterbalance is focused on denying the United States an advantage in U.S.-China competition that can be used to prevent the accomplishment of political objectives such as unification with Taiwan.

Secure National Rejuvenation

As a strategic service, the Rocket Force employs military strength to serve the political objectives of the CCP. PLA writings note this explicitly, highlighting that the force's "construction and development have always been closely linked with the grand strategy of the party and the state, playing an irreplaceable role in the overall situation of national politics, diplomatic, and military struggles, as well as in safeguarding national sovereignty, security, and development interests."⁴¹ Ultimately, in the face of "unprecedented major changes in the world," the nuclear force's "inherent mission" is to "support the great rejuvenation of the Chinese nation" by "counterbalancing and controlling" the United States.⁴² Nuclear forces serve as the "decisive factor in deterring, stopping, and winning wars," serving to prevent the United States from denying the "great rejuvenation of the Chinese nation" or splintering its perception of national sovereignty.⁴³

For the CCP, a key component of this mission includes securing unification with Taiwan.⁴⁴ Beijing has made clear that it sees unification with Taiwan as a political goal and an essential component of its national rejuvenation—be this via coercion or military force.⁴⁵ Unclassified public

³⁸ "砺剑图强开新局."

³⁹ Sun, "敌人怕啥发展啥瞄准强敌死穴打"; and "军报评论:扎扎实实把战略能力搞上去."

⁴⁰ "砺剑图强开新局."

⁴¹ Wei and Li, "火箭军聚焦备战打仗加速推动战略能力提升."

⁴² "砺剑图强开新局."

⁴³ Huo, "打造世界"; and "砺剑图强开新局."

⁴⁴ Jude Blanchette, Briana Boland, and Lily McElwee, "What Is Beijing's Timeline for 'Reunification' with Taiwan?" Center for Strategic and International Studies, CSIS Interpret: China, May 26, 2023, <https://interpret.csis.org/what-is-beijings-timeline-for-reunification-with-taiwan>.

⁴⁵ Ibid.

statements from U.S. intelligence officials suggest that the PLA seeks the capability to invade the island, as well as to keep the United States out of any such conflict, by 2027.⁴⁶ Recent PLA publications intended to be studied across the force have highlighted that “forming strategic capabilities is the core task of achieving the goal of the 100th anniversary of the founding of the Army” in 2027.⁴⁷

One researcher from the PLA’s National University of Defense Technology explained it quite succinctly. Writing in the *People’s Tribune*, in a piece discussing the nuclear element of strategic deterrence enhancements and how that relates to political goals, the researcher writes:

China is building a strong strategic deterrent force system to resolutely oppose the interference of external hegemonic forces in national sovereignty and security issues. The report of the 20th CCP National Congress pointed out: “Solving the Taiwan issue and achieving complete reunification of the motherland is the party’s unswerving historical mission, the common aspiration of all Chinese people, and the inevitable requirement for realizing the great rejuvenation of the Chinese nation.” Faced with the separatist activities of a very small number of Taiwan separatists, and the increasingly obvious manipulation of “using Taiwan to control China” by external hegemonies to undermine China’s sovereignty and territorial integrity and major national security risks, the use of force is still an option that cannot be abandoned. Therefore, building a strong strategic deterrent force system is the trump card for safeguarding the country’s core interests. This is also an unequivocal message to external interference forces that no one should underestimate the Chinese people’s determination, will, and ability to defend national sovereignty and territorial integrity. Any external interference will inevitably be resolutely counterattacked by the Chinese people, and any external interference cannot succeed.⁴⁸

⁴⁶ Michael Martina and David Brunnstrom, “CIA Chief Warns against Underestimating Xi’s Ambitions toward Taiwan,” Reuters, February 2, 2023, <https://www.reuters.com/world/cia-chief-says-chinas-xi-little-sobered-by-ukraine-war-2023-02-02>; and Office of the Director of National Intelligence, “2023 Annual Threat Assessment of the U.S. Intelligence Community.”

⁴⁷ The remainder of this section bears inclusion as well, as it pointed to underreported information on PLA concerns of systemic issues that may threaten their objectives. It goes on to say “however, it must be noted that issues such as falsifying combat preparedness, disconnects between operations, construction, training, and research, and unrealistic styles in training and exercises still persist in current force development. In particular, some key combat capability building efforts have involved ‘cutting corners’ and ‘lowering standards.’ If these problems are not thoroughly corrected, we will not only fail to deliver on our necessary ‘capability plans’ for the military’s centenary, but will also be undermining our own foundation. We must deepen efforts to build combat effectiveness, crack down on fraud and counterfeiting in combat capability development, closely examine and address major programs, key projects, and critical areas, and strictly investigate and handle issues such as falsifying key combat capabilities or distorting the realism of training and exercises. This is essential to ensure that the combat power we generate is real and reliable.” Propaganda Bureau of the Political Work Department of the Central Military Commission, 军管理论热点怎么看 [How to View Hot Topics in Military Theory 2024] (Beijing: PLA Press, 2024), 48.

⁴⁸ Ge Tengfei, “打造强大的国家战略威慑力量体系” [Build a Strong National System of Strategic Deterrence], *People’s Tribune*, no. 2 (2022), https://web.archive.org/web/20241105004938/http://paper.people.com.cn/rmlt/html/2022-11/01/content_25950663.htm.

At first glance, how the PRC envisions nuclear weapons contributing to this goal might not be apparent in light of its no-first-use posture that would logically seem to constrict explicit nuclear first-use threats. While this linkage between nuclear deterrence and countering U.S. intervention over Taiwan is made fairly clear, PLA writings simultaneously discuss the limitations of using nuclear weapons to deter conventional actions—which could seem like a contradiction when saying nuclear forces help deter U.S. intervention.⁴⁹ However, when viewed through the lens of Beijing’s concerns about the United States’ use of nuclear options against it during a conflict, the connection to developing nuclear weapons to prevent U.S. intervention in a Taiwan scenario becomes clearer.

If Beijing believes that Washington might employ nuclear options against it in such a conflict, then the PRC needs the ability to deter the United States from being able to employ nuclear force under any circumstance. In doing so, the PRC seeks to limit U.S. nuclear options and deny Washington the option to escalate to nuclear use to compel Beijing into backing down. Hence, by deterring U.S. nuclear options, it limits a key tool of U.S. military success and creates space for conventional military action. The PRC needs credible retaliatory measures at all levels of escalation to eliminate any doubts that it could respond effectively to prevent the United States from being able to play the nuclear card.

However, some military writings acknowledge a direct role for nuclear weapons to deter larger conflicts, and this appears to be becoming an increasingly prominent view. The 2013 *Science of Military Strategy* discussed this in fairly broad terms, stating that the United States “avoids direct military conflicts with great nations, particularly nuclear great nations.”⁵⁰ But recent writings on the topic have grown more explicit. A *PLA Daily* article explicitly highlights that both the conventional and nuclear elements of the Rocket Force serve as “anti-interference capabilities” and boasts that such capabilities are improving.⁵¹ Some sources have pointed to examples of Russia’s invasion of Ukraine, discussing the perceived success of Russian nuclear threats in deterring U.S. and NATO intervention and calling on China to increase the size of its nuclear arsenal to achieve similar effects.⁵² Perhaps most interestingly, a recent textbook written by professors from

⁴⁹ Xiao, 战略学, 128–29.

⁵⁰ Shou, 战略学, 90.

⁵¹ Wei and Li, “火箭军聚焦备战打仗加速推动战略能力提升.”

⁵² Zhang Wenzong, “美国遏压背景下再论统筹发展和安全” [Re-discussing the Coordination of Development and Security in the Context of U.S. Containment], *China Security Studies*, no. 3 (2022), <http://www.cicir.ac.cn/NEW/opinion.html?id=17fd601b-4059-44de-bf71-e993ddfeaa8c>.

the Rocket Force Engineering University and intended for new PLA Rocket Force recruits has included preventing “possible military interventions from other countries” as a direct goal of PLA nuclear deterrence operations, which is a sharp departure from past norms of only using nuclear deterrence to prevent an adversary’s nuclear threats or strikes.⁵³

Concerningly, if the PRC believes its development of a world-class nuclear force has successfully deterred the United States from being able to escalate to nuclear use, this could enable a conventional invasion of Taiwan. This is, after all, the intent. The PRC seeks to deny the United States the ability to threaten it with a superior nuclear force, taking nuclear weapons off the playing field. As the PLA develops an increasingly world-class nuclear force to meet this challenge—particularly if the conventional balance of power in the region shifts in its favor—the risk of conventional conflict grows immensely. While the PRC actively seeks to coerce Taiwan into unification with measures short of military force, Beijing has been incredibly transparent that it will stop at nothing to forcefully control Taiwan, and that it is willing and able to use military force if Taiwan will not willingly surrender.

Deter Nuclear Coercion and Counterstrike If Struck First

The PRC has maintained a no-first-use pledge since it first detonated a nuclear weapon in 1964 and has ascribed that its nuclear force serves to deter nuclear threats against it and to conduct nuclear counterattacks should deterrence fail.⁵⁴ Western commentators have often postulated that evolutions in China’s nuclear force posture are inconsistent with these principles. However, per the Chinese discussion on the subject, that does not appear to be the case. Chinese writings continue to consistently highlight that the nuclear force is intended to be employed only after being struck first, and the increasingly central role nuclear weapons are playing in the accomplishment of PRC political objectives is still understood as retaliatory. While this is ultimately a political decision that could be changed if CCP leadership were to determine it was prudent to do so, we have no indication that such a shift from no first use is imminent or part of the PRC’s vision for a world-class nuclear force. All PLA writings on nuclear campaign plans and procedures still appear to be developed in the terms of retaliatory

⁵³ Gao Guiqing, 导弹武器系统概况 [Introduction to Missile Weapon Systems] (Beijing: National Defense Industry Press, 2023), 40–43.

⁵⁴ State Council Information Office (PRC), *China’s Military Strategy* (Beijing, May 2015), https://english.www.gov.cn/archive/white_paper/2015/05/27/content_281475115610833.htm.

strikes only.⁵⁵ However, while maintaining this retaliatory baseline, Chinese writings do describe a wider aperture of military targets and escalation management abilities than is often understood.⁵⁶

Deter Nuclear Coercion

Deterring nuclear coercion is a long-standing goal of Beijing's nuclear force. By possessing credible retaliatory capabilities, the PRC seeks to prevent adversaries from having the option of using nuclear threats against it. Nuclear deterrence is one element of "comprehensive strategic deterrence," which utilizes both conventional and nuclear forces to deter conflict in all battlespaces.⁵⁷ Within this strategy, the nuclear element focuses primarily on deterring adversary nuclear coercion or nuclear attack, and in doing so, it serves the greater purpose of deterring war. While some recent sources seem to be leaning toward a more direct role in nuclear forces deterring conventional intervention in a crisis as well as nuclear coercion, the mechanism seemingly remains unchanged.⁵⁸ In a crisis, the PLA discusses conducting "nuclear deterrence operations" to create fear or compel the adversary to change its actions. PLA writings divide nuclear deterrence operations into three levels: low-, medium-, and high-intensity.

- *Low-intensity deterrence operations.* These are intended to not be directly confrontational. Examples of low-intensity deterrence operations include messaging that missile forces are prepared and capable, displaying missile forces such as by inviting foreign journalists or military officials to view nuclear silos or weapons storage, and raising combat readiness levels.⁵⁹

⁵⁵ One document of note is the *Science of Second Artillery Campaigns*. While the text consistently reaffirms the policy of no first use and only describes the employment of nuclear weapons in a retaliatory manner, it does note that in the most dire of circumstances national leadership could opt to "reduce the nuclear threshold." However, when this is defined in the section, the text's instructions still do not appear to go as far as shifting to a first-use posture. They instead seem to describe a series of high-intensity nuclear deterrence operations to counter conventional actions against strategic targets that the PRC has no means of resisting, instead of actually employing nuclear attacks. See Yu Jixun, ed., 第二炮兵战役学 [Science of Second Artillery Campaigns] (Beijing: PLA Press, 2004), 294–96.

⁵⁶ State Council Information Office (PRC), *China's National Defense in the New Era* (Beijing, July 2019), http://www.xinhuanet.com/english/2019-07/24/c_138253389.htm; Xiao, 战略学, 128; and Bi Xinglin, ed., 战役理论学习指南 [Campaign Theory Study Guide] (Beijing: PLA National Defense University Press, 2002), 384.

⁵⁷ Xiao, 战略学, 126–41.

⁵⁸ Gao, 导弹武器系统概况, 40–43; Wei and Li, "火箭军聚焦备战打仗加速推动战略能力提升"; and Zhang, "美国遏压背景下再论统筹发展和安全."

⁵⁹ Wu Weidong, ed., 中国战略导弹部队百科全书 [Chinese Strategic Missile Forces Encyclopedia] (Beijing: China Encyclopedia Publishing House, 2012), 80; Yu, 第二炮兵战役学, 281–96; Zhao Xijun, 慑战: 导弹威慑纵横谈 [Deterrence Warfare: A Comprehensive Discussion on Missile Deterrence] (Beijing: National Defense University Press, 2003), 169–70; and Gao, 导弹武器系统概况, 40–43.

- *Medium-intensity deterrence operations.* These are strong and targeted messages against an adversary. Examples include raising the readiness levels of nuclear forces to a high state of alert, adjusting troop deployments to create “momentum” and confuse enemy decision-making, giving key speeches to relay intent, and performing some types of live missile launches with training warheads.⁶⁰
- *High-intensity deterrence operations.* These are clear, targeted messages during a crisis and constitute the highest level of deterrence operations before conflict. High-intensity deterrence operations can include performing large-scale military exercises; switching to the highest possible levels of combat readiness; conducting live nuclear missile launches of one or several missiles with training warheads, including launches into predetermined areas of the sea; and broadcasting warnings of potential nuclear strikes or disseminating lists of intended nuclear targets.⁶¹

In addition, several Rocket Force and CCP sources claim that the PLA is shifting its nuclear force from one of “existential deterrence” to nuclear “actual combat deterrence.”⁶² The 2013 *Science of Military Strategy* describes a nuclear existential deterrent as a force of small size with a basic counterattack capability.⁶³ By possessing some nuclear weapons and knowing that, even with a small force, at least a few missiles would likely manage to bypass defenses and hit the adversary during a nuclear counterattack, the PLA would be able to deter foreign nuclear blackmail.⁶⁴

The PLA appears to believe existential deterrence is no longer sufficient. According to PLA writings, actual combat deterrence requires the ability of nuclear units to maintain higher states of readiness and launch immediately upon receiving orders.⁶⁵ These writings highlight a set of core standards for nuclear forces seemingly linked to this posture, including “being ready for battle at any time, launching on time, and causing effective damage.”⁶⁶ While

⁶⁰ Wu, 中国战略导弹部队百科全书, 80; Yu, 第二炮兵战役学, 281–96; Zhao, 慑战: 导弹威慑纵横谈, 169–70; and Gao, 导弹武器系统概况, 40–43.

⁶¹ Ibid.

⁶² Li Bingfeng, Song Wei, and Tian Runze, “核导弹部队: 从存在威慑走向实战威慑” [Nuclear Missile Force: From Existential Deterrence to Actual Combat Deterrence], *Banyuetan*, October 27, 2017, <https://web.archive.org/web/20240514043608/http%3A%2F%2Fwww.banyuetan.org%2Fcontent%2Fsz%2Fjunshi%2F20171027%2F238621.shtml>; and Wang, “听党指挥, 战略军种阔步前行”.

⁶³ Shou, 战略学, 171–72.

⁶⁴ Ibid.

⁶⁵ Wang, “听党指挥, 战略军种阔步前行”; and Li et al., “从存在威慑走向实战威慑”.

⁶⁶ Huo, “打造世界”; and Wang, “听党指挥, 战略军种阔步前行”.

not explicitly linked to China's own nuclear posture, PLA writings have separately used the same phrase—nuclear actual combat deterrence—to describe other countries' deterrence with precise, low-yield nuclear weapons that could be more readily employed in limited nuclear conflict.⁶⁷ Writings on the Chinese shift to nuclear actual combat deterrence do not explicitly state that the PRC would develop similar weapons. But given increased Chinese interest in managing nuclear escalation, fears of U.S. employment of these types of forces, and statements by the U.S. Department of Defense that the PLA is looking into these types of capabilities, the description is probably reflective of China's position as well, as will be discussed in the next section.⁶⁸

Counterstrike If Struck First and Manage Nuclear Escalation

If deterrence fails, the PRC intends to conduct nuclear counterattacks in response to adversary-initiated attacks. The PLA has seemingly been expanding the array and scope of targets it seeks to strike with a larger nuclear force. Authoritative PLA documents on nuclear campaigns have long emphasized the desire to conduct “key point counterattacks” that seek to capitalize on fear to shake the enemy's will for war, paralyze enemy command and control, degrade enemy industry and war potential, delay enemy movement, contain the escalation of war, and return the conflict to the conventional realm.⁶⁹ Several different types of intended targets are discussed that can broadly be separated into civilian and military targets.⁷⁰

Strikes on civilian targets would be intended to disrupt society by shocking adversary populations and political leadership, disrupting foreign economies, and killing large numbers of personnel.⁷¹ Several types of targets of this nature are discussed by PLA planners, including attacks against population centers; industrial targets such as fuel, electric, and metal production to weaken the adversary's potential to wage war; communications centers; and logistics hubs such as railways, ports, and airports to weaken the adversary's supply capacity.⁷² Attacks on these types of targets are considered to require fewer and less accurate nuclear forces,

⁶⁷ Shou, 战略学, 138.

⁶⁸ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023*, 111–12.

⁶⁹ Bi, 战役理论学习指南, 384; and Yu, 第二炮兵战役学, 298.

⁷⁰ Shou, 战略学, 175–76.

⁷¹ Ibid., 174.

⁷² Bi, 战役理论学习指南, 385; and Yu, 第二炮兵战役学, 297.

reflecting the nuclear arsenal the PRC possessed when these documents were written.⁷³

However, explicit military targets are discussed as well. Attacks on these targets seemingly require forces that the PLA did not possess at the time, but that it is rapidly developing and will seemingly include in a world-class nuclear force. In particular, PLA writings discuss using nuclear counterattacks on key air and naval bases, with the intent of degrading an adversary's operational capacity.⁷⁴ Further, they highlight targeting large troop formations and strategic reserves.⁷⁵ While few recent writings give detailed information on nuclear counterattacks, some confirm that operational military targets are still intended targets within Chinese nuclear planning.⁷⁶

PLA writings detail the need for much higher accuracy, greater numbers of nuclear weapons, and improved damage effectiveness to conduct these types of campaigns—developments that we are seeing today.⁷⁷ Deployment of highly accurate, regional-range nuclear weapons systems appears particularly geared toward such a role. U.S. government reporting highlights that the H-6N bomber's air-launched ballistic missile and the DF-26 are both capable of conducting “nuclear precision strikes against targets in the Indo-Pacific theater” today.⁷⁸

However, the PLA is seemingly expanding this capability and moving toward the development of highly accurate tactical nuclear weapons to further its capability to conduct these types of strikes. A comprehensive encyclopedia on strategic missile forces—the compilation of which was led by Yu Jixun, deputy director of the Second Artillery—highlights that attacking these types of military targets is the responsibility of “tactical nuclear forces,” which are “an important part of the military strength of nuclear states.”⁷⁹ The U.S. Department of Defense warns that the PRC is probably actively seeking low-yield nuclear weapons, with the DF-26 being identified as a prime candidate—further enabling attacks against military

⁷³ Shou, 战略学, 174.

⁷⁴ Bi, 战役理论学习指南, 385.

⁷⁵ Ibid.

⁷⁶ Gao, 导弹武器系统概况, 38–39.

⁷⁷ Shou, 战略学, 175–76.

⁷⁸ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023*, 108–9.

⁷⁹ Wu, 中国战略导弹部队百科全书, 46. For details on this encyclopedia, its levels of review and approval throughout the Chinese system, and its authoritativeness, see Xie Youyi, “中国战略导弹部队百科全书通过终审” [“Encyclopedia of China's Strategic Missile Forces” Passes the Final Review], *Rocket Force News*, January 30, 2010.

targets in the region.⁸⁰ A recent Rocket Force textbook describing their force defines five different yield classes, with the sub-kiloton and sub-10 kiloton categories being the domain of tactical nuclear weapons, possibly providing insight into what future PLA tactical nuclear weapons may resemble.⁸¹

Few Chinese writings openly discuss active developments in low-yield nuclear weapons, though some hard-to-obtain internal writings seem to suggest this may be the case.⁸² However, when considering increased PRC concerns about U.S. low-yield nuclear weapons developments making nuclear weapons more usable, it seems Beijing would want to acquire a proportional means of counterattack to respond to this threat.⁸³ Chinese writings continuously express concerns about U.S. low-yield nuclear weapons increasing the likelihood of nuclear conflict, claiming that the only response to such developments is “possessing nuclear strength and maximizing the effectiveness of nuclear deterrence” to “force powerful enemies to always be wary...and fundamentally and effectively regulate their possible nuclear provocations.”⁸⁴ Per the Department of Defense, around 2018 the PLA became particularly concerned that the United States would employ nuclear weapons against its Taiwan invasion fleet and was calling for proportionate response capabilities.⁸⁵

As previously mentioned, Chinese writings have described the U.S. posture of possessing low-yield capabilities that can execute limited strikes against military targets as one of “nuclear actual combat deterrence”—a term the PRC has separately used to describe some of its own shifts currently being undertaken today.⁸⁶ Writings about the PLA’s own shift to nuclear actual combat deterrence do not explicitly say that this includes low-yield nuclear weapons. Giving only limited information on how upgrades in

⁸⁰ “U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 111–12.

⁸¹ Gao, 导弹武器系统概况, 13.

⁸² At least some Rocket Force writings allude to low-yield weapons developments, but these are seemingly distributed in closely held journals not readily available to researchers—likely due to the subject being perceived as a sensitive issue. For example, a 2018 edition of Rocket Force News showed the table of contents for an edition of its internal journal *Long Tassel* that included an article titled “战术核武器的发展与运用研究” [Research on the Development and Application of Tactical Nuclear Weapons]. See “2018年第2期‘长缨’目录” [Contents of “Long Tassel,” Issue 2, 2018], Rocket Force News, February 23, 2018.

⁸³ Hiim et al., “The Dynamics of an Entangled Security Dilemma,” 156–60.

⁸⁴ “砺剑图强开新局.”

⁸⁵ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 111–12.

⁸⁶ For a description of U.S. “nuclear actual combat deterrence” (核实战威慑), see Shou, 战略学, 138. For descriptions of the PRC shifting to “nuclear actual combat deterrence,” see Wang, “听党指挥, 战略军种阔步前行”; and Li et al., “从存在威慑走向实战威慑.”

weapons and equipment are enabling this shift, they only acknowledge publicly that it includes increased readiness of nuclear forces and the ability to conduct effective damage on an adversary's targets. However, given the PRC's use of this term in the past, along with its continuing nuclear force developments, concerns about U.S. tactical nuclear employment, and writings on conducting limited nuclear counterattack campaigns of differing scales, nuclear actual combat deterrence likely also alludes to a similar role with the development of regional precise nuclear forces as a means of providing "proportional response capabilities" to U.S. tactical nuclear forces.⁸⁷ PRC writings on nuclear strategy frequently invoke Mao's comment that "if you have it, I must have it too."⁸⁸ This prevalent reasoning likely continues to apply to concerns about U.S. low-yield nuclear developments.

Writings on hitting military targets demonstrate another area where PLA nuclear forces appear to be headed—the need to be able to manage nuclear escalation.⁸⁹ Previously, most examinations of Chinese nuclear strategy have concluded that Chinese strategists are overly confident in their ability to control conventional escalation but believe that nuclear war is uncontrollable.⁹⁰ The thinking goes that Chinese nuclear strategists only seek the ability to respond to a nuclear strike with a small number of higher-yield weapons against U.S. civilian targets. This was likely an accurate reflection of an earlier mindset, but Chinese strategy is probably evolving as the PLA races toward a world-class nuclear force.

Chinese military writings within some sectors of the PLA have long pointed toward aspirations for capabilities and concepts that contradict this historical viewpoint. Recent force expansions and current capability developments suggest that different trains of thought have taken hold within national leadership. Nuclear experts with influence in older generations of Chinese leadership are possibly being replaced by PLA nuclear strategists who are increasingly bullish on their capacity to control nuclear escalation, and who see the ability to respond at various levels of nuclear escalation as essential to deter an adversary's employment of nuclear weapons.

⁸⁷ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023*, 108–12.

⁸⁸ Huang, "毛泽东的核战略思想," 54–63.

⁸⁹ For one analyst's view on China moving in this direction, see Tong Zhao, "China's Silence on Nuclear Arms Buildup Fuels Speculation on Motives," *Bulletin of the Atomic Scientists*, November 12, 2021, <https://thebulletin.org/2021/11/chinas-silence-on-nuclear-arms-buildup-fuels-speculation-on-motives>.

⁹⁰ M. Taylor Fravel and Fiona S. Cunningham, "Dangerous Confidence: Chinese Views on Nuclear Escalation," *International Security* 44, no. 2 (2019): 61–109.

Instead of seeing nuclear war as an uncontrollable act, several PLA writings focus on the “need to control the intensity, pacing, and target scope of (nuclear) counterstrikes.”⁹¹ Writings on nuclear campaigns highlight that the PLA is not planning for a single nuclear exchange but for multiple waves of nuclear exchanges within a conflict.⁹² Within these waves of counterattacks, PLA writings describe attacks of varying scope and scale, including differentiating between small and large nuclear counterattack campaigns, as well as between theater and strategic counterattack campaigns.⁹³ These are differentiated based on the scale of nuclear combat to achieve different campaign objectives.⁹⁴

Strikes against military targets are seen as especially “beneficial for controlling the war situation.”⁹⁵ The objective of controlling nuclear war involves stricter requirements on the number of nuclear weapons employed, the precision of nuclear weapons used, and damage effectiveness against targets.⁹⁶ As previously highlighted, the U.S. Department of Defense warns that the PLA is advancing systems designed to enable this objective, with both the H-6N bomber and DF-26 missile being designed to conduct regional precision nuclear strikes, and probably developing low-yield capabilities to “provide proportional response capabilities.”⁹⁷ As argued earlier, in light of PRC concerns about the United States’ regional employment of nuclear weapons, the PRC is seemingly moving toward proportional response capabilities to credibly deter U.S. nuclear options short of full-scale war.

In essence, PLA writings indicate that the PRC could conduct either a smaller, more limited counterattack against a small number of regional targets or a larger, strategic counterattack, depending on the need and situation.⁹⁸ The PLA seemingly seeks flexible response options for varying situations. This seemingly provides a doctrinal basis for the PLA to acquire the ability to attack a large range of civilian and military targets using different salvo sizes, target sets, and areas, depending on the scale of the war, the nature of the adversary’s attack against the PRC, and the resulting campaign objectives. In doing so, the PLA ultimately seeks to

⁹¹ Shou, 战略学, 175.

⁹² Wu, 中国战略导弹部队百科全书, 72.

⁹³ Bi, 战役理论学习指南, 384; and Wu, 中国战略导弹部队百科全书, 72.

⁹⁴ Wu, 中国战略导弹部队百科全书, 72.

⁹⁵ Shou, 战略学, 74.

⁹⁶ Ibid.

⁹⁷ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 108–12.

⁹⁸ Bi, 战役理论学习指南, 384; and Wu, 中国战略导弹部队百科全书, 72.

be able to “defeat the enemy’s strategic intent, destroy their will for war, paralyze their command system, delay enemy combat operations, weaken their war potential, and deter further escalation of the enemy’s intent for nuclear war.”⁹⁹

The Evolving Requirements of a World-Class Nuclear Force

The PLA does not openly discuss programs of record for future capability developments. However, authoritative texts discuss broad requirements and functions that future capabilities should fulfill. These texts, coupled with unclassified U.S. government publications, allow us to evaluate the general direction that PLA capabilities are evolving toward, and what PLA leaders feel is necessary to fulfill these strategic missions. Much of this can be boiled down to the Rocket Force’s “core standards” of “being ready to fight at any time, launching on time, and causing effective damage.”¹⁰⁰ The PLA believes that a credible counterattack requires several conceptual objectives that it is actively working toward. Analysis of these objectives can inform our understanding of the PLA’s developing capabilities.

Rapid Reaction and Readiness

Historically, the Rocket Force has kept its nuclear warheads and missiles in a relatively low state of readiness.¹⁰¹ While some separation seemingly will continue, this policy appears to be evolving rapidly as the PLA’s nuclear forces undergo substantial revisions to increase responsiveness and ensure survivability. The 2020 PLA National Defense University edition of the *Science of Military Strategy* highlights that “especially for the defensive party, the ability to react quickly can reduce losses to a large extent, hit the enemy with an effective counterattack in a shorter period of time, and ensure the achievement of strategic objectives.”¹⁰² PLA writings routinely emphasize force mobility and the ability to launch rapidly in order to deter adversaries and conduct an effective nuclear counterattack.¹⁰³

⁹⁹ Bi, 战役理论学习指南, 384; and Wu, 中国战略导弹部队百科全书, 72.

¹⁰⁰ Huo, “打造世界.”

¹⁰¹ Mark Stokes, “China’s Nuclear Warhead Storage and Handling System,” Project 2049 Institute, March 12, 2010.

¹⁰² Xiao, 战略学, 385.

¹⁰³ Shou, 战略学, 232; and Xiao, 战略学, 383–84.

The nuclear force has apparently already made substantial changes to alert status and readiness. One Rocket Force News piece described this in terms of improving decision times and bringing launch abilities to lower echelons of the nuclear force.¹⁰⁴ It also highlighted that the use of a nuclear weapon previously involved an entire missile brigade, along with elements from the defense industry, Rocket Force Headquarters, and research institutes. This is no longer the case, and launch procedures have become streamlined to take place at the level of the individual launch battalion and launcher. Nuclear forces are now ready to launch at any moment upon receiving orders. The piece claimed that this was a critical development in the Rocket Force's transition from nuclear "existential deterrence" to "actual combat deterrence."¹⁰⁵

The Department of Defense's China Military Power Report indicates that at least a portion of the PLA's nuclear force is now kept in a higher state of readiness, conducting "high alert duty" in which some nuclear missile battalions are prepared to rapidly launch if needed.¹⁰⁶ Additionally, it appears that some of the PLA Navy's nuclear-armed submarines are now conducting nearly continuous deterrence patrols, allowing nuclear-armed submarines to maintain a higher state of readiness.¹⁰⁷ Most notably, the PLA also appears to be fielding an "early-warning counterstrike" (预警反击) posture, a position likened to launch on warning.¹⁰⁸ As a result, some Chinese nuclear forces will be in a constant state of alert and able to launch upon warning of an adversary's nuclear attack while the adversary's forces are still inbound. PLA writings have long held that such a position would be valuable to ensure the survivability of nuclear forces and the effectiveness of their counterattack.¹⁰⁹ China has begun to load ICBMs into its 320 solid-fueled nuclear silos, probably with DF-31-class missiles, to support such a posture.¹¹⁰

One 2019 book discussing the development trajectory of China's nuclear force summarizes this by describing the country's future nuclear force as being able to maintain three distinct readiness levels simultaneously. The first is a force that is continuously alerted and has the ability to rapidly

¹⁰⁴ Wang, "听党指挥,战略军种阔步前行."

¹⁰⁵ Ibid.

¹⁰⁶ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023*, 106.

¹⁰⁷ Ibid., 108.

¹⁰⁸ Ibid., 106.

¹⁰⁹ Shou, *战略学*, 175.

¹¹⁰ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023*, 106–7.

respond to any threat—seemingly capable of an early-warning counterstrike posture. The second is a theater-level mobile force, highly organized and capable of dispersing. The third is a strong and integrated force capable of independently operating under any conditions, seemingly a protected force capable of surviving any attack and carrying out orders under any condition.¹¹¹

Force Survivability

Readiness addresses another key concern, force survivability. The 2013 *Science of Military Strategy* explains that “ensuring survival under conditions where nuclear forces have encountered an enemy nuclear strike is a basic prerequisite for executing a retaliatory nuclear counterattack.”¹¹² For the PLA to credibly hold on to its no-first-use policy and to effectively deter an adversary’s nuclear attack, or counterattack if deterrence fails, it needs to be able to survive a nuclear strike. Fielding an early-warning counterstrike posture would enable the PLA to launch a nuclear attack before the first adversary weapon detonates. If executed successfully, this would all but ensure that the PRC has the ability to survive and mount a counterattack following an adversary’s nuclear strike.

However, the PRC has long pursued various means to ensure the survivability of its force in addition to a higher state of readiness. This likely gives it options in a wide variety of scenarios. The PLA could not only conduct an early-warning counterstrike in the face of a large attack that jeopardizes its forces, but also perhaps launch a more traditional counterattack after an adversary’s weapons have struck their targets, if faced with a limited nuclear attack.

Three other key measures help ensure force survivability: protection, mobility, and force size. Protection involves several elements, but the most notable is the complex of underground and hardened facilities that the PRC has built to protect and shelter its forces from adversary attacks.¹¹³ Advances in PLA air and missile defenses will assist in limiting the threats that can strike PLA nuclear forces and improve force survivability.¹¹⁴ This helps boost its confidence that it can ride out attacks and mount an effective counterattack following the damage. Mobility is another key measure.

¹¹¹ Ling and Peng, 我国战略威慑能力建设研究, 41–50.

¹¹² Shou, 战略学, 175.

¹¹³ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 88.

¹¹⁴ Ling and Peng, 我国战略威慑能力建设研究, 41–50.

Several components of the PLA's nuclear force are mobile systems, which can disperse to avoid detection. Finally, the 2013 *Science of Military Strategy* also calls out “increasing the quantity of missile weapons usable for nuclear counterattack” as a means of force survivability and effectiveness.¹¹⁵ More weapons mean more targets an adversary needs to hit, increasing the odds that more Chinese weapons will survive—particularly when coupled with the other measures.

Defense Penetration and Effective Damage

Once a nuclear attack is launched, the PLA needs to overcome another long-standing concern—penetrating defenses and causing the intended effects on a target. While the United States is quick to point out that its missile defense capabilities are limited, these proclamations have done little to assuage the PRC's concerns on the matter, and PRC planners regularly inflate U.S. capabilities in this domain.¹¹⁶ The 2020 *Science of Military Strategy* highlights a variety of technical measures the PRC pursued to improve the defense penetration capabilities of its nuclear force, including “maneuvering warheads, stealth, decoys, electronic jamming, and multiple warheads.”¹¹⁷

The PLA particularly stresses multiple independent reentry vehicles (MIRVs) and gliding technologies as necessary to penetrate adversary missile defenses.¹¹⁸ The PRC now maintains MIRVed systems, including the DF-5B, which is a silo-based, liquid-fueled system that might be able to carry up to five warheads.¹¹⁹ Further, the DF-41, which is a solid-fueled, mobile missile that can carry no more than three warheads, was revealed at a military parade in 2019.¹²⁰ U.S. government reports highlight that the PLA is also developing strategic hypersonic glide vehicles to deliver nuclear weapons, as well a fractional orbital bombardment system (FOBS) to deliver nuclear payloads while bypassing U.S. missile defense.¹²¹ In July 2021 the PRC first tested a FOBS, traveling over 40,000 kilometers before striking its

¹¹⁵ Shou, 战略学, 232–33.

¹¹⁶ Xiao, 战略学, 384–85.

¹¹⁷ Ibid., 385.

¹¹⁸ Shou, 战略学, 232.

¹¹⁹ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023*, 67; and “DF-5,” CSIS, *Missile Threat*, April 23, 2024, <https://missilethreat.csis.org/missile/df-5-ab>.

¹²⁰ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023*, 107.

¹²¹ Ibid., 111.

target. This type of system enables the PLA to hit targets in the United States from directions U.S. missile defenses are not oriented to protect.¹²²

PLA writings also highlight tactical means to defeat missile defenses and allow nuclear forces to strike their intended targets. Tactical elements include “the timing of nuclear counterattacks, the destruction of the enemy’s defense systems, and the coordination of multiple forces” to overcome U.S. defenses.¹²³ This seemingly suggests that the PLA seeks a nuclear force that is able to engage in more sophisticated targeting and counterattack operations, employing advanced nuclear delivery systems with sophisticated defense penetration capabilities to first eliminate U.S. missile defenses before following up with attacks against other U.S. targets. This objective requires a larger, more diverse, and better coordinated nuclear force.

Finally, once a nuclear payload bypasses an adversary’s defenses, it must be able to hit a target and cause the intended effect. Improvements in accuracy are critical to ensure that the PLA’s nuclear forces can effectively strike the intended target after bypassing defenses.¹²⁴

Conclusion

The PLA nuclear force is a key element in Beijing’s pursuit of national rejuvenation. Nuclear weapons serve as the ultimate “trump card” in U.S.-China competition, undergirding increasingly tense interactions between the two rivals and serving to counterbalance the United States, isolate Taiwan, and ensure that nothing can stand in the way of China’s rise to power. While there are no indications of plans to shift to a first-use or counterforce posture as part of a world-class nuclear force, it appears that Beijing is adopting a more capable, assertive nuclear stance that it believes can help constrain the United States and enable the PRC’s success in local wars.

To enable this shift, the CCP has called on the PLA nuclear force to support a series of strategic missions. Each of these objectives is buttressed by a variety of evolving capability and operational requirements that the PLA is developing. The PLA seeks to improve nuclear force readiness, with missile units being able to launch faster and under a launch-on-warning posture. A more survivable force ensures that Beijing can retaliate under any circumstances. Capabilities such as long-range hypersonic glide vehicles

¹²² U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 111.

¹²³ Xiao, 战略学, 385.

¹²⁴ *Ibid.*, 386.

and a FOBS will allow the PLA to penetrate any possible defenses and cause effective damage on intended military and civilian targets. Finally, a world-class nuclear force includes several different counterstrike options, ensuring that the PLA can manage escalation of a nuclear conflict and that it has the capabilities to respond to limited attacks proportionally.

The challenges that the United States faces with the PRC are not a mirror image of what it encountered with the Soviet Union, but they are no less dangerous or concerning. A nuclear first strike by an adversary is not the only driver of risk. As the PLA becomes an increasingly world-class force across a wide suite of nuclear and conventional capabilities, the risk of conflict between the United States and China, along with the risk to U.S. allies and partners in the region, grows substantially. Meeting this threat requires new, innovative, and unique approaches to the bilateral relationship.

EXECUTIVE SUMMARY

This chapter examines Xi Jinping's dictum of creating a world-class military by 2049 and assesses the progress of the PLA ground forces toward achieving that notional benchmark.

MAIN ARGUMENT

Over the past decade, the PLA has increasingly recognized the need to harness emergent technologies and develop a ground force capable of contributing to the joint force in future campaigns by leveraging capabilities in multiple domains. This operational concept has been coined "all-domain operations." The PLA's ability to realize "world-class" status in the land domain is indivisible from its ability to conduct all-domain operations. To this end, the PLA has acquired new weapon systems and developed technologies that will equip its ground forces with all-domain capabilities, while using real-world deployments, unique organizational constructs, and training exercises to better prepare these forces for future conflicts in complex all-domain operational environments. Given these trends, PLA ground forces are very likely to develop all-domain operational capabilities by 2049 and thus achieve world-class status.

POLICY IMPLICATIONS

- The PLA is building ground forces that emphasize contributing offensive and defensive actions across all domains. If these forces can integrate artificial intelligence and quantum technologies into modern all-domain weapon systems, they will be capable of rapidly supporting integrated joint operations in the Indo-Pacific.
- As the PLA continues to adapt and deploy active ground forces to complex littoral and mountainous regions, its units will maintain advantages against peer adversaries in those environments.
- The PLA's ground forces are rapidly fielding world-class weapons; intelligence, surveillance, and reconnaissance systems; and mobility platforms designed to gain an operational advantage over adversaries during amphibious and mountain operations.

The PLA's Progress toward World-Class Ground Force Capabilities

Joshua Arostegui and Jake Vartanian

In October 2017 at the 19th Party Congress, Xi Jinping outlined the goal of the Chinese Communist Party (CCP) to transform the People's Liberation Army (PLA) into a world-class military by the middle of the century. Following his speech, debates occurred between Sinologists on what building a world-class military means. Senior People's Republic of China (PRC) civilian and military leaders have yet to release a standard definition of "world-class." This chapter attempts to explain this concept, with a specific focus on the land domain. It argues that a world-class ground force is one where elements operating in the land domain must be capable of contributing multidomain offensive and defensive actions that provide an overall advantage to the PLA's joint force in future campaigns.

The PLA Army and its joint-service ground components already hold advantages over other militaries in many areas of modern warfare, placing some parts of those services in a world-class status. This chapter serves to inform readers that new technologies are under development to improve many of those capabilities and that the PLA's ground forces are using real-world deployments, unique organizational constructs, and training exercises to better prepare for future conflicts in complex all-domain operational environments. While the PLA still trails the U.S. military in recent combat experience, as well as research, development, and implementation of emerging technologies like artificial intelligence (AI) and quantum technologies, if the PRC is successful in fielding those capabilities in its ground forces, it will greatly improve the chance for the PLA Army and other ground forces to achieve world-class status by allowing those troops,

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many of whom are two-year conscripts, to effectively command and conduct offensive and defensive operations in other domains.

The Transformation of the PLA Army into a World-Class Ground Force

What Will Make the PLA Army a World-Class Ground Force?

According to a June 2023 article in China Military Online, the future operating environment will require the PLA to adapt to the widespread application of emerging technologies like intelligent unmanned systems and precision-guided munitions. As a result, the Chinese military will be forced to deal with the introduction of new types of combat forces onto the battlefield, while developing its own high-tech multidomain weapons and platforms. The authors of the article determined that the side that can best innovate and seize the initiative, especially offensively, will gain a decisive advantage in multidomain operations.¹ The PLA Army has been preparing for this eventuality for more than a decade.

Both the PLA Army and the U.S. Army were the first of their countries' military services to develop concepts of multidomain operations. The United States defines multidomain operations as the combined arms employment of joint and army capabilities to create and exploit relative advantages that achieve objectives, defeat enemy forces, and consolidate gains on behalf of joint force commanders.² The PLA Army initially pursued all-domain (全域, originally translated as "trans-theater") maneuver concepts around 2013 after that year's edition of the *Science of Military Strategy* defined the requirement for the army to be capable of rapidly projecting force to key areas beyond China's borders. This concept was primarily focused on increasing mobility based on the army's need to execute future campaigns in the wide variety of complex terrains in and around China. To achieve this goal, it called for a transformation from regional defense to a force made up of units designed to operate in amphibious, mountain, plateau, urban, and other terrains.³

¹ Sun Jianjun, Chen Xiaopeng, and Yu Fei, "盘点未来战场作战新趋势" [Taking Stock of New Trends in Future Battlefield Operations], China Military Network, June 20, 2023, http://www.81.cn/szb_223187/szbqx/index.html?paperName=jfjb&paperDate=2023-06-20&paperNumber=07&articleid=908561.

² U.S. Department of the Army, *FM 3-0: Operations* (Washington, D.C., 2022), 1–2, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN36290-FM_3-0-000-WEB-2.pdf.

³ Shou Xiaosong, ed., *战略学* [Science of Military Strategy] (Beijing: Academy of Military Sciences, 2013), 200–206.

At the ceremony establishing the PLA Army as a force in December 2015, Xi Jinping ordered the army to accelerate its transformation from regional defense to all-domain operations (ADO). Yet, the concept remained vague and emphasized the physical operational space and terrain where ground forces executed actions. PLA reporters translated Xi's order to indicate that the army should move toward fielding new aviation platforms, unmanned combat systems, intelligent strike weapons, over-the-horizon precision fires, and special operations capabilities.⁴

Not long before the U.S. Army moved from its 2016 future warfighting concept of multidomain battle to a broader and more joint multidomain operations theory in 2018, Xi tasked the PLA with adopting ADO capabilities at the 19th CCP National Congress in October 2017 as part of becoming a world-class force. His proposal for the new ADO capabilities expanded into joint operations using networked information systems to effectively shape military posture, manage crises, and deter and win wars. Following Xi's announcement, Chinese military academics set off determining how to define domains, while also applying lessons learned from the U.S. military's new concept of joint all-domain operations and Russia's application of hybrid warfare in Ukraine and Syria. Those studies recognized how effective the United States is in applying force within and across the physical (land, sea, air, and space) and information (cyber and electromagnetic) domains, and that Russia's approach to economic, diplomatic, and political warfare fits well within how China could conduct future campaigns in the cognitive and social domains.⁵

Ultimately, the PRC recognizes the U.S. military's concept of joint all-domain operations, with its objective of using information advantage

⁴ “陆军领导机构火箭军战略支援部队成立大会在京举行 习近平向中国人民解放军陆军火箭军战略支援部队授予军旗并致训词” [The Founding Meeting of the Rocket Force, Strategic Support Force, the Leading Organization of the Army, Was Held in Beijing; Xi Jinping Awarded the Military Flag to the Chinese People's Liberation Army, Rocket Force, and Strategic Support Force and Delivered a Speech], Xinhua, January 1, 2016, http://www.xinhuanet.com/politics/2016-01/01/c_1117646667.htm; Ji Ming et al., “全域作战概念研究与机理验证” [All-Domain Operations Concept Research and Mechanism Verification], *Military Operations Research and Assessment* 37, no. 1 (2022): 42–46; and Yang Dexin and Qian Xiaohu, “全域机动立体攻防: 新型陆军装备长什么样?” [All-Domain Mobile Three-Dimensional Attack and Defense: What Does the New Army Equipment Look Like?], China Military Network, March 8, 2016, http://www.81.cn/jwsj/2016-03/08/content_6949242.htm.

⁵ State Council Information Office of the People's Republic of China (PRC), *China's National Defense in the New Era* (Beijing, July 2019), <http://eng.mod.gov.cn/xb/Publications/WhitePapers/4846452.html>; “习近平: 决胜全面建成小康社会 夺取新时代中国特色社会主义伟大胜利——在中国共产党第十九次全国代表大会上的报告” [Xi Jinping: Win Decisively to Build a Moderately Prosperous Society in All Respects and Strive for the Great Success of Socialism with Chinese Characteristics in the New Era: Report at the 19th National Congress of the Communist Party of China], Xinhua, October 27, 2017, http://www.xinhuanet.com/politics/19cpcnc/2017-10/27/c_1121867529.htm; and Zhang Fuzhi and Li Changjun, “全域作战”军事理论相关问题探赜” [Exploration of Issues Related to “All-Domain Operations” Military Theory], *Western Journal*, no. 188 (2023): 173–76.

to create a decision-making advantage in conflict, as a benchmark for the PLA to achieve. PLA researchers closely read U.S. publications and acknowledge that the U.S. military is in the lead when it comes to the pursuit of ADO. The PLA desires to catch up to the U.S. military's current joint all-domain operation capability, designed to integrate all operational domains and forces across those domains to form a comprehensive combat advantage through effective all-domain command and cross-domain coordination. These researchers also realize that the PLA will never be able to dominate every domain but can gain advantages in other domains to make up for those shortcomings.⁶ This suggests that the PLA Army and its joint-service ground components seek to achieve world-class status but understand that they need not always surpass the U.S. Army in every element of land power in every location. Rather, they aim to be capable of equally contributing multidomain offensive and defensive actions on land (and along the shore) that provide an overall advantage to the PLA joint force maritime and air operations, while developing advanced systems and concepts to operate in or defeat adversary capabilities in the information, space, and cognitive domains.

How the PLA's Ground Forces Intend to Achieve ADO Capability

As part of its move toward ADO, the PLA Army initially prioritized acquiring maneuver systems that would allow it to conduct missions in unfamiliar terrains following rapid deployments, while also restructuring its combat units into modular organizations that relied on informationized capabilities for battlespace awareness. These acquisitions and changes were designed to enable the army to adjust from its traditional offensive and defensive missions during joint operations, such as the siege of cities or static positions, to three-dimensional force projection and rapid control of key points to deny the enemy the ability to resist.⁷ Such rapid long-range maneuvers, according to PLA researchers, allow the army to not only complete combat deployments but also capture combatants, reach attack positions, engage in combat, and complete the transition between offense and defense while maneuvering. For overseas missions, the researchers determined that the PLA Army would also need to create a force that could

⁶ Ji et al., “全域作战概念研究与机理验证.”

⁷ Sun Jianjun, Su Gang, and Si Guoqiang, “全域机动作战陆军应注意啥?” [What Should the Army Pay Attention To in All-Domain Mobile Operations?], China Military Network, June 11, 2019, http://www.81.cn/jfjbmap/content/2019-06/11/content_235708.htm.

be quickly and efficiently delivered through joint and civilian transportation capabilities.⁸

In addition, Chinese researchers determined that the PLA Army would need to incorporate more advanced equipment than just new maneuver platforms to participate in future ADO, especially as ground forces would face uncertainty about future combat opponents, threats, operational environments, and missions. To solve those problems, the researchers assessed that the army would need to develop and acquire a new system-of-systems that incorporated the following:

- multi-source campaign and tactical intelligence acquisition capability;
- system interconnection, information sharing, and integrated control capability;
- capabilities to intercept air and space targets in complex electromagnetic environments;
- long-range precision targeting and fire interdiction capability; and
- highly effective time-sensitive target strike capability.⁹

Unsurprisingly, many of these desired capabilities have appeared in the PLA Army and joint-service ground forces since the strategic- and tactical-level restructuring that began in late 2015. In addition to fielding modern land-domain systems that allow for maneuver in complex terrain, the army added new weapon platforms that enable cross-domain strikes to support the joint force. For example, the PLA Army's PCH191 long-range rocket launcher and its anti-ship missile weapon system can support the PLA Navy in the maritime domain.¹⁰ The establishment of electronic warfare battalions in army air defense brigades in 2017 is another example. The fielding of advanced jamming systems that support assets in both the land and air domains involves electromagnetic spectrum offensive operations.¹¹

⁸ Hai Jun et al., “全域作战陆军部队投送基本问题研究” [On Basic Problems of Army Force Delivery in Global Operations], *Journal of Military Transportation University* 22, no. 4 (2020): 17–20.

⁹ Qian Xiaochao et al., “面向关键能力的陆军全域作战体系贡献率评估” [Evaluation of Contribution of Army Combined Arms in All-Domain Weapon System-of-Systems Based on Critical Capability], *Journal of System Simulation* 30, no. 12 (2018): 4786–93; and Sun et al., “全域机动作战陆军应注意啥?”

¹⁰ Joshua Arostegui, “The PCH191 Modular Long-Range Rocket Launcher: Reshaping the PLA Army's Role in a Cross-Strait Campaign,” China Maritime Studies Institute, CMSI China Maritime Reports, no. 32, November 2023, <https://digital-commons.usnwc.edu/cmsi-maritime-reports/32>.

¹¹ Chen Dianhong, “第74集团军某旅电子防空营融入体系练兵新闻观察” [The Electronic Air Defense Battalion of a Brigade of the 74th Group Army Was Integrated into the System Training News Observation], China Military Network, June 1, 2022, http://www.81.cn/xxqj_207719/tsysb_207739/qjcjd_207746/10159322.html.

Applying World-Class ADO Capabilities to Key Future Campaigns

The PLA Army and its joint-service ground components already field some systems that can be considered world-class simply because no other country maintains a similar capability. However, those same services are not world-class based on the continued fielding of obsolete equipment and nascent levels of experience. The PRC acknowledges the force must overcome many hurdles to achieve world-class status. Top priorities include training for senior army leaders to oversee new-type operations and weapons and equipment modernization. Official Chinese media emphasizes the need to improve weapons and equipment design, production, cost, and sustainability to enable the PLA to win the first battle and deter and stop war.¹² Research and development of new equipment is underway that would allow the PLA Army and other Chinese ground forces to meet the requirements for future ADO listed above. This chapter posits that many of these new technologies and weapons, especially those developed within China, will make their way to the force in the coming decades.

In addition, the continued rotation of PLA forces to high-threat areas during both peacetime and periods of heightened tensions is providing China's ground forces with experience that supplements the improved training Xi Jinping demands. Following Sino-Indian border clashes along the Line of Actual Control (LAC) in 2020 and U.S. House Speaker Nancy Pelosi's visit to Taiwan in 2022, the PLA has maintained a new status quo of units deploying to high-elevation outposts or maneuvering to coastal exercise areas far from their home garrison to train leaders in how to sustain their forces and operate within a modern integrated joint force construct.¹³

The experience gained from these deployments and new status quo, combined with an effective PLA border and coastal defense force that protects national sovereignty, allows modern army maneuver forces the freedom to project force beyond the PRC's periphery for priority missions.

¹² “陆军瞄准世界一流军队目标推进转型建设” [The Army Aims to Become a World-Class Military and Promotes Transformation and Construction], Xinhua, May 27, 2018, http://www.xinhuanet.com/politics/2018-05/27/c_1122894928.htm; and Zhao Xun, “加紧推进武器装备现代化” [Accelerate the Modernization of Weapons and Equipment], Xinhua, April 10, 2023, http://www.news.cn/mil/2023-04/10/c_1212006074.htm.

¹³ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023* (Washington, D.C., October 2023), 129, <https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>; and Dennis J. Blasko, “A Baseline Assessment of the PLA Army's Border Reinforcement Operations in the Aksai Chin in 2020 and 2021,” Strategic Studies Institute, China Landpower Studies Center, April 9, 2024, <https://ssi.armywarcollege.edu/SSI-Media/Recent-Publications/Display/Article/3735300/a-baseline-assessment-of-the-pla-armys-border-reinforcement-operations-in-the-a>.

The following sections consider two key future ADO-centric campaigns—joint island landing and border defense—to demonstrate how existing and in-development systems, training, and organization will enable PLA forces to become world-class by 2049 or sooner. Most, if not all, of these technologies and concepts can be applied to the army’s other primary missions, notably those that require overseas deployments like UN peacekeeping operations and protection of China’s Belt and Road Initiative projects.

Island Landing Campaign

The joint island landing campaign is a complex amphibious landing operation on the beachheads of Taiwan that will integrate all of the PLA’s services and forces. While all of the PLA services have their respective roles in an island landing campaign, each service’s land component will be the linchpin in this complex all-domain operation. These units include the PLA Navy Marine Corps’ amphibious brigades and air assault battalions, the PLA Army’s amphibious combined arms brigades, and the PLA Air Force Airborne Corps’ airborne brigades. Their collective objectives will be to penetrate or circumvent Taiwan’s coastal defenses, establish a lodgment, consolidate combat power, and seize key inland targets.¹⁴

PLA scholars have concluded that the future of amphibious operations will change from “manned and informationized” to “unmanned and intelligentized,” indicating an emphasis on autonomous platforms and intelligent technology to facilitate future operations.¹⁵ While all of the PLA’s ground forces train regularly for amphibious and air landing operations, this section will explore their present technological limitations and future capabilities to conduct a joint island landing campaign and assess whether these units are on track to become a force that is world-class.

Amphibious Operations

The PLA’s amphibious land-domain weapon system can already be considered world-class. Fielding the Type-05 amphibious armored vehicle and its multiple variants, the PLA Army and PLA Navy Marine Corps’ amphibious brigades are similarly equipped to provide a unique suite of

¹⁴ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 141.

¹⁵ “两栖作战，早已不是你以为的那种打法” [Amphibious Operations, No Longer the Way You Think], *PLA Daily*, October 2, 2018, http://www.81.cn/jmywyl/2018-10/02/content_9302793.htm.

weapons to the landing force capable of swimming long distances, while offering a combination of multidomain tactical mobility, protection, and firepower.¹⁶ The U.S. Marine Corps, in contrast, is still preparing to field its next-generation amphibious combat vehicle (ACV), the ACV-30, in 2026, with the command, recovery, and armored personnel carrier variants following in 2027.¹⁷ While the ACV-30 shares some similarities with the Type-05, it is only capable of swimming 11 kilometers per hour, whereas the Type-05 can swim 26 kilometers per hour.¹⁸

It remains unclear whether the PRC ordnance industry continues production on the Type-05 family of vehicle. Nonetheless, the PLA and China's defense industry have been actively developing and advertising new unmanned capabilities, some of which are already fielded, that could supplement or even replace the assault amphibious vehicles (AAVs) in the force.

Unmanned vehicles and vessels. PLA-affiliated publications frequently address the changing state of warfare, shedding light on the emerging application of AI, unmanned systems, autonomous weapons, and swarm technology on the future battlefield.¹⁹ In a June 2022 article, authors affiliated with the Chinese ordnance industry noted that intelligent unmanned systems would be critical to future amphibious operations in carrying out battlefield reconnaissance, target designation, communications relay, amphibious assault, obstacle removal, battlefield material distribution, area defense, and special operations.²⁰

In November 2022 the Zhuhai Airshow featured a quad-track unmanned AAV developed by the Chinese ordnance industry. According to a China Central Television (CCTV) report, the AAV is equipped with

¹⁶ Joshua Arostegui, "PLA Army and Marine Corps Amphibious Brigades in a Post-Reform Military," in *Crossing the Strait: China's Military Prepares for War with Taiwan*, ed. Joel Wuthnow et al. (Washington, D.C.: National Defense University Press, 2022), 161–93, <https://ndupress.ndu.edu/Publications/Books/Crossing-the-Strait>.

¹⁷ Todd South, "Marine Amphibious Combat Vehicle Variants Will Arrive," *Marine Corps Times*, January 4, 2024, <https://www.marinecorpstimes.com/news/your-marine-corps/2024/01/04/new-in-2024-marine-amphibious-combat-vehicle-variants-to-arrive>.

¹⁸ "U.S. Marine Corps Receives First ACV-30 Armored Fighting Vehicle from BAE Systems," Army Recognition Group, February 2, 2024, <https://armyrecognition.com/news/army-news/2024/us-marine-corps-receives-first-acv-30-armored-fighting-vehicle-from-bae-systems>.

¹⁹ Liu Haijiang, "研究军事,研究战争,研究打仗:善用科技之力强军胜战" [Study the Military, Study War, Study Victory: Aptly Employing the Power of Science and Technology to Strengthen the Army and Win Battles], China Military Online, February 29, 2024, http://www.81.cn/ll_208543/16289590.html.

²⁰ Sun Xuguang et al., "周中锋,未来两栖作战中智能化无人装备的应用展望" [The Prospect of Applying Intelligent Unmanned Equipment in Future Amphibious Operations], *Journal of Ordnance Equipment Engineering* (2022): 7–10.

infrared and electro-optical sensors, as well as an anti-tank weapon system. Its most notable feature is its four triangular tracks, which are intended to give the AAV enhanced mobility in sand and the ability to maneuver in terrain with steep gradients.²¹ The proliferation of the new unmanned AAV will afford the PLA landing force with an economy-of-force measure to attrite enemy resistance while greatly reducing friendly attrition.

In 2020 a remote-controlled obstacle-breaching unmanned surface vessel (USV) appeared in a PLA Army 73rd Group Army amphibious landing exercise. Once debarked from a landing ship, it swam to its target area and released a cluster of explosive canisters to destroy enemy surf-zone obstacles and clear lanes for a beach landing.²² In 2023, *Tank and Armored Vehicle* magazine observed that the USV's cost and combat effectiveness would be optimal for a Taiwan operation.²³ Of note, the vessel's media debut occurred one year before the U.S. Marine Corp began fielding its explosive ordnance disposal remotely operated vehicle for littoral countermine operations.²⁴

Swarm technology. An April 2020 article declared that drone swarms had a wide range of applications in a cross-strait island landing operation, including support to forces during the cross-strait transit, reconnaissance and attack during the landing phase, and support to high-intensity operations once friendly forces are on the island.²⁵ That same year, the PLA Army Engineering University emphasized the growing significance and tactical application of loitering munition swarms in future conflicts. In the land domain specifically, artillery-launched loitering munitions can assist tanks in executing tactical penetrations and envelopments, enhancing the firepower and mobility of armored units while providing protection from

²¹ “海陆全面应对!新型两栖无人战车首次亮相可搭载反坦克武器!20221130” [A Comprehensive Response on Land and Sea! New Amphibious Unmanned Combat Vehicle Debuted Can Carry Anti-tank Weapons!], CCTV, November 30, 2022, available at <https://www.youtube.com/watch?v=hEcAQ5KJTFQ>.

²² 暴力美学!无人破障船亮相73集团军联合登陆演习 [“Violence Aesthetics! An Unmanned Obstacle-breaching USV Debuts at a 73rd GA Joint Landing Exercise], October 10, 2020, <https://www.bilibili.com/video/BV1A541177bt>.

²³ Chen Tao, “岸滩破障神器——国产无人破障艇” [A Magnificent Tool for Surf Zone Obstacle Breaching—Domestically Produced Unmanned Obstacle-Breaching USV], *Tank and Armored Vehicle*, March 6, 2023, <https://cn.oversea.cnki.net/kcms/detail/detail.aspx?QueryID=2&CurRec=3&DbCode=CJFT&dbName=CJFTLAST&filename=TKZJ202306003>.

²⁴ “MCSC Begins Fielding Amphibious Robot System for Littoral Missions,” U.S. Marines, October 21, 2021, <https://www.marcorsyscom.marines.mil/News/News-Article-Display/Article/2817775/mcsc-begins-fielding-amphibious-robot-system-for-littoral-missions>.

²⁵ Hu Hang et al., “胡杭,杨健,陆皖麟,田博,贺佳,无人机蜂群在渡海登陆(岛)作战中的应用研究” [Research on the Application of UAV Swarm in the Sea Crossing Landing (Island) Operation], *National Defense Technology* (2020): 107–12.

enemy close-air support and anti-tank weapon systems.²⁶ Chinese military experts posited that land-domain swarm tactics may be extended to the maritime domain, where AAVs could be mounted with multiple-launch systems carrying loitering munitions, transforming the AAVs into “cruisers” with search and destroy capabilities.²⁷

The Chinese defense industry has been actively developing loitering munitions clusters that can be launched to saturate enemy defenses or autonomously find, fix, and destroy enemy targets. One of the many future technologies exhibited at the 2022 Zhuhai Airshow was a vehicle-mounted loitering munition swarm weapon system equipped with the newly developed YS-101 series of loitering munitions capable of being launched through a man-portable single canister or a multi-canister system that was adaptable to amphibious operations.²⁸ Providing these systems to PLA amphibious forces would enable them to keep pace with the U.S. Marine Corps, which is also actively exploring the tactical application of loitering munitions in future conflicts and intends to field infantry and vehicle-mounted loitering munitions to squad and platoon elements by 2027.²⁹

Air Mobile Operations

In contrast to the current level of armored amphibious sophistication, the air domain mobility of PLA ground forces is not world-class. With the exception of the PLA Air Force Airborne Corps’ SOF brigade, one of the PLA’s best-trained units, its six airborne combined arms brigades field largely outclassed air-droppable armored vehicles and obsolete firepower systems, reducing their utility in a hotly contested island landing campaign. Additionally, the air assault capabilities of the PLA Army, PLA Air Force Airborne Corps, and PLA Navy Marine Corps are substandard when compared with the United States due to a lack of heavy-lift helicopters. The PLA appears to recognize these discrepancies as Chinese ordnance and

²⁶ Li Hui et al., “巡飞弹蜂群关键技术与战术构想研究” [Research on the Key Technology and Tactical Concept of Loitering Munition Swarms], PLA Army Engineering University, Shijiazhuang Missile Engineering Department, 2020, 59–63.

²⁷ “垂发蜂群饱和攻击,两栖战车变迷你巡洋舰” [Vertically Launched Swarm Saturation Attacks, Amphibious AAVs Transform into Mini Cruisers], Sohu, March 28, 2023, https://www.sohu.com/a/679483217_121451128.

²⁸ “珠海航展蜂群巡飞弹白菜化,各种载具都能打,各厂商开启疯狂内卷_腾讯新闻” [Zhuhai Airshow Loitering Munition Swarms becoming Widespread, Each Platform Can Strike, Each Factory Is Ramping Up Production], Tencent News, November 11, 2022, <https://new.qq.com/rain/a/20221111A0283Y00>.

²⁹ Sam Skove, “Marine Corps to Field Squad-Level Loitering Munitions by 2027,” Defense One, January 30, 2024, <https://www.defenseone.com/defense-systems/2024/01/marine-corps-field-squad-level-loitering-munitions-2027/393776>.

aviation industries have initiated a wide range of projects to enable air mobile forces to potentially achieve world-class status in the coming decades.

Airborne maneuver and firepower equipment. As of 2024, only two of the PLA Air Force Airborne Corps' six airborne brigades include a mechanized battalion: one that fields the ZBD03 tracked airborne IFV, and one that fields the CS/VN3C air-droppable 4x4 light armored tactical vehicle. While the CS/VN3C has only been in service for five years, the ZBD03 is approaching twenty years of service. Despite its age, media reporting exists that the Chinese ordnance industry has conducted tests on a new fire-control system for the ZBD03 that would improve its aiming to the level of the ZBD05.³⁰ Chinese media also has noted that the PLA Air Force Airborne Corps anticipates an updated version of the ZBD03 at an undetermined point in the future.³¹ These upgrades could enable China's airborne forces to improve protection and mobility for troops on the ground, though likely not to the level of a world-class military.

On the other hand, the Central Military Commission (CMC) Equipment Development Department recognized the need for multifunctional air-droppable rocket-launcher systems during airborne operations, given the PLA's lack of such equipment. The airborne artillery battalion's towed PL96 122-mm Howitzer and Type 63 107-mm multiple-rocket launcher (MRL) currently provide the crux of fire support for airborne units during ground operations, while man-portable air defense systems and towed anti-aircraft artillery provide its only air defense. Officials from the CMC Equipment Development Department explored the ability to "lighten" modern rocket artillery platforms to be suitable for airdrops from the PLA Air Force's medium-lift Y-8C transport aircraft that can conduct multidomain reconnaissance and fire strikes on ground targets in the brigade's area of responsibility, while concurrently building an air defense network within the same space.³²

As of 2024, there has been no evidence that the PLA Air Force Airborne Corps has fielded new air-droppable MRLs. However, if the CMC Equipment Development Department can develop and field the envisioned air-droppable MRL system within the next two decades, the upgrade in multidomain firepower could push the airborne corps closer to world-class status.

³⁰ Riccardo Cociani, "China Aims to Upgrade FCS on PLAAF's ZBD-03 IFVs," *Janes Defence Weekly*, March 17, 2021, https://customer.janes.com/Janes/Display/FG_3920972-JDW.

³¹ Zhang Wenlao, "Airborne Corps Gets New Type of Vehicle," *China Daily*, May 12, 2020, <https://www.chinadaily.com.cn/a/202005/12/WS5eb9e969a310a8b241154e57.html>.

³² Dai Bo et al., "空降火箭炮武器系统轻量化研究" [Research on a Lightened Airborne Rocket Launching Weapon System], *Journal of Gun Launch and Control* 42, no. 2 (2021): 106–12.

Airborne protection and sustainment. Long-standing challenges facing airborne operations include the protection of airborne units on ground and operations sustainment.³³ In 2021, researchers at the PLA Air Force Early-Warning Academy emphasized the inherent dangers that airborne forces face during operations and how such dangers necessitate electromagnetic dominance (a precondition to airborne operations) to enhance survivability. To counter these threats, researchers outlined the future development of tactical airborne electronic countermeasure teams to protect airborne units on the ground, counter enemy reconnaissance, and facilitate ground assault during airborne operations. These teams will be outfitted with air-dropped and portable reconnaissance and electronic warfare equipment, as well as micro anti-radiation loitering munitions, enabling airborne units to maintain friendly communications while simultaneously detecting, suppressing, or destroying enemy sensors.³⁴ PLA strategists have recognized the utility of low-cost anti-radiation loitering munitions based on the application of these systems in the Russia-Ukraine war, and they are considering the application of these systems in a Taiwan scenario.³⁵

The PLA Air Force Airborne Corps is also testing unmanned platforms to solve the unique logistical challenges in a restricted environment.³⁶ A 2021 *Science and Technology Daily* article reported that the Airborne Corps had already started integrating unmanned aerial vehicles (UAVs) into its formations for forward resupply and casualty evacuation—on pace with the U.S. Army and ahead of the U.S. Marine Corp. Moreover, the same unmanned platform was used in the evacuation of casualties.

Rotary-wing platforms. In 2021, China's Aviation Industry Corporation (AVIC) successfully developed the Z-8L, which is a wide-body variant of its standard medium-lift helicopter capable of loading light all-terrain

³³ Li Dongjie et al., “空降作战的制约因素及前瞻” [Analysis of the Restricting Factors and Prospects of Airborne Operations], *National Defense Technology* (2019): 105–8; and Zhao Shang, “空降作战中空降兵电子对抗力量运用浅析” [A Coarse Analysis on the Application of Airborne Electronic Countermeasures in Airborne Operations], *National Defense Technology* (2021): 124–28.

³⁴ Zhao, “空降作战中空降兵电子对抗力量运用浅析.”

³⁵ Lyle Goldstein and Nathan Waechter, “Chinese Strategists Evaluate the Use of ‘Kamikaze’ Drones in the Russia-Ukraine War,” RAND Corporation, November 7, 2023, <https://www.rand.org/pubs/commentary/2023/11/chinese-strategists-evaluate-the-use-of-kamikaze-drones.html>.

³⁶ “PLA Airborne Forces Use UAVs for Forward Resupply,” *Janes Defence Weekly*, December 14, 2021, https://customer.janes.com/display/BSP_10747-JDW; and “无人机参与助攻空降作战有了新帮手” [Airborne Operations Have a New UAV Assistant], *Science and Technology Daily*, December 9, 2021, http://stdaily.com/index/kejixinwen/2021-12/09/content_1237788.shtml.

vehicles and artillery. However, only 30 aircraft had been fielded as of 2024.³⁷ At present, the PLA does not possess a rotary-wing platform with the lift capacity of the U.S. CH-53K and Russian Mil Mi-26, which are capable of lifting 36,000 and 44,000 pounds of heavy equipment, respectively.³⁸ AVIC is currently developing a 5,000-kilowatt turboprop engine for its in-development ANC313A, which is a civilian variant of the Z-8 platform that will almost certainly serve in a dual-use capacity for military operations. The upgrade in engine power will effectuate a substantial increase in load performance, transforming the ANC313A into a rotary-wing platform comparable to the U.S. CH-53K and allowing for a greater troop, weapon, and supply capacity.³⁹ Improved heavy-lift capacity, as well as increased numbers of modern medium-lift helicopters, would also directly support PLA special operations forces. PLA media reports that these are multidomain units and the smallest PLA formations capable of carrying out strategic missions.⁴⁰

According to official PRC media in 2023, the PLA acknowledges its present lack of heavy-lift or heavy-attack helicopters, though it views itself as world-class in regard to its integrated operations between UAVs and helicopters.⁴¹ In 2023 a PLA Army 80th Group Army aviation brigade demonstrated the enhanced target acquisition capabilities that UAVs afford attack helicopters.⁴² PLA UAV-integrated operations, also called manned-unmanned teaming (MUM-T), is a key PLA warfighting concept in development with an application in all domains. According to PLA media, MUM-T enables manned platforms with complementary capabilities to

³⁷ “我国现役最大吨位直升机:直-8L成登陆夺岛利器” [China’s Largest Active Helicopter: The Z-8L Is an Effective Instrument in an Island Landing], *Takungpao*, July 5, 2021, <https://www.takungpao.com/news/232108/2021/0705/605453.html>; and International Institute for Strategic Studies (IISS), *The Military Balance 2024* (London: Routledge, 2024), 256.

³⁸ “CH-53K Helicopter: The Modern Solution for True Heavy Lift,” Lockheed Martin, <https://www.lockheedmartin.com/en-us/products/sikorsky-ch-53k-helicopter.html>; and Parth Satam, “Russia Gets World’s Largest and Most Powerful Heavy-Lift Helicopter That Twice Ferried U.S. Chinooks,” *Eurasia Times*, October 27, 2023, <https://www.eurasiantimes.com/russia-gets-worlds-largest-most-powerful-heavy-lift-helicopter>.

³⁹ “国产发动机还要加油AC313A直升机用进口发动机水平比我们先进一代” [Domestically Manufactured Engine Still Needs to Persevere, More Advanced by a Generation Compared to the AC313A Helicopter’s Imported Engine], *Sohu*, March 30, 2022, https://www.sohu.com/a/534015411_121118978; and “Why Did the AC313A Helicopter Change the Engine Layout or Prepare for the Upgrade to a Heavy-Duty Helicopter,” *iNews*, <https://inf.news/en/military/d40c35fa6c972982fbb997612d70f176.html>.

⁴⁰ Zhang Zhengju et al., “特战小队体能极限在哪里?看完这场考核再猜” [What Is the Physical Limit of the Special Operations Team? Guess after Watching This Test], *China Military Network*, April 8, 2020, https://photo.81.cn/jypk/2020-04/08/content_9786156.htm.

⁴¹ Liu Xuanzun, “PLA Army’s Top Choppers, Drones to Debut at Upcoming Helicopter Expo,” *Global Times*, September 8, 2023, <https://www.globaltimes.cn/page/202309/1297805.shtml>.

⁴² “直升机无人机空地协同打击演练” [Helicopter-UAV Air-Ground Coordination Strike Exercise], *Xinhua*, January 2, 2023, http://www.xinhuanet.com/mil/2023-01/02/c_1211713645.htm.

augment their situational awareness and increase their ability to sense, decide, and act.⁴³ For rotary-wing platforms, UAVs such as the PLA Army's KVD series can provide attack helicopters with reinforced intelligence, surveillance, and reconnaissance (ISR) capabilities to improve targeting.⁴⁴

One of China's aviation industries latest projects is the Z-21 heavy-attack helicopter, a rotary-wing platform coupling the attack capabilities of a Z-10 with the enhanced lift capacity of a Z-20. Although the development and exact attributes of the new attack helicopter are unknown, it reportedly possesses electronic warfare capabilities in addition to a heavier weapons payload.⁴⁵ When fielded, the improved offensive and defensive capabilities of the Z-21 will augment rotary-wing fire support and leverage electronic warfare capabilities to counter Taiwan's air defense systems, including its emergent use of loitering munition swarms.⁴⁶

Urban Operations

PLA researchers acknowledge that any future conflict will inevitably involve urban operations due to the incessant rise in global urbanization. Therefore, the PLA Army has been developing innovations that will facilitate subsequent urban operations during a joint island landing campaign and ultimately change the paradigm of how urban operations are conducted. In 2021, researchers at the PLA Army Academy of Artillery and Air Defense identified two key problems in urban operations: a high casualty rate and low strike capabilities. The researchers determined that the optimal future application of UAV groups in urban terrain would be to improve reconnaissance strikes on enemy defenders and mitigate combat attrition.⁴⁷

China's *Military Digest* affiliates observed the U.S. military's experimentation with man-portable UAVs and unmanned ground vehicles

⁴³ “有人/无人机协同作战优势何在” [The Combat Advantage of Manned/Unmanned Teaming], *PLA Daily*, April 11, 2013, http://www.81.cn/jfjbmap/content/2023-04/11/content_337364.htm.

⁴⁴ “KVD-002 UCAV Strengthens PLAGF's Airborne ISR Capability,” *Janes Defence News*, October 3, 2023, <https://www.janes.com/defence-news/news-detail/kvd-002-ucav-strengthens-plagfs-airborne-isr-capability>.

⁴⁵ “重型武装直升机直21悄然亮相能否超越阿帕奇?” [Z-21 Heavy Attack Helicopter Quietly Debuts Can It Surpass the Apache?], NetEase, April 16, 2024, <https://www.163.com/dy/article/IVTE82JV05564850.html>; and Parth Satam, “China's Heavy Attack Z-21 Helicopter Spotted for 1st Time; May Use Ka-52 Alligator's Tactics in Taiwan War,” *Eurasia Times*, March 22, 2024, <https://www.eurasiantimes.com/chinas-heavy-attack-z-21-helicopter-spotted>.

⁴⁶ Gabriel Honrada, “Taiwan Showcases Kamikaze Drones as Warning to China,” *Asia Times*, August 24, 2023, <https://asiatimes.com/2023/08/taiwan-showcases-kamikaze-drones-as-warning-to-china>.

⁴⁷ Ding Yukun and Ye Ai, “城市进攻作战无人机蜂群发展设想与运用探析” [A Probe Into the Development and Application of UAV Groups in Urban Offensive Operations], *Command and Control Simulation*, August 2020, 58–62.

(UGVs) in an urban operational environment, drawing lessons on the practicability and optimal employment of autonomous systems.⁴⁸ To keep pace with the U.S. Army, PLA Army units have explored tactics using MUM-T in urban environments since 2022. Rotary-wing UAVs and UGVs, such as UAV-delivered robot dogs, unmanned reconnaissance vehicles, unmanned anti-tank vehicles, and other weapons-capable UGVs designed for “alley combat,” have been featured in PLA Army urban training exercises. According to military experts, the application of these autonomous systems in future urban operations will be to assist soldiers in clearing buildings as well as to serve as a “small warehouse” for ammunition and supplies, thus mitigating “supply shortages under extreme operational conditions.”⁴⁹

A joint island landing campaign is fundamentally an all-domain operation. Its accomplishment requires the integration of combat power from each domain to attain an advantage and defeat the enemy. China’s research, development, and acquisition of key technologies and weapon systems that will facilitate a joint island landing campaign are ongoing, with many of the aforementioned capabilities set to be delivered within the next decade. From swarm technology to unmanned ground and maritime systems, air-droppable launchers, and heavy-lift platforms, this range of equipment will provide the PLA landing force not only with cross-domain capabilities but with attritable systems. These systems will help hedge against the lethality and unpredictability that are inherent in a joint island landing campaign and thus preserve manpower and resources for increased endurance. When leveraged alongside the PLA’s growing joint force, these technologies constitute an overall operational capability that is indicative of a world-class military.

Border Defense Campaigns

Unlike a joint island landing campaign, the PLA Army will play the primary role in future border defense campaigns, especially those along

⁴⁸ “首发美军单兵便携式地面无人装备使用分析” [Analysis of the U.S. Army’s Man-Portable Unmanned Ground Equipment], Military Informationized Equipment Online, October 9, 2023, <http://www.81it.com/2023/1009/14604.html>.

⁴⁹ “解放军无人作战群曝光,连抢滩都用上无人战车,为统一之战练兵?” [PLA Unmanned Operational Groups Exposed, Even Beach Assaults Employ Unmanned Assault Vehicles, Training for Reunification], Sohu, July 6, 2023, https://www.sohu.com/a/695016608_121452400; and “兵器面面观:机器狗等无人装备对各种极端环境有很强的适应能力” [Military Weapons Overview: Robot Dog and Other Unmanned Equipment Strong Adaptability to Extreme Environments], CCTV, January 30, 2023, <https://tv.cctv.com/2023/01/30/VIDE73xj7OQdFp7jOFgKIFA4230130.shtml?spm=C53074552346.PlpOTFgsFbqA.0.0>.

China's borders with India and Myanmar. During a border defense campaign, the PLA Army, with support from the rest of the joint force, is responsible for carrying out land closure, defense, and counterattack operations from ground maneuver and air landing, as well as information operations, special operations, and air defense operations.⁵⁰

Due to the complex terrain along China's western and southern borders, the army is forced to rely on its own world-class organic capabilities for timely support to the abovementioned operations, instead of depending on national-level and joint systems. Based on this requirement, forces in the Western Theater Command have witnessed increased modernization since 2020 as units have fielded some of the PLA's most advanced ADO-capable combat systems. While the discussion of island landing campaigns focused on the incorporation of new technology to achieve a world-class force, this section will demonstrate how unique force structures and persistent deployments will only allow the PLA Army to increase those capabilities.

Unlike many Western nations, China does not have designated warfare forces that train to deploy to mountainous regions. Instead, it has units that are permanently garrisoned in the world's highest elevations, including both lightly equipped border defense troops and mechanized mobile tactical units. The PLA Army also fields some of the most advanced equipment found in any force designed to operate in such complex terrain. It can be argued that since 2020 the Western Theater Command Army and Xinjiang and Xizang Military Districts have received increased priority in modernizing their offensive combat forces.⁵¹ The ongoing tensions along the border with India and continuous rotation of combined arms and supporting units to the region clearly influenced the PLA leadership's decision to equip those units with systems designed to operate at high elevations, while also organizing them to simply ensure command and control. The new systems not only provided the PLA Army with advantages in controlling the land domain but also enabled its units in the area to bring along their own assets that assist in achieving air and information domain superiority.

⁵⁰ Cao Zhengrong et al., 信息化陆军作战 [Informationized Army Operations] (Beijing: National Defense University Press, 2014), 218–23.

⁵¹ “新疆军区遵循习主席训词建设现代化新型陆军纪实” [Xinjiang Military District Follows Chairman Xi's Instructions to Build a Modern New Army], *Global Times*, August 1, 2016, <https://m.huanqiu.com/article/9CaKrnJWO8h>; Wang Shichun, 观察者网 [Guancha], August 11, 2020, https://www.guancha.cn/military-affairs/2020_08_11_560968.shtml; and “多型陆战利器同时列装新疆军区,解放军将要建成什么样的‘新型陆军?’” [Multiple Types of Land Warfare Weapons Are Equipped in the Xinjiang Military District at the Same Time: What Kind of “New Army” Will the People's Liberation Army Build?], Phoenix News Network, July 8, 2021, <https://news.ifeng.com/c/87i5RxMJFym>.

As Dennis Blasko points out, the PLA Army's deployments to the LAC in the Aksai Chin are the land domain equivalent of Chinese military maritime operations in the South China Sea and sea deterrent operations directed against Taiwan. To support the mission of border defense regiments in the area, the army initiated an operation, known as the 506 Special Mission, to rotate additional forces from the Xinjiang Military District to the border area. Although the rotations occurred at smaller scales in the past, entire regiments and elements of the Western Theater Command Army combined arms brigades started moving forces to the area after the deadly clashes in the region in June 2020.⁵² These efforts to build a world-class force to conduct border defense campaigns consist of three main components: equipment modernization, persistent deployment experience, and command and control.

Equipment Modernization

In what was likely an approach to improving the primary units destined for the border, the PLA Army carried out a program of reorganizing its conventional infantry divisions in the Xinjiang Military District into combined arms divisions in 2020.⁵³ It also began to replace most of their obsolete systems around 2021.⁵⁴ According to the 2024 edition of *The Military Balance*, the replacement of equipment to the regiments under those divisions in the Xinjiang Military District appeared to be nearing completion.⁵⁵ In a period of under three years, PLA media published several videos and reports demonstrating the new systems, including Type-15 light tanks that replaced Type-59 main battle tanks, Type-08 8x8 armored vehicles that replaced Type-92 6x6 vehicles, CSK-series high-mobility vehicles that replaced unprotected transportation trucks for light infantry, self-propelled

⁵² Blasko, "A Baseline Assessment of the PLA Army's Border Reinforcement Operations."

⁵³ Joshua Arostegui and J.R. Sessions, "PLA Army Logistics," in *PLA Logistics and Sustainment: PLA Conference 2022*, ed. George R. Shatzter et al. (Carlisle: U.S. Army War College Press, 2023), <https://press.armywarcollege.edu/monographs/958>.

⁵⁴ "新疆军区大换装拉开序幕,新装备陆续有来,敌人压力促使我们换代" [Xinjiang Military District's Major Equipment Replacement Kicked Off, New Equipment Is Coming One after Another, Enemy Pressure Forces Us to Upgrade], NetEase, September 26, 2023, <https://m.163.com/dy/article/IFIU9DVS055656US.html>; and Samuel Cranny-Evans and Gabriel Dominguez, "Modernisation of PLAGF's Xinjiang Military Command continues apace," *Janes Defence News*, May 17, 2021, <https://www.janes.com/defence-news/news-detail/modernisation-of-plagfs-xinjiang-military-command-continues-apace>.

⁵⁵ IISS, *The Military Balance 2024*, 235.

155-mm howitzers typically assigned to group army artillery brigades, and new individual soldier systems issued to the troops.⁵⁶

Certain systems fielded in the Xinjiang Military District can already be considered world-class, including the Type-15 light tank, which predated the U.S. Army's fielding of its M10 Booker combat vehicle by over five years and is in use in some of China's most difficult terrain.⁵⁷ The PCL181 truck-mounted 155-mm howitzer—another system where the U.S. Army lacks an equivalent—is also fielded to some of the Xinjiang Military District's combined arms divisions for use in plateau and mountain areas. According to a Chinese ordnance industry publication, the PCL181 was designed specifically to improve operability and range of fires in high elevations.⁵⁸ Additionally, China's most advanced short-range mobile surface-to-air missile system, the wheeled HQ-17, is assigned to division firepower regiments, providing air defense to tactical units—a capability U.S. brigade combat teams do not have organically.⁵⁹

The maneuver and combat support units assigned to the Tibet (Xizang) Military District have also witnessed the influx of new weapon systems and maneuver platforms. Following the use of the 53rd Combined Arms Brigade as a pilot unit for the light high-mobility concept in the early 2010s,⁶⁰ additional high-mobility firepower variants and light armor have been

⁵⁶ See, for example, Yu Haiyang, “奔跑的‘黑豹’！15式坦克挺进高原首次列装新疆军区部队” [Running “Black Panther”! Type 15 Tanks March into the Plateau and Are First Deployed in Xinjiang Military District Troops], China Military Network, February 5, 2021, http://www.81.cn/bg_208596/9981248.html; Jin Xin, “新疆军区某合成团战备拉动进行时” [A Combined Arms Regiment of the Xinjiang Military District Is Conducting Combat Readiness Exercises], 81.cn TV, April 23, 2023, http://www.81.cn/byds_206407/byds_206410/16219162.html; and Li Bo et al., “海拔5200米！新疆军区某合成团多要素侦察渗透演练” [5,200 Meters Above Sea Level! A Multi-Element Reconnaissance and Infiltration Exercise by a Combined Arms Regiment of the Xinjiang Military District], China Military Network, April 18, 2024, http://www.81.cn/lj_208555/16301627.html.

⁵⁷ John Ashley, “Army Takes Delivery of First M10 Booker Combat Vehicle,” U.S. Army, April 18, 2024, https://www.army.mil/article/275419/army_takes_delivery_of_first_m10_booker_combat_vehicle; and Liu Xunzun, “PLA Xinjiang Military Command Commissions First Type 15 Light Tanks,” *Global Times*, February 1, 2021, <https://www.globaltimes.cn/page/202102/1214633.shtml>.

⁵⁸ “简析PCL-181车载榴弹炮(下)” [A Brief Analysis of the PCL-181 Truck-Mounted Howitzer (Part 2)], *Tank and Armored Vehicle*, December 2020, 23–27.

⁵⁹ “新疆军区某火力团防空分队某新型地空导弹对亚音速靶机进行实弹射击演练” [A New Type of Surface-to-Air Missile of an Air Defense Unit of a Firepower Regiment of the Xinjiang Military District Conducted a Live-Fire Shooting Exercise against a Subsonic Target Aircraft], CCTV, August 22, 2023, <https://tv.cctv.com/2023/08/22/VIDEX3v0zxdV89PeKfL2kieZ230822.shtml>; and David Axe, “China's New Mountain Tanks Crawl into the Himalayas to Confront India,” *Forbes*, June 17, 2020, <https://www.forbes.com/sites/davidaxe/2020/06/17/chinas-new-mountain-tanks-crawl-into-the-himalayas-to-confront-india/?sh=7972dae22043>.

⁶⁰ Joshua Arostegui, “An Introduction to China's High-Mobility Combined Arms Battalion Concept,” *Infantry Magazine*, Fall 2020, 12–17.

fielded in all three of the district's maneuver brigades.⁶¹ Despite the PLA's publicization of its maneuver forces to demonstrate land domain superiority, it has also established new brigade types in both Xinjiang and Tibet Military Districts that are the same as those found at theater army levels at the joint theater commands for information domain dominance. While other PLA services have similar capabilities in the military district, the PLA Army's electronic countermeasures brigades, intelligence reconnaissance brigades, and information support brigades are likely equipped with modern platforms designed to provide commanders with unique reconnaissance, offensive weapons, and defensive systems to disrupt adversaries' sensors and weapons while maintaining information domain superiority to improve decision-making.⁶²

Persistent Deployment Experience

Although the fielding of modern systems represents a unique capability to carry out informationized warfare along China's periphery, this represents only one component of the PLA Army's move toward becoming a world-class force in the coming decades. Equipment modernization simply puts the combined arms divisions and regiments and other support brigades on par with the rest of the PLA's theater armies. On the other hand, through the persistent deployment of combat forces to high-threat environments along the border with India, especially as non-lethal clashes have continued to occur even after 2020, the PLA Army is gaining experience in sustaining

⁶¹ Liu Xunzun, "China's Type 15 Tanks Join Exercises in Mountainous Plateau Region," *Global Times*, June 14, 2020, <https://www.globaltimes.cn/page/202006/1191562.shtml>. PLA Army forces garrisoned in the mountainous jungle terrains of southern China also have fielded new combat systems. These forces must prepare not only for contingencies against India but also for deployment to trouble spots in Myanmar. Similar terrain is found on Taiwan, likely making these brigades a part of planning for on-island operations. Units in the Southern Theater Command Army, especially those in the Yunnan Province's 75th Group Army, have witnessed additional modernization to operate in the complex mountainous jungle terrain along the border areas near Myanmar and Vietnam. The group army is home to units equipped with light high-mobility platforms, one of the PLA Army's two air assault brigades, as well as new Lynx 4x4- and 6x6-wheeled all-terrain firepower and support platforms that allow for roll-on/roll-off capabilities from medium-lift helicopters. These small all-terrain vehicles enable the army to nearly eliminate the need for sling-loading mobility and fire-support equipment, which would be optimal when projecting force in complex mountainous jungle regions.

⁶² Cai Wei, "我感动,我加油,我担当" [I Am Touched, I Cheer Up, I take Responsibility], *PLA Daily*, April 22, 2020, http://www.81.cn/jfbmap/content/1/2020-04/22/08/2020042208_.pdf.pdf; "陆军第二届'四有'新时代革命军人十大标兵简要事迹" [Brief Deeds of the Top Ten Model Soldiers of the Second "Four-Have" Revolutionary Soldiers of the New Era in the Army], *People's Daily*, January 13, 2020, <http://military.people.com.cn/n1/2020/0113/c1011-31545993.html>; and Fan Song et al., "陆军合成旅山地进攻作战电子对抗战术计算要素探析" [Research and Analysis on Calculating Essential Factors in Army Combined Arms Brigade Mountain Offensive Operations Electronic Countermeasures], *Aerodynamic Missile Journal* (2017): 41–44.

the rotation of units into and out of the region.⁶³ In addition to building critical infrastructure in remote and inhospitable terrain, the PLA is using the rotations to the LAC and permanent garrisoning near the Sino-Indian border to learn how to sustain forces. Army leaders in the Xinjiang and Tibet Military Districts oversee the joint processes of moving goods from across the country while using organic army support units to complete the shipment of supplies to those remote garrisons.⁶⁴ According to commercial imagery analysis, army forces are also using important wartime concepts to improve their positions, including the storage of weapons and ammunition in high-threat areas and the construction of defense earthworks.⁶⁵

More importantly, the requirement to command forces thousands of kilometers from the Western Theater Command headquarters, which holds overall operational responsibility for the contested Sino-Indian border regions, is likely providing the PLA Army with vital experience for future wars. As Blasko notes, the Nanjiang Military District, a corps-grade military district under the deputy theater-grade Xinjiang Military District, is responsible for military operations along the LAC in the Aksai Chin.⁶⁶ These army-run organizations oversee the joint operations within the region, providing the PLA Army with experience employing all-domain effects against a potential modern adversary and likely assisting in its efforts to achieve world-class status.

Command and Control

Given the tyranny of distance and the demand on senior officers to command units semi-independently in the world's most challenging terrain, the combined arms divisions in Xinjiang Military District organizationally have become some of the most unique units in the PLA Army. The standard construction of the majority of the army's operational forces in the five joint theater commands is according to the hierarchy of theater, theater army, group army, brigade, and battalion. In the Xinjiang Military District, however, forces are now organized into theater, military district, division,

⁶³ Blasko, "A Baseline Assessment of the PLA Army's Border Reinforcement Operations"; and Krishn Kaushik, "Indian, Chinese Troops Clashed Twice in 2022 Even as Peace Talks Were On," Reuters, January 17, 2024, <https://www.reuters.com/world/asia-pacific/indian-chinese-troops-clashed-twice-2022-even-peace-talks-were-2024-01-17>.

⁶⁴ Arostegui and Sessions, "PLA Army Logistics," 108.

⁶⁵ Matthew P. Funaiolo et al., "China Is Deepening Its Military Foothold along the Indian Border at Pangong Tso," Center for Strategic and International Studies (CSIS), ChinaPower, November 28, 2022, <https://chinapower.csis.org/analysis/china-satellite-imagery-military-pangong-tso>.

⁶⁶ Blasko, "A Baseline Assessment of the PLA Army's Border Reinforcement Operations."

regiment, and battalion. While the army is no stranger to the division-regiment formations that existed since the founding of the PLA, the 2017 reorganization left only those four divisions in Xinjiang Military District, two guard divisions in the Beijing Military Garrison District, and one (now dissolved) mechanized infantry division subordinate to the Central Theater Command.

The command and control of the standard twelve- and thirteen-brigade group armies is broad, with six major generals overseeing a corps-level organization of roughly 50,000–60,000 personnel.⁶⁷ These formations are designed to allow the establishment of a task force that can be custom-built around one or more combined arms brigades (the PLA Army's basic tactical unit), with additional forces and equipment from the group army's functional support brigades. While the 2017 restructure allowed the PLA Army to push much of the equipment formerly held at the division level down to the combined arms brigades, it still required those brigades to reach back to artillery brigades for long-range howitzer fires and to engineer and chemical defense brigades for advanced bridging equipment, among other supplies. The approximately 10,000-person combined arms division has much of that equipment on hand, minimizing the need for corps-level reach-back support. In addition, the three combined arms regiments under the divisions are smaller than their brigade counterparts, as are the combined arms battalions within them.⁶⁸ This likely makes those units far more sustainable and easier to deploy into the restricted terrain to which they rotate along the LAC.

The PLA Army's decision to maintain divisions and reorganize them into combined arms formations with regiments that, like combined arms brigades, include light, medium, and heavy variants indicates that China recognizes the continued value of the division. With the U.S. Army's refocus on the division after years of an emphasis on counterinsurgency and counterterrorism operations, as well as the Russian Army's turnaround from the 2007 plan to convert all divisions into brigades, the PLA Army undoubtedly recognized the benefits of keeping some form of a division

⁶⁷ Dennis J. Blasko, "The PLA Army after 'Below the Neck' Reforms: Contributing to China's Joint Warfighting, Deterrence and MOOTW Posture," *Journal of Strategic Studies* 44, no. 2 (2021): 149–83; and "一个集团军里到底有多少个少将呢?看完后才知道,原来人数不一定" [How Many Major Generals Are There in a Group Army? After Reading This, I Realized That the Number of Major Generals Is Not Certain], Sina, April 18, 2022, https://k.sina.cn/article_2800587327_a6ed923f001013caq.html?from=mil.

⁶⁸ Blasko, "A Baseline Assessment of the PLA Army's Border Reinforcement Operations."

structure, and sometime in the future it may consider reintroducing more divisions into its force structure.⁶⁹

In future ADO, if the PLA Army determines that its group army–brigade structure is untenable, or if continued downsizing happens to the force, the army already has a tested tactical formation capable of deploying regiments with multidomain capabilities to high-threat and complex environments. This more streamlined organizational approach to command and control could put the PLA Army on par with Western forces and enable it to achieve world-class status, especially if supplemented with emerging technologies like AI and quantum computing.⁷⁰

Conclusion

The PLA's impressive new array of land domain weaponry and reconnaissance systems clearly fits into the list of requirements that researchers determined the PLA Army must incorporate for future ADO. However, other Chinese researchers in 2022 claimed that the PRC trailed the United States in efforts to integrate sensor and communications systems to share data between multidomain platforms and weapons using AI, machine-learning, and other technologies. As a result, the researchers noted that the PRC's ADO was lacking in three key areas when compared with the U.S. concept of joint all-domain operations:

- The PLA is still in the stage of building a high-level networked information system, whereas the U.S. military is already building a command information system like a machine-enabled global common operational picture.
- The PLA's new joint operations command system has not been in existence for a long period and still needs to vigorously improve ADO based on joint command and control. The U.S. military's joint operations system, by contrast, is already mature. Therefore, in ADO more attention is paid to all-domain command and cross-domain collaboration than to joint command.

⁶⁹ Cao Yongsheng, “俄罗斯陆军师旅军改走向解析” [Analysis of Russian Army Division-Brigade Reform Trend], *China's Military-to-Civilian Magazine*, July 2020, 75–80.

⁷⁰ Zi Yang, “How China Leverages Artificial Intelligence for Military Decision-making,” in *China's Military Decision-making in Times of Crisis and Conflict*, ed. Roy D. Kamphausen (Seattle: National Bureau of Asian Research, 2023), <https://www.nbr.org/publication/how-china-leverages-artificial-intelligence-for-military-decision-making>.

- In terms of core capabilities, the PLA needs to comprehensively improve its information and decision-making advantages to create an overall advantage in its ADO.⁷¹

While these three discrepancies are not just army problems, but PLA-wide issues, they clearly affect the ability of the PLA Army to effectively conduct cross-domain strikes and command joint ADO, especially under future intelligitized conditions. This is important because two of the five key capabilities that researchers determined the PLA Army needed for ADO were adequate system interconnection and information sharing and a highly effective time-sensitive target strike capability.⁷²

As the PRC continues its development to answer the above discrepancies, the PLA's advanced equipment and new organization will eventually give it world-class capabilities that enable it to compete with the U.S. military and other modern forces on the battlefield. However, PLA researchers also believe that the military must work with the Chinese defense industry to advance its abilities in AI and quantum technologies, which will give the PLA the relative advantage in incorporating the new systems into future intelligitized ADO.

With respect to AI, the U.S. Department of Defense notes that the PLA is pursuing greater autonomy for unmanned aerial, surface, and underwater vehicles to enable manned and unmanned teaming, swarm attacks, optimized logistic support, and distributed ISR, among other capabilities.⁷³ According to 2024 testimony from Jacob Stokes, if the PLA hopes to make use of AI for unmanned weapons and operational support, including command, control, and communications, it must figure out how to handle multiple roadblocks like technology controls, corruption, political control, and funding.⁷⁴ Without appropriate AI integration, the PLA Army will need to rely on personnel, particularly conscripts and noncommissioned officers who often lack adequate education and training, to operate advanced systems.⁷⁵

⁷¹ Ji et al., “全域作战概念研究与机理验证.”

⁷² Qian, “面向关键能力的陆军全域作战体系贡献率评估.”

⁷³ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2023*, 97.

⁷⁴ Jacob Stokes, “Military Artificial Intelligence, the People's Liberation Army, and U.S.-China Strategic Competition,” Center for a New American Security, February 1, 2024.

⁷⁵ Matt Tetreau, “The PLA's Weak Backbone: Is China Struggling to Professionalize Its Noncommissioned Officer Corps?” Modern War Institute, January 23, 2023, <https://mwi.westpoint.edu/the-plas-weak-backbone-is-china-struggling-to-professionalize-its-noncommissioned-officer-corps>; Thomas Corbett and Peter W. Singer, “China's New Conscript Rules Reveal Concerns,” *Defense One*, June 8, 2023; and Marcus Clay, Dennis Blasko, and Roderick Lee, “People Win Wars: A 2022 Reality Check on PLA Enlisted Force and Related Matters,” *War on the Rocks*, August 12, 2022.

Although the PRC has made advances in quantum technology, especially in quantum sensing, and is viewed as a global leader in quantum communications, it still trails the United States in some aspects of quantum computing. These technologies are necessary for the PLA Army to improve reconnaissance, command and control, logistics, and encryption processes and systems.⁷⁶ They are also critical to address the rapid decision-making problems that would plague the army because of limited manpower in unit staffs, especially at combined arms battalion echelons.⁷⁷

Can the PLA Army fully achieve world-class status by 2049? Are parts of its force already at a world-class level? The answer to both questions is most likely yes. While the PLA Army would likely have difficulties beating the U.S. Army on an open battlefield now and in the near future, the PRC has clear advantages in certain areas based on its development of weapon systems for unique terrain and the lessons it is learning from keeping troops stationed in those types of areas. Additionally, the PLA Army remains focused on improving its own ADO capabilities to support the joint force in future informationized conflicts, especially in the information domain. If the PRC is successful in developing and implementing new technologies like AI and quantum, the likelihood of the PLA Army achieving world-class status through the fielding of advanced weapon systems and sensors supported with high-powered decision-making processes will become a near certainty.

⁷⁶ “Is China a Leader in Quantum Technologies?” CSIS, ChinaPower, January 31, 2024, <https://chinapower.csis.org/china-quantum-technology>.

⁷⁷ Dennis J. Blasko, “The Biggest Loser in Chinese Military Reforms: The PLA Army,” in *Chairman Xi Remakes the PLA: Assessing Chinese Military Reforms*, ed. Phillip C. Saunders et al. (Washington, D.C.: National Defense University Press, 2019), chap. 10, <https://ndupress.ndu.edu/Media/News/News-Article-View/Article/1748401/the-biggest-loser-in-chinese-military-reforms-the-pla-army>.

EXECUTIVE SUMMARY

This chapter identifies the PLA Navy's 2035 and midcentury modernization goals, examines its progress in building requisite world-class capabilities, and assesses its current capability shortfalls and efforts to overcome them.

MAIN ARGUMENT

While there are multiple ways to measure a “world-class” navy, what matters most are China's own criteria informing its efforts toward that end. Capabilities-based benchmarks are a widespread indicator of a navy's level. PLA leadership appears focused on developing the capabilities that improve the PLA Navy's proficiency to execute specified missions at the operational level of war. China's 2019 defense white paper provides a roadmap for the PLA Navy to become the world's most capable navy regarding these missions. Only when the PLA Navy successfully integrates the means required to support the full range of these missions will Beijing perceive that it has reached world-class status. By sowing doubt about the PLA Navy's capability to execute these missions, Washington can downgrade party-military leadership perceptions about China's world-class naval status and instill restraint.

POLICY IMPLICATIONS

- Full world-class status is reserved for when the PLA Navy establishes a global navy capable of protecting Chinese interests worldwide as instructed. On its current trajectory, the PLA Navy is likely to be capable of fully executing such operations by midcentury.
- If Beijing is unable to effectively integrate advanced technologies into tactical operations to enable the building of its desired fleet, then the PLA Navy will question its ability to surpass the U.S. Navy and achieve its top-tier objective.
- If the PLA Navy is unable to access suitable overseas ports for ship repair and armament resupply, its combat power projection overseas will be limited, thereby degrading the PRC's ability to use the PLA Navy as a tool of influence overseas and potentially slowing its progress toward achieving its world-class objectives.

China's Future World-Class Navy: Ends, Ways, Means

Christopher H. Sharman and Andrew S. Erickson

On the morning of April 12, 2018, the People's Liberation Army (PLA) Navy Type 052D (Luyang III) destroyer *Changsha* was moored pierside at Yulin, a naval port in the Southern Theater.¹ The national ensign of the People's Republic of China (PRC)—the PLA Navy's own "8-1" pennant—was hoisted, and the ship was fully dressed in a rainbow of signal flags that punctuated the auspicious event.² The navy band's patriotic tunes broke the anticipatory silence as the ship's honor guard snapped to attention. Central Military Commission (CMC) chairman Xi Jinping crossed the ship's brow wearing military fatigues.³ After honor guard inspection, the ship's horn sounded, the propellers began rotating, and the *Changsha* was underway, bound for nearby waters off Hainan's southern coast.⁴ There, it would rendezvous with ten thousand PLA Navy sailors manning 48 warships on parade.⁵ The sheer preponderance of participating ships and attendees

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Note: The views expressed here are the authors' alone. They thank conference participants and anonymous reviewers for valuable inputs.

¹ Li Xuanliang and Wu Dengfeng, "习近平: 把人民海军全面建成世界一流海军" [Xi Jinping: Comprehensively Build the People's Navy into a World-Class Navy], Xinhua, April 12, 2018; and "China Focus: President Xi Reviews Navy in South China Sea," Xinhua, April 18, 2013, http://www.xinhuanet.com/english/2018-04/13/c_137106984.htm.

² "向海图强, 建设一支强大的人民海军" [Strengthening toward the Sea, Building a Strong People's Navy], *PLA Daily*, April 13, 2018.

³ "China Focus: President Xi Reviews Navy in South China Sea."

⁴ "向海图强, 建设一支强大的人民海军."

⁵ Yu Zhangcai, "把人民海军全民建成世界一流海军, 深入贯彻新时代党的强军思想: 习近平在出席南海海域海上阅兵时强调" [Build the People's Navy into a World-Class Navy, Thoroughly Implement the Party's Thought on Strengthening the Military in the New Era: Xi Jinping Emphasized When Attending a Naval Parade in the South China Sea], *People's Navy*, April 13, 2018.

made this the largest-ever naval review for the PRC.⁶ The total tonnage of participating ships exceeded that of all other previous fleet reviews combined.⁷ With over half of participating warships commissioned after Xi became CMC chairman at the 18th National Congress in 2012, the arrayed armada represented a navy built and developed under him.⁸ The PLA Navy's official newspaper, *People's Navy*, highlighted the event's theme: a celebration of the great efforts and latest achievements in PLA naval modernization in the "new era"—a tribute to Xi, his influence, and his unfolding legacy.⁹

Transiting in two columns, ships were grouped by mission: strategic strike, underwater attack, far seas combat, amphibious landing, carrier strike, coastal defense, and "comprehensive security." With sailors standing at attention and manning its rails, the PLA Navy's crown jewel passed by: China's first aircraft carrier and a symbol of sea power, the CV-16 *Liaoning*.¹⁰ Later that morning, Xi would observe four J-15 fighter jets launch from the *Liaoning*'s ski-jump flight deck.¹¹ Ten mission-choreographed aircraft sections then flew in diamond formations overhead. The 76 airframes included sorties of shipboard helicopters and antisubmarine patrol, airborne early-warning, command-and-control, long-range refueling, surveillance, and antisurface warfare-capable aircraft.¹²

The highlight of the day's events was an important speech by Xi declaring that a strong navy has always been China's aspiration.¹³ However, the ultimate object was not the fleet before him but the one he envisioned for China's future. Before the PLA Navy and CMC leadership, Xi pledged unprecedentedly to build a "world-class navy," according to official media.¹⁴ Specifically, he committed to accelerating modernization with new types of

⁶ "Chinese President Xi Jinping Reviews Naval Parade in South China Sea," China Military Online, April 12, 2018, http://eng.mod.gov.cn/xb/News_213114/Photos/4809317_3.html.

⁷ Yu, "把人民海军全面建成世界一流海军, 深入贯彻新时代党的强军思想."

⁸ "向海图强, 建设一支强大的人民海军."

⁹ Yu, "把人民海军全面建成世界一流海军, 深入贯彻新时代党的强军思想."

¹⁰ Li Gaojian and Sun Guoqiang, "航行在领神的目光里——辽宁舰航母打击群接受习主席检阅侧记" [Sailing in the Eyes of the Leader—Side Notes of the Liaoning Aircraft Carrier Strike Group Being Inspected by President Xi], *People's Navy*, April 13, 2018.

¹¹ "China Focus: President Xi Reviews Navy in South China Sea."

¹² Ibid.

¹³ Ibid.

¹⁴ Naval Command College, "建设一支强大的人民海军, 寄托着中华民族向海图强的世代夙愿, 是实现中华民族伟大复兴的重要保障 牢牢把握全面建成世界一流海军的时代内涵" [The Building of a Strong People's Navy Is an Important Guarantee for the Realization of the Great Rejuvenation of the Chinese Nation, as It Is the Long-Cherished Wish of the Chinese Nation to Strive for Strength in the Sea, Grasping Firmly the Connotation of the Era of Building a World-Class Navy in a Comprehensive Manner], *PLA Daily*, June 6, 2018.

weapon systems, technologies, and platforms.¹⁵ Perhaps more importantly, Xi suggested that this future navy required immediate action, which “has never been more urgent than today.”¹⁶ His navy-building path unfolded clearly: the PRC would use innovation to “surpass” the U.S. Navy as the PLA Navy strives to become a world-class navy.¹⁷

Xi’s ambition to overtake the American paradigm is manifesting clearly in the force structure that China is building and its organization of personnel to take the PLA Navy to sea—that is, more in capabilities than in high-end global operations—even as Beijing’s military maritime missions remain far from converging with Washington’s. Xi’s fleet review suggested that in many ways the PLA Navy is already front-ranking. Not only did the parade highlight the aircraft carrier *Liaoning*; it also included numerous ships armed with advanced long-range surface-to-surface and surface-to-air missiles, submarines offering China’s first credible sea-based nuclear strike capability, and trained crews enabling the PLA Navy to choreograph this complex event.¹⁸ China already boasts the navy with the most ships, produced by the world’s largest shipyard infrastructure and shipbuilding industry with the fastest expansion of production capacity since World War II. Despite these and other distinctions, Xi made clear in his speech that he is dissatisfied with the status quo. He does not yet consider the PLA Navy to be a world-class navy, but vows that it will become one by midcentury.

While there are many ways to measure world-class status, the PLA leadership appears to be focused on the navy’s proficiency to execute specified missions and tasks as its primary metric. We believe that China’s 2019 defense white paper, published less than a year after the 2018 naval review and heretofore not updated, provides a roadmap for the missions and capabilities that the PLA Navy seeks in becoming world-class. This chapter argues that only when the PLA Navy integrates both advanced technologies and capabilities and has the requisite proficiency to support the full range of these missions will the PRC’s military leadership assess that the service has achieved its goal. National priorities affect the relative emphasis on these missions over time. Therefore, strategically timed efforts

¹⁵ “China Focus: President Xi Reviews Navy in South China Sea.”

¹⁶ “习近平在出席南海海域海上阅兵时强调 深入贯彻新时代党的强军思想 把人民海军全面建成世界一流海军” [Xi Jinping, Attending a Military Parade in the South China Sea, Emphasized That the Party’s Idea of Strengthening the Military in the New Era Should Be Implemented In Depth to Build the People’s Navy into a World-Class Navy], *PLA Daily*, April 13, 2018.

¹⁷ Zhou Meng, Qian Xiaohu, and Duan Jiangshan “海军长沙舰向着梦想全速前进” [Naval Ship Changsha: Full Speed Ahead toward the Dream], *PLA Daily*, September 18, 2020, http://www.xinhuanet.com/politics/2020-09/14/c_1126492624.htm

¹⁸ “China Focus: President Xi Reviews Navy in South China Sea.”

by Washington to sow doubt about the PLA Navy's ability to execute the requisite missions could influence Beijing's perceptions of progress toward becoming world-class.

Top-Tier Navies and China's Strategy

The goal of developing a world-class military preceded Xi Jinping's fleet review.¹⁹ At the 19th Party Congress in October 2017, Xi stated that China would "modernize our military" by 2035 and "transform the military into world-class forces" by midcentury. In M. Taylor Fravel's interpretation, this does not mean that the PLA must be "the single best" military but only that it must be "among the best." However, as Fravel acknowledges, "the phrase [world-class military] has never been clearly defined. Authoritative Chinese government and PLA documents lack a clear and accepted definition of the term."²⁰ Although 2049 is typically cited as the deadline for achieving this goal, Beijing's time horizon might be even shorter than midcentury. One officer states that Xi ordered the PLA to "speed up" progress toward this goal and to "become a world-class military before 2049."²¹ Regardless of the exact timeline, Xi appears to have had the PLA Navy's transformation prominently in mind. His naval parade occurred one year after the 19th Party Congress, underscoring his priority for developing the navy's world-class status. The 20th Party Congress reaffirmed these timelines.

What constitutes world-class status in practice? First, there is no substitute for naval power as the ultimate determinant of maritime power. Michael McDevitt emphasizes that China is already the "great maritime power" that both Xi and his predecessor Hu Jintao have envisioned, but the PLA Navy is not yet "commensurate with China's international standing."²² All of China's maritime superlatives, impressive as they are, do not make the PLA Navy world-class.

Some analysts consider numbers of blue water-focused warships and the order of battle when assessing the status of a navy. U.S. Defense Department

¹⁹ M. Taylor Fravel, "China's 'World-Class Military' Ambitions: Origins and Implications," *Washington Quarterly* 43, no. 1 (2020): 85–99.

²⁰ *Ibid.*, 85.

²¹ Amber Wang and Sylvie Zhuang, "China Used Water Cannon as 'Deterrence' against Philippine Ships, PLA Senior Colonel Says," *South China Morning Post*, April 29, 2024, <https://www.scmp.com/news/china/military/article/3260690/china-used-water-cannon-deterrence-against-philippine-ships-pla-senior-colonel-says>.

²² Michael A. McDevitt, *China as a Twenty-First Century Naval Power* (Annapolis: Naval Institute Press, 2020), 2.

talking points, for example, emphasize that China already has the largest navy by number of ships and submarines, with over 370 hulls and counting. Some suggest that fleet numbers matter most, and Beijing's numerical superiority confers inherent advantages.²³ PLA Navy surface combatants have more than tripled from around 50 in 1985 to roughly 160 today.²⁴

Others measure the force's progress by tonnage, linked to advances in naval technologies, which tend to require additional volume and power. During the interwar years, the Washington Navy Treaty used tonnage and gun caliber to set the ratio of capital ships among leading world navies.²⁵ The U.S. Navy still displaces far more than the PLA Navy, but tonnage alone does not account for the types of ships, sophistication of sensors, weapons, command-and-control processes, tactics, training, and logistical support that all affect a navy's combat potential.²⁶

PRC military writers consider many such points. One suggests that the PLA Navy "is still far from a first-class navy in terms of quantity and quality of weapons and equipment, total number of troops, total tonnage of ships, and level of information combat."²⁷ Another laments that the service lacks experience in the construction of ships and training, and that there is "still a long way to go before we can build a world-class navy."²⁸ Internal debate clearly persists concerning how to evaluate blue-ribbon status. While there are many ways to compare navies, what ultimately matters most is what the PRC's military leadership believes a world-class navy should be and what force it actually seeks.

Published one year after Xi directed the navy to become world-class at his 2018 review, China's 2019 defense white paper offers particularly useful insights into his related thinking and how the PLA Navy may operationalize its strategy. This publication is the most comprehensive open-source

²³ Sam J. Tangredi, "Bigger Fleets Win," *Proceedings*, January 2023, <https://www.usni.org/magazines/proceedings/2023/january/bigger-fleets-win>.

²⁴ Christopher Carlson, "China Maritime Technologies and Structures" (presentation at the U.S. Naval War College, Newport, November 3–4, 2021).

²⁵ "The Washington Naval Conference 1921–1922," U.S. State Department, Office of the Historian, <https://history.state.gov/milestones/1921-1936/naval-conference>.

²⁶ Robert McKeown, "Assessing Military Capability: More Than Just Counting Guns," *Proceedings*, December 2022, <https://www.usni.org/magazines/proceedings/2022/december/assessing-military-capability-more-just-counting-guns>.

²⁷ "外界关注中国海军——向着世界一流海军迈进" [The Outside World Focuses on China's Navy—Moving toward a World-Class Navy], in "本期特稿：中国海军开训全景大扫描——向着世界一流海军阔步前进" [Special Report: A Panoramic View of PLA Navy Military Training—Advance in Giant Strides to Build a World-Class Navy], ed. Yuan Zhenjun and Yan Jianyi, *Navy Today*, January 2018, 12–21.

²⁸ Jun Sheng, "捍卫和平筑梦深蓝" [Defending Peace and Dreaming of the Deep Blue], *PLA Daily*, April 18, 2018.

document available containing Xi's strategic vision for his military. With broad strokes, it identifies many of the objectives, missions, and capabilities he expects of his armed forces. This chapter's framework therefore draws on China's 2019 defense white paper. Following the 2015 defense white paper (and 2014 strategic guidelines), which prioritized the maritime domain, the 2019 defense white paper identifies several missions for the PLA, including many that prioritize the maritime domain.

The next section examines the ends, ways, and means of a world-class PLA Navy.²⁹ One indication that the PLA Navy has achieved its objective of becoming a top-of-the-line navy (ends) will be its ability to execute a global strategy. PRC maritime strategy (ways) has a direct impact on what the PLA Navy procures and how it trains. Maritime strategy has been consistently prioritized, funded, and implemented since 1985, when the PLA Navy received its first service-specific strategy (near seas active defense) under Deng Xiaoping. Three decades later, in 2015, Xi added a far seas protection layer. Since around the publication of the 2019 defense white paper, the PLA Navy has been pursuing a comprehensive strategy incorporating a third layer: "near seas defense, far seas protection, oceanic presence, and expansion into the two poles."³⁰ The increasingly global nature of the maritime domain for preeminent naval operations is underscored by the transitioning of the PLA Navy's strategy to include the aforementioned radiating layers of emphasis. Demonstrated capabilities to execute these missions (means) will convince the PRC leadership that it has a top-quality navy.

The Ends, Ways, and Means of a World-Class PLA Navy

A World-Class Navy's Vision (Ends)

The concept of a world-class military is nested within the 2019 defense white paper as one of the strategic efforts for the PLA to safeguard China's sovereignty, security, and development interests.³¹ Listed under the heading

²⁹ Ends are the strategic outcomes sought, including defining the overarching political aim. Means are the resources and capabilities available. Ways are how means are used to achieve the desired end state. Steven Heffington, Adam Oler, and David Tretler, eds., *A National Security Strategy Primer* (Washington, D.C.: National Defense University Press, 2019), 1–2.

³⁰ Yu Wenbing, "乘势而上建设一流军事指挥学院" [Take Advantage of the Situation to Build a World-class Military Command College], *People's Navy*, July 13, 2018, 3, cited in Ryan D. Martinson, "The Role of the Arctic in Chinese Naval Strategy," Jamestown Foundation, China Brief, December 20, 2019, <https://jamestown.org/program/the-role-of-the-arctic-in-chinese-naval-strategy>.

³¹ State Council Information Office of the People's Republic of China (PRC), *China's National Defense in the New Era* (Beijing, July 2019), https://english.www.gov.cn/archive/whitepaper/201907/24/content_WS5d3941ddc6d08408f502283d.html.

“Continuing to strengthen the military in the Chinese way,” the concept of a top-tier military is one of the PLA’s three benchmark developmental goals. It is identified as the third goal, behind achieving mechanization by 2020 and completing modernization by 2035.³² While the first two goals address modernization milestones, this third goal calls for PLA “transformation,” which is more than simply a linear continuation of advancing technological strengths. PLA writings suggest this “world-class” goal is tied to both technological development and the navy’s capability to execute specified missions.

Two months after Xi Jinping first called for “transform[ing] the military into world-class forces,” Admiral Shen Jinlong (the PLA Navy commander from 2017 to 2021) delivered an internal speech explaining how to make the navy an unsurpassed service.³³ He addressed a conclave of senior PLA Navy leaders gathered to study how to implement the vision of the 19th Party Congress. Shen’s statements provide some of the clearest insights into leadership thinking about Xi’s transformational objectives, articulating several important characteristics of an outstanding navy.

The first quality Shen addressed was China’s need for a navy with global strategic influence. Shen’s obligatory rejection of “global hegemony” allows for limited use of naval force overseas as a strategic scalpel advancing China’s strategic interests. A 2023 journal article published by the PLA’s Academy of Military Science (AMS) elaborates on this characteristic. According to the article, a world-class navy should amplify China’s international voice and contribute to influencing the shape of international maritime governance, deter and stop wars, stabilize and control international tensions, and show China’s willingness to demonstrate strategic support to the world.³⁴ This supplemental context to Shen’s statements suggests that a world-class navy is far more than a symbolic overseas presence. Instead, a navy with global strategic influence is one that can be used to project combat power overseas to “fight and win local regional wars that could occur at sea.”³⁵

³² State Council Information Office (PRC), *China’s National Defense in the New Era*.

³³ “深入贯彻党的十九大精神——统筹和推进新时代海军转型建设” [Deeply Implementing the Spirit of the 19th Chinese Communist Party National Congress—Coordinating and Promoting the Transformation and Construction of the Navy in the New Era], *People’s Navy*, December 13, 2017; and “深入贯彻党的十九大精神——坚持从思想上政治上建强海军” [Thoroughly Implement the Spirit of the 19th Chinese Communist Party National Congress—Persist in Building a Strong Navy Ideologically and Politically], *People’s Navy*, December 13, 2017.

³⁴ Liu Liqiao and Jia Benjia, “‘全面建成世界一流海军’的理论逻辑, 历史逻辑与实践逻辑” [“Building a World-Class Navy in a Comprehensive Way”: Theoretical Logic, Historical Logic, and Practical Logic], *Military History* 3 (2023): 6–8.

³⁵ *Ibid.*

Next, Shen focused on integrated sea control—one of the PLA Navy’s main efforts, which he considered essential for naval preeminence. He explained that “if we cannot control the sea, we are controlled by the sea.”³⁶ Shen’s speech did not address the specific parameters wherein China’s navy should be capable of exercising sea control. The PLA Navy, however, has underscored that its goal within the first island chain is “sea control.” This means being able to operate at will in a given area for a given period of time while preventing the adversary from doing so.³⁷ Authoritative PLA authors affirm this objective. Some describe the tactics the PLA Navy will use to establish sea control as “integrated near seas operations,” which are defined as “having the ability to seize and maintain control over the main waters of the near seas.”³⁸

The U.S. Navy is the benchmark the PLA Navy uses to measure its progress toward this objective. A 2018 article in the AMS journal *China Military Science* focused on contestation with the U.S. Navy in and around the near seas, declaring that “the PLA Navy should not only be more powerful than the world’s most powerful navy, but also *prevent* the powerful navy from engaging in maritime disputes” (*italics added*).³⁹ A more recent AMS article highlights China’s geographic proximity to the near seas and calls for a world-class navy to “fixate on the Strong Enemy opponent” and to “focus on fighting and winning wars.”⁴⁰ Taken in conjunction with Shen’s call for sea control, these statements suggest that a world-class navy is one that can establish sea control in disputed areas—the near seas and their western Pacific approaches—and that this criterion of success is squarely focused on competition for sea control with the U.S. Navy.

Beyond the western Pacific, the combat power required to establish sea control would likely vary situationally. Shen’s comments about global influence and those of other PLA authors about deterring and halting wars overseas may suggest a focus on deterring the maritime activities of potential

³⁶ “深入贯彻党的十九大精神——统筹和推进新时代海军转型建设”

³⁷ The *PLA Dictionary of Military Terms* defines “sea control” as “command of the sea,” which means “the right to control a certain sea area within a certain period of time during combat” and which “depends on corresponding control of the air.” To achieve this goal, “the navy is usually the main force, with the cooperation of other military services/branches.” No definition is provided for “sea denial.”

³⁸ Yu Lingling, Feng Jinbo, and Liu Zhihao, “毛泽东海军建设运用思想探要” [Mao Zedong Thought on Building and Employing Naval Forces], *China Military Science* 6 (2023): 52.

³⁹ Liu Lijiao and Chen Wenhua, “改革开放以来海军战略理论的发展及经验启示” [Theoretical Development of Naval Strategy since Reform and Opening Up and Its Historical Implications], *China Military Science* 6 (2018): 59–65.

⁴⁰ Liu and Jia, “‘全面建成世界一流海军’的理论逻辑, 历史逻辑与实践逻辑,” 6–8.

adversaries. The PLA Navy must be the strongest force present so that it can influence the behavior of other lesser maritime forces.

A third characteristic of an elite navy, according to Shen, is technological innovation. While militaries typically attempt to integrate advanced technologies, Shen believed that today's cutting-edge technologies will enable the PLA Navy to "solve" existing weaknesses. It faces a "historic opportunity" to "seize the high ground" in strategic competition by harnessing such innovation. Shen viewed mastering intelligitized warfare—shaped centrally by the integration of artificial intelligence (AI)—as enabling China to outcompete the United States in such technological fields as the Internet of Everything and smart manufacturing.⁴¹

Other PLA authors echo Shen's emphasis on the need for a world-class navy to integrate such technologies. One author states that the "key to victory is achieving intelligent combat dominance through precise attacks and defenses, with weapons and systems that mix man and machine, with those that are unmanned being dominant, and combat units that are agile and can autonomously reconstruct themselves."⁴² Other authors are even more explicit. Two even claim that mastering AI will provide the PLA Navy with the opportunity to "leapfrog" its U.S. counterpart.⁴³

In incorporating such technologies, however, the PLA Navy is charting a unique course. In the context of a discussion about the history of world-class navies, one PLA author opposes merely emulating other navies: "to build a first-class navy, it is necessary to break through traditional habitual thinking [and] firmly establish the concept of innovation, foresight, and transcendence."⁴⁴ From this perspective, building a world-class navy requires the PLA Navy to innovate uniquely and leverage these technologies to achieve its objectives.

⁴¹ "深入贯彻党的十九大精神, 统筹推进新时代海军转型建设——沈金龙在海军军以上领导干部学习贯彻党的十九大精神理论集训上的辅导讲话" [Thoroughly Implement the Spirit of the 19th Party Congress, Plan and Promote Transformational Construction for the Navy in the New Era—Shen Jinlong's Guidance Speech at the Theoretical Training for Navy Leadership Cadres (Officers) at the Corps and Above Levels to Study and Implement the Spirit of the 19th National Congress of the Chinese Communist Party], *People's Navy*, December 13, 2017.

⁴² Liu and Jia, "'全面建成世界一流海军' 的理论逻辑, 历史逻辑与实践逻辑."

⁴³ "责任编辑虞章才责任校对李国强 为伸么海军转费在必行?" [Why Is the Transformation of the Navy Essential?], *People's Navy*, July 6, 2018, 3.

⁴⁴ Zhuang Congyong, "世界一流海军发展的理论轨迹——美俄等主要海军强国建设海军的经验与启示" [Theoretical Trajectory of the Development of a World-class Navy: The Experience and Inspiration of the Construction of the Navies of Major Naval Powers such as the United States and Russia], *PLA Daily*, November 28, 2017, <http://military.people.com.cn/n1/2017/1128/c1011-29672189.html>.

A World-Class Navy's Missions (Ways)

Shen Jinlong's calls for the PLA Navy to achieve global influence, develop integrated sea control, and capitalize on technological innovation constitute its broad objectives. Global influence and sea control appear to be mission-oriented objectives—indicative of a navy enabled by advanced technologies to execute diverse tasks at multifarious locations. PRC authors highlight concerns about building a navy without mission focus. One author describes China's previous ship construction practices as akin to launching "dumplings" in the water aimlessly.⁴⁵

Recognizing rudder requirements, Shen explained that Xi Jinping's call to "comprehensively build a world-class military" reflects the need to expand naval development from a "capability-based" approach to a "needs-based" approach.⁴⁶ That is, the PLA Navy needs to shift to building a fleet equipped with platforms and weapon systems designed for the missions assigned. A Naval Research Institute author indicates that the navy's role is shifting from performing a single task and responding to traditional maritime threats to performing diversified tasks and responding to complex maritime threats.⁴⁷ Such statements clarify that the PLA Navy must be operationally focused on assigned missions and tasks to guide its development. The future capabilities—the means of strategy—that it is likely to develop are those that will enhance its capabilities to execute these missions.

The 2019 defense white paper summarizes the PLA Navy's missions. The document identifies numerous strategic "ways" for the PLA to support the strategic end state of safeguarding PRC sovereignty, security, and development interests.⁴⁸ These include "ways" consistent with many nations' defense aims, such as deterring and resisting aggression; safeguarding national sovereignty, maritime rights, and space, cyber, and overseas interests; and promoting sustainable development. Also included are ways unique to China, such as opposing and containing "Taiwan independence." The 2019 defense white paper expounds on several of these ways to support the PLA's strategic end state.

The third section, "Fulfilling the mission...of China's armed forces in the new era," describes what missions the PLA must fulfill and how the military must prepare itself to execute them to achieve the PLA's strategic

⁴⁵ Jun, "捍卫和平筑梦深蓝"

⁴⁶ "深入贯彻党的十九大精神——统筹推进新时代海军转型建设"

⁴⁷ Naval Command College, "建设一支强大的人民海军,寄托着中华民族向海图强的世代夙愿,是实现中华民族伟大复兴的重要保障 牢牢把握全面建成世界一流海军的时代内涵"

⁴⁸ State Council Information Office (PRC), *China's National Defense in the New Era*.

end state. The missions identified in this section repeat missions identified earlier in the white paper, underscoring their importance. This includes elaboration of the PLA’s roles beyond PRC-controlled borders: addressing sovereignty issues, protecting overseas interests, and conducting disaster relief and rescues. Mission operationalization is also explicated. The PLA will develop the capabilities to execute these missions by maintaining combat readiness, training in realistic combat conditions, and advancing its cyber, space, and nuclear capabilities—critical force enablers. **Table 1** summarizes these missions and the requirements to execute them. Taken together, the third section of the defense white paper prescribes how China’s military will progress toward achieving its world-class goal. These missions and the training necessary to fulfill them hold significant implications for the PLA Navy’s transformation and its development of combat and operational capabilities.

The prescribed missions exemplify Shen’s vision for an outstanding navy. Missions to protect China’s overseas interests, which have expanded under Xi’s signature Belt and Road Initiative, and to conduct disaster relief

TABLE 1 World-class naval missions

Mission	Requirements
Safeguard national territorial sovereignty and maritime rights and interests	• Defend waters, islands, and reefs in the East and South China Seas • Acquire full situational awareness of adjacent waters • Conduct joint rights protection and law-enforcement operations • Respond to security threats • Safeguard national unity
Protect China’s overseas interests	• Build far seas forces • Develop overseas logistical facilities • Enhance capabilities to conduct diversified military tasks • Conduct vessel protection operations • Maintain the security of strategic sea lines of communication • Execute overseas evacuation and maritime rights protection operations
Participate in disaster rescue and relief	• Transport materials • Conduct specialized operations such as search and rescue • Control major threats

SOURCE: State Council Information Office (PRC), *China’s National Defense in the New Era*.

operations align with Shen's goals for the PLA Navy's global influence. Safeguarding national territorial sovereignty and maritime rights and interests requires sea control. Harnessing advanced cyber, space, and nuclear technologies underpins all these missions and dovetails with Shen's goals for technological innovation. Development of these capabilities enhances combat preparation and readiness. The consistency between Shen's characterization of a leading navy and the attendant missions just one year after Xi's call for a world-class PLA in the 19th Party Congress work report suggests that his service's ability to execute these missions represents the benchmark to evaluate the PLA Navy's progress toward becoming world-class. Moreover, these missions chart a clear course, providing the navy with the guiding framework for its training, construction, and development.⁴⁹

A World-Class Navy's Capabilities (Means)

Transforming the PLA Navy into a world-class force requires both the necessary hardware and the tactical proficiency to employ it to execute the missions mandated in the 2019 defense white paper. Each mission requires different combinations of platforms, equipment, experience, and prowess. Evaluating the PLA Navy's progress, therefore, requires data derived from each of these variables.

A qualitative comparison of general mission-specific technologies elucidates hardware progress. Driven by Beijing's maritime strategy, PLA Navy capabilities have advanced tremendously over the past two decades, with far seas operations driving the acquisition and deployment of many platforms and systems.

By contrast, information concerning ship readiness and crew proficiency remains sparse. Specific details, such as communications difficulties, failures encountered, and crew coordination issues are rarely included in available reporting about PLA Navy tactical training evolutions. This makes it particularly difficult to evaluate the proficiency of a ship or its crew to execute tactical assignments or to accurately strike targets at range. Yet, even though the required information to evaluate proficiency is opaque, the core capabilities necessary to achieve mission success are often intuitive. The PLA Navy's proficiency to achieve these core capabilities can thus be extrapolated from observations of its order of battle, platform characteristics, and operations.

⁴⁹ Xiao Tianliang, ed., 战略学 [Science of Military Strategy] (Beijing: PLA National Defense University Press, 2020), 358–69.

Inferring the full extent of PLA Navy possibilities for the distant 2049 horizon from guidance grounded in the 2019 defense white paper requires an authoritative standard to measure the force's progress toward achieving premier status. Unfortunately, open-source literature does not provide a rubric to pinpoint progress. Moreover, with the desire to surpass the U.S. Navy, the PLA Navy's own criteria will be different from those criteria used by other nations to evaluate progress. Nonetheless, knowing the PLA Navy's developmental goals provides some context. Further insights can be gleaned from Chinese military journal articles describing areas of emphasis or operational challenges the PLA Navy is working to address. In sum, given these constraints on outside assessments of its progress toward world-class status, an informed, albeit subjective, evaluation of the PLA Navy's capability to execute the missions required to achieve world-class status is more realistic.

Evaluation of Mission Capabilities and Progress toward World-Class Status

The capability to execute the missions identified in the 2019 defense white paper is the yardstick by which the PLA Navy measures its progress toward world-class status. While the ability to execute each of these missions contributes to perceptions of progress toward maritime preeminence, the sequence of their listing may suggest the PLA Navy's priorities. The mission to safeguard China's national territorial sovereignty and maritime interests is identified at the outset of the section in the white paper detailing the PLA's requirements to fulfill its missions and tasks. It is logically listed first, indicating the primacy of this mission. The prerequisites for execution—synchronization of combat power, communications, and capabilities—are the most complex and challenging. Training evolutions suggest that the PLA Navy routinely conducts “high-intensity, and realistic combat training” to develop the proficiency to execute this mission to become a “world-class navy.”⁵⁰ While sovereignty issues extend to the East and South China Seas, the most challenging campaigns concern Taiwan. PLA Navy ships and aircraft routinely train to achieve this mission, which is the source of extensive PLA scholarship. Depending on the situation, a Taiwan campaign

⁵⁰ “外界关注中国海军——向着世界一流海军迈进。” For a discussion of training evolutions, see Fan Pengyu et al., “海军某护卫舰支队组织多课目实战化训练” [A Frigate Detachment of the Navy Organizes Multi-Course Combat Training], China Military TV, October 7, 2021, http://www.js7tv.cn/video/202110_259349.html.

could require the PLA Navy to establish sea control, deny access to an enemy, project power, and provide sealift, among other tactical requirements. The complexity of this mission is second only to executing major combat operations in the far seas.

PLA Navy tactical requirements regarding Taiwan differ by contingency. Requisites for a joint island-landing campaign differ from those for a joint blockade campaign/quarantine action or a joint firepower-strike campaign.⁵¹ A common necessity is the capability to establish sea control, which Shen Jinlong highlighted as defining a world-class navy. While sea control is only one characteristic of a world-class navy, it is one of the most difficult tasks to perform in a contested environment, such as during a Taiwan campaign or any sovereignty-related mission. Capabilities to execute sea control, therefore, indicate not only the potential for mission success but also the PLA Navy's progress toward becoming the navy Xi Jinping seeks. Evaluating progress toward this objective, therefore, yields insight into its progress toward becoming world-class.

Long-range ship-launched surface-to-surface missiles such as the YJ-18, ship-launched anti-ship ballistic missiles (ASBMs) such as the recently developed YJ-21, and the PLA Rocket Force's and PLA Air Force's ASBMs are weapons China's military could employ to concentrate firepower in specific sea areas in an attempt to deny access to portions of the western Pacific and achieve sea control. Weapon system capabilities alone do not guarantee proficiency in establishing sea control.⁵² The ability to concentrate firepower at a time and place of one's choosing, however, represents a significant step toward establishing sea control.

Analysis of the naval exercise the PLA conducted in response to the visit to Taiwan by House Speaker Nancy Pelosi in August 2022 offers a case study elucidating the PLA Navy's proficiency in denying water space as a step toward establishing sea control. While the uncontested exercise did not occur during war, the PLA termed these "joint combat training exercises" focusing on preparing methodically for "joint blockade, sea target assault," among other operations.⁵³ Given the incentives to blur training operation

⁵¹ Zhang Yuliang, ed., 战役学 [Science of Campaigns], 2nd ed. (Beijing: National Defense University Press, 2006). This is the most authoritative source available, but its coverage reflects its lack of updating in nearly two decades: "Landing Campaign," 310–29; "Joint Blockade Campaign," 292–309; and "Second Artillery Conventional Missile Assault Campaign," 629–36.

⁵² Moreover, other forces also support sea denial, such as via multifarious anti-ship missiles launched from various platforms. Notably, some naval aviation is being transferred to the PLA Air Force, which likewise is responsible for long-range maritime strike missions.

⁵³ Bonny Lin et al., "Tracking the Fourth Taiwan Strait Crisis," Center for Strategic and International Studies, ChinaPower, <https://chinapower.csis.org/tracking-the-fourth-taiwan-strait-crisis>.

distinctions and reduce warning time, this suggests that these exercises might closely resemble wartime deployments or operations.

The exercise conducted after Pelosi's visit was larger and closer to Taiwan than previous PLA drills, including during the 1995–96 Taiwan Strait crisis.⁵⁴ The integrated firepower capabilities demonstrated suggest PLA efforts to control the sea by holding adversary surface forces in a chosen area at risk. At the peak on August 7, seven closure areas were announced and fourteen PLA Navy ships were detected operating near Taiwan.⁵⁵ The closure areas themselves are a strategic tool to deny access to specific water space during peacetime. This example shows that the PLA Navy needs to function within a joint team to achieve coercive effects—as it did here. With part of the training focused on executing a blockade, ships were likely distributed along major shipping channels rather than positioned around the island evenly. Nevertheless, the fourteen participating surface ships, as well as at least one submarine, would enable the PLA Navy to have overlapping, redundant anti-ship cruise missile coverage to target surface ships around Taiwan's entirety.⁵⁶ This scenario assumes omniscient command, control, computing, communications, cyber, intelligence, surveillance, reconnaissance, and targeting (C5ISRT). Concentration of such firepower more narrowly would further enhance sea-denial capabilities. Surface-to-air missile (SAM) coverage would not be nearly as dense, but the inclusion of PLA Air Force aircraft in the exercise suggests they theoretically could have been employed to complement PLA Navy surface-to-air capabilities.

Establishing sea control requires undersea control. Major PLA Navy destroyers and frigates, which likely participated in the exercise, are armed with Yu-8 torpedoes. These weapons can be vertically launched and fly approximately twenty nautical miles airborne before traveling an additional six to eighteen nautical miles submerged.⁵⁷ Shang-class nuclear-powered submarines also carry other torpedo variants (e.g., Yu-6, Yu-9, Yu-10, or Yu-12).⁵⁸ The density of antisubmarine warfare capabilities present in the exercise likely was insufficient to establish control of the entire undersea domain. In a real contingency, however, the PRC would presumably

⁵⁴ Lin et al., "Tracking the Fourth Taiwan Strait Crisis."

⁵⁵ Ibid.

⁵⁶ Distances have been calculated using Google Earth.

⁵⁷ "Yu-8/CY-5 Rocket-Assisted ASW Weapon," Janes, July 25, 2023, https://customer.janes.com/display/JNW_0062-JNW_.

⁵⁸ Manfred Meyer, *Modern Chinese Maritime Forces*, 2nd ed. (Springfield, VA: Admiralty Trilogy Group, 2024), 21.

augment its undersea warfare capabilities with subsurface platforms and seabed weapon systems.

The August 2022 exercise demonstrated that the PLA Navy has sufficient platforms and embarked weapon systems to deny water space around Taiwan, at least in uncontested conditions. Yet, while the force is theoretically capable of denying sea areas as a step toward establishing sea control, its proficiency with the necessary C5ISR networks to synchronize efforts remains unknown in available open sources. Future PLA Navy investments may prioritize developing systems and technologies that help ensure that ships and crews are equipped and trained on networks and information systems to ensure synchronization to enhance sea control capabilities. This exercise also suggests that PLA Navy warships could require longer-range SAMs for air defense, mitigating the need for complicated air support from the PLA Air Force. Longer-range SAMs and greater magazine depth would be especially helpful when the navy operates outside the air force's air defense coverage. The development of ship-based SAMs capable of ranging well beyond existing performance parameters, therefore, may be necessary to support efforts to establish control of the sea during deployments farther from China.

The 2019 defense white paper's second mission is protecting overseas stakes—security, rights, and the interests of PRC citizens, institutions, and investments. This mission has profound implications for the PLA Navy. China's national interests are rapidly expanding at home and abroad. PLA scholars emphasize the country's tremendous reliance on seaborne trade,⁵⁹ which currently constitutes approximately 90% of its trade by volume and 60%–70% by value.⁶⁰ Moreover, millions of PRC citizens work overseas in virtually every country. “Wherever our ships sail, our warships should go,” a scholar at the Naval Research Institute declares. “Wherever our overseas interests expand, our people's navy should be there.”⁶¹ PRC officials and scholars appear to envision a navy with a larger far seas footprint, with more ships being deployed wherever China's national interests face threats.

The PLA Navy appears to consider limited combat operations a potential requirement for protecting China's interests abroad in the far seas. PLA writings describe “far seas mobile operations” as designed to protect sea

⁵⁹ “责任编辑虞章才责任校对李国强 为伸么海军转费在必行?”

⁶⁰ “Maritime Profile: China,” UN Commission on Trade and Development, April 11, 2024, <https://unctadstat.unctad.org/CountryProfile/MaritimeProfile/en-GB/156/index.html>.

⁶¹ “责任编辑虞章才责任校对李国强 为伸么海军转费在必行?”

lines of communication and safeguard China's equities overseas.⁶² Authors of recent PLA journal articles suggest that the intent of these operations is to damage or attack enemies' key strategic passages and lines of communication rather than to contest a peer competitor.⁶³ Depending on the scope of the objective, the PLA Navy could execute such operations to advance limited objectives armed with existing capabilities. As China's naval fleet grows, its capabilities continue to improve to conduct such operations.

Avoiding major contingencies that do not involve its vital interests enables the PLA Navy to advance the primary end state it is tasked to support elsewhere. This allows it to focus its efforts on amassing capabilities necessary for Taiwan or other near seas contingencies while simultaneously projecting power around the world unencumbered by conflict. An article in *China Military Science* argues that future overseas missions will be oriented more toward diversified non-war maritime missions such as countering maritime terrorism, piracy, crime, and natural disasters.⁶⁴ Examples of such operations include China's noncombatant evacuation of citizens of the PRC and ten other countries from Yemen in April 2015. Similarly, the PLA Navy's forward presence enabled the PRC to evacuate over 1,300 PRC citizens from Sudan in April 2023, albeit in a permissive environment hundreds of miles away from the actual fighting.⁶⁵ Other PRC authors describe the need for this expanded footprint to support these missions. PLA Navy commander Shen Jinlong and political commissar Qin Shengxiang declare that China's world-class navy will have "new" aircraft carrier formations and amphibious forces capable of responding to maritime security threats."⁶⁶ This unprecedented reference suggests deployments beyond current operational norms and may indicate that China intends to deploy these large decks overseas.

⁶² Xiao Tianliang, ed., *战略学* [Science of Military Strategy] (Beijing: National Defense University Press, 2015), 342. The revised 2020 edition of this volume removed the content about "expelling the enemy from the near seas" and the particular threats posed by the "powerful enemy," presumably because it was judged too sensitive. See Xiao, *战略学* (2020), 362–63.

⁶³ Feng Jinbo and Yu Lingling, "毛泽东关于海军建设论述探要" [An Exploration of Mao Zedong's Discourse on Naval Construction], *Political Work Journal* 12 (2023): 8–9. For a discussion of this operational concept, see Ryan Martinson, "On the PLAN's 'Core Operational Capabilities,'" China Maritime Studies Institute, CMSI Note, no.9, August 22, 2024, <https://digital-commons.usnwc.edu/cmsi-notes/9>.

⁶⁴ Liu and Chen, "改革开放以来海军战略理论的发展及经验启示."

⁶⁵ Guo Yundan and Xu Yelu, "PLA Naval Vessels Evacuate More Than 1,300 Chinese and Citizens of 5 Other Countries from Sudan," *Global Times*, April 27, 2023, <https://www.globaltimes.cn/page/202304/1289902.shtml>.

⁶⁶ "海军司令员沈金龙海军政治委员秦生祥" [PLA Navy Commander Shen Jinlong and Political Commissar Qin Shengxiang], *Navy Today*, April 2018; "人民海军: 扬帆奋进70年" [The People's Liberation Army Sailing for 70 Years], *Navy Today*, April 2018; and *Qiushi*, no. 8 (2019).

Similar to how sea control is required to defend China's national sovereignty and its maritime claims, port access underpins the scope of global navy operations. Given that ports are necessary for provisioning, repair, and maintenance, the 2019 defense white paper emphasizes overseas access in discussing far seas operations. Specifically, it highlights the Djibouti support base, with its maintenance and medical offerings, as the type of facility needed to sustain these global operations.⁶⁷ While facilities like Djibouti and the recently constructed piers at Ream Naval Base in Cambodia are two models for potential logistics support facilities, pier space at commercial port facilities may meet many PRC needs.

The PLA Navy's larger worldwide footprint presages an increase in the number of comprehensive resupply ships to support sustained operations. These vessels routinely accompany the navy on deployments to the Gulf of Aden and support its training evolutions in the Philippine Sea. Crews must become proficient with tactical ship-to-ship resupply requirements. Navigating approaches to a resupply ship, connecting fuel lines, and station-keeping are skills that crews must master to operate routinely worldwide. Vessel training centers have integrated underway training replenishment simulators, which enable crews to master ashore manifold weather, times, and refueling formations as part of training required to certify vessels as deployable.⁶⁸ To routinely deploy to more locations around the world to protect the diversity of the PLA's global strategic interests, the PLA Navy is likely to require additional comprehensive resupply ships while continuing to routinely train its crews in proficient ship-to-ship resupply. The existing capacity of such platforms, however, allows the PLA Navy to operate along limited strategic sea lines of communication for protracted periods. Such capabilities align with the requirement to conduct the "far seas mobile operations" described by PLA authors, suggesting that the PLA Navy could be on track to be capable of this mission—a prerequisite for becoming a world-class navy.

The third mission and task listed in this section of the 2019 defense white paper is for the PLA to participate in humanitarian assistance and disaster relief (HADR). This mission primarily addresses aid regarding domestic disasters such as earthquakes, floods, and epidemics. However, it also is suggestive of military maritime roles overseas. For the PLA Navy,

⁶⁷ State Council Information Office (PRC), *China's National Defense in the New Era*.

⁶⁸ Zou Xiangmin, Zhu Minyu, and Wang Lei, "舰艇海上补给仿真训练系统投入使用" [Simulation Training System for Naval Replenishment Put into Use], Tencent QQ Net, October 14, 2022, <https://mp.weixin.qq.com/s/Wyiu1xWFRGw6czcq0YoRw>.

executing this mission also effectuates its assignment to protect overseas interests as disasters threaten them.

Expeditionary capabilities are a critical component of international HADR efforts. PLA Navy Marine Corps deputy chief of staff Chen Weidong outlined plans to increase low-intensity non-war military tasks for amphibious forces, including forward presence, maritime deterrence, chokepoint control, escort operations, and overseas defense.⁶⁹ These undertakings are not only near seas but also far seas requirements: expeditionary operations include forward deployment to hot spots and “key points overseas.”⁷⁰ This indicates that China’s naval footprint may soon consist of regular expeditionary force deployments capable of responding to multifarious contingencies, both proximate and global.

What, then, might the PLA Navy become by 2035, the time by which Xi mandates its modernization to be essentially completed? McDevitt emphasizes that China already has the world’s second-strongest blue water navy.⁷¹ “China wants to be able to compete effectively against the best.... A world-class PLA would be able to achieve the CCP’s political objectives, especially in the face of armed resistance from the United States,” he explains. He adds that “Beijing is not looking to fight any foe at any time anywhere” but rather “to have an unsurpassed military advantage in contingencies it assesses it may face.”⁷²

McDevitt foresees a PLA Navy “with global expeditionary capabilities, mimicking the United States in certain aspects in the Indian Ocean region, but...also maintain[ing] an overwhelming regional force reminiscent of Imperial Japan’s on the eve of World War II.”⁷³ Unless China somehow unifies Taiwan, freeing up military resources for an extraregional focus, Fravel’s projection seems likely to hold: “the greatest near- to mid-term challenge for the United States is not the global presence of the PLA, but a PLA with world-class capabilities that becomes the dominant military in East Asia.”⁷⁴ Beyond the PRC’s domestic demands and potential progress in addressing prioritized sovereignty claims, the next most consequential variable for protracted global PLA Navy capabilities is overseas access and

⁶⁹ Chen Weidong, “透视两栖作战新特点” [A Perspective on the New Characteristics of Amphibious Operations], *People’s Navy*, October 8, 2021.

⁷⁰ *Ibid.*

⁷¹ McDevitt, *China as a Twenty-First Century Naval Power*, 67.

⁷² *Ibid.*, 177–78.

⁷³ *Ibid.*, xi.

⁷⁴ Fravel, “China’s ‘World-Class Military’ Ambitions,” 97.

basing. This is a force multiplier increasing presence and response options in distant seas more than any conceivable fleet growth.

Conclusion: Sailing Vast Oceans, Destination Unclear

This chapter has examined Xi Jinping's concept of a world-class navy, reviewing where it sits within China's overall military strategy and how it supports China's military objectives. The chapter defines how this concept applies to the PLA Navy, focusing on a 2017 speech by its then commander Admiral Shen Jinlong detailing his vision for a prime-grade navy. Shen focused on missions that determine the capabilities necessary. The 2019 defense white paper defines several of these missions and thus is a useful guide for identifying the capabilities and priorities the PLA Navy will likely pursue. To ascertain the force's progress in becoming second to none, the chapter subsequently evaluated the navy's current capabilities to execute these missions. In doing so, the chapter has examined ends and ways extensively, while means are addressed in the hardware component of capabilities. Using observed tactics to evaluate proficiency concretely is particularly challenging with open-source materials and merits further research. This study reveals that the PLA Navy is steadily converging with the U.S. Navy structurally but has been tasked to surpass the U.S. Navy in assigned missions.

The PLA Navy appears to measure progress toward achieving world-class status using criteria related to the capability to effectively execute the missions specified in the 2019 defense white paper, including safeguarding national territorial sovereignty and maritime rights and interests, protecting China's overseas interests, and providing HADR. Observed naval operations and a review of PLA literature suggest that the PLA Navy devotes the preponderance of its efforts toward achieving the first two missions and places somewhat less emphasis on fostering the capabilities necessary for HADR. This, along with the sequence in which missions are listed in the defense white paper, could be indicative of their relative priority and the possibility that the PLA Navy could achieve world-class status in some areas well ahead of others. Nevertheless, on balance, these imperatives will likely dictate ship construction, tactics, training, and operations for the next several decades. The ability to execute missions likely correlates with observable PLA Navy order of battle, platform capabilities, crew proficiency, and operations. While the PLA Navy already has many of the platforms and weapon systems necessary to conduct these missions, further training and

experience operating overseas are likely required to achieve Xi's ambitious goals for naval preeminence.

Execution of these missions portends a dramatic increase in the number of far seas naval deployments over the next several years in order to protect China's global interests. Near seas training will likely focus on achieving sea control and warfighting through simulated combat conditions, improving coordination among platforms, and experimenting with command and control. The PLA Navy has begun building expeditionary capabilities for diversified operations throughout the near and far seas. A world-class navy is not guaranteed, however.

China might already be pursuing a somewhat different path from the United States regarding sea control and power projection. A case in point is China's Type 055 Renhai-class cruiser. The extraordinary firepower available for its 112 vertical launching system cells, including YJ-21 ASBMs,⁷⁵ could enable Beijing to sidestep future debates regarding whether the carrier should be the sea control capital ship by emphasizing the anti-ship capabilities of its escorts. But there is no guarantee that the path the PLA Navy takes will lead to its objective. Innovating with advanced technologies to build a more potent force will be a key enabler for the navy to achieve the status it seeks. Export controls or other efforts to limit high-tech transfer to the PLA could hamper the PLA Navy's efforts to become world-class.

Similarly, deliberate actions that compromise capabilities to execute tasks envisioned may instill doubt about the PLA Navy's progress toward world-class transformation. While the navy is rapidly developing the weapon systems and capabilities it needs to establish sea control in the near seas and western Pacific, it could lack the C5ISRT capabilities necessary to present an integrated real-time threat under the fog of war. The U.S. Navy's sustained physical presence in waters close to China during peacetime or its manipulation of PLA perceptions concerning the location of U.S. warships at strategic locations in wartime may cause PLA Navy leadership to question its ability to establish sea control given the inability to deny targeted water space. In addition, a more robust military response than anticipated to a PRC military action could instill further doubt about the PLA Navy's ability to establish sea control. Requirements for overseas port access represent a critically vulnerable rate-limiter for sustained global operations. Targeted collaboration with receptive nations to thwart the PLA Navy's access may help prevent the force from gaining the supportive experience it needs to

⁷⁵ Minnie Chan, "Chinese Navy Shows Off Hypersonic Anti-Ship Missiles in Public," *South China Morning Post*, April 20, 2022, <https://www.scmp.com/news/china/military/article/3174946/chinese-navy-shows-hypersonic-anti-ship-missiles-public>.

operate globally at the highest levels. Port-related weaknesses could also help slow China's transition to more regular overseas deployments. Finally, HADR is among several potential tasks for PLA Navy expeditionary forces. As expeditionary forces operate farther from China, they will gain confidence in their ability to execute HADR and other non-wartime tasks. The persistence of near seas requirements for these forces, such as to support PRC claims in the South China Sea or respond to a Taiwan contingency, could help calibrate the pace of development of naval capabilities for this mission, degrading Beijing's confidence in expeditionary force capabilities.

Beijing's perceptions concerning the PLA Navy's status can still be influenced by agile, credible U.S. and allied policies. All indications, however, are that the PLA Navy is on track to be capable of executing some of its assigned missions well ahead of Xi's midcentury transformational goal—allowing it to demonstrate progress toward claiming world-class status.

EXECUTIVE SUMMARY

This chapter reviews stated requirements for the PLA Air Force's and PLA Rocket Force's conventional forces to become "world-class" and assesses their progress and ongoing challenges.

MAIN ARGUMENT

Requirements for the PLA Air Force and conventional PLA Rocket Force to achieve world-class status are not well-defined. Concepts that provided the most detail about goals and standards include the strategic air force concept for the PLA Air Force and the three core standard requirements for the PLA Rocket Force. According to these criteria, the goal of world-class status is a work in progress for both services. For the PLA Air Force, a force-wide generational modernization of combat aircraft and the arrival of key enabler aircraft increasingly fulfill some desired capabilities of a strategic air force. Its impressive surface-to-air missiles and perhaps some beyond-visual-range air-to-air missiles can be considered leading capabilities. But struggles with hardware, along with personnel issues, training, "peace disease," and corruption, remain challenges. The PLA Rocket Force is closer to world-class status. It has no immediately comparable competition and has invested decades into amassing a quiver of long-range, accurate, and increasingly survivable missiles. However, the force likely still faces persistent challenges with corruption, joint and integrated operations, and personnel and leadership issues.

POLICY IMPLICATIONS

- Both services have transformed their hardware (weapons and equipment) in recent decades. But the thorny issues of maximizing human talent, minimizing corruption, and grappling with training and integration for joint warfare may be key considerations as PLA leaders and analysts assess progress toward attaining world-class status.
- Given the lack of clarity surrounding near-term requirements for either service to achieve world-class status, external watchers should closely monitor both services' developments against the PLA's 2035 modernization goals.
- In a conflict in the western Pacific involving China and the U.S. in the 2027 or 2035 time frame, the PLA Air Force and conventional PLA Rocket Force would play key roles leveraging their already world-class capabilities as well as other modernizing capabilities.

Toward World-Class Air and Conventional Missile Forces: Requirements for and Progress by the PLA Air Force and Rocket Force

Cristina L. Garafola and Elliot S. Ji

This chapter reviews stated requirements for the People's Liberation Army (PLA) Air Force's and PLA Rocket Force's conventional forces to become “world-class” and assesses their progress and the ongoing challenges to reaching that status. How to assess benchmarks for achieving world-class status is challenging, given that the requirements are not well-defined for either service. We evaluated ten concepts or approaches the PLA leaders and analysts could use to enumerate attributes of a world-class force, including both service-specific and cross-service options (see the **Appendix** for more information). In other words, we hypothesized that these options could clarify what leaders expect for each force to become world-class.

Although we did not find one granular set of standards for either service or across the services, three concepts provide details about the goals for continued PLA modernization: the strategic air force concept for the PLA Air Force, the three core standard requirements for the PLA Rocket Force, and 2035 modernization goals for both services. We leveraged these three concepts to assess the progress and continued challenges facing the air and conventional rocket forces. Our sources drew from speeches by General Secretary Xi Jinping and PLA Air Force and Rocket Force service leaders; the service newspapers *Air Force News* and *Rocket Force News* (primarily dating from 2021 and 2022); PLA digital news media like *PLA Daily*; articles on PLA topics in *Xinhua*, *Qiushi*, and other state-run newspapers and official

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Chinese government sources; articles by or citing PLA Air Force Command College, PLA Rocket Force Command College, and Academy of Military Sciences researchers; and select articles published by nonauthoritative Chinese sources.

We found that world-class status is a work in progress for both services. For the PLA Air Force, a force-wide generational modernization of combat aircraft and the arrival of key enabler aircraft increasingly fulfill some desired capabilities of a strategic air force. Its impressive surface-to-air missile (SAM) forces and perhaps some beyond-visual-range air-to-air missiles can be considered leading capabilities. But some pieces of hardware, along with personnel issues, training, “peace disease,” and corruption, continue to remain challenges. The PLA Rocket Force is closer to world-class status, given that it has no immediately comparable competition and has invested decades into amassing a quiver of long-range, accurate, and increasingly survivable missiles. However, the Rocket Force likely still faces persistent challenges with corruption, equipment maintenance, joint and integrated operation, personnel and leadership, and indigenous technological innovation.

This chapter is organized into four parts. First, we identify and assess key concepts the PLA uses to describe world-class air and missile forces. Second, we evaluate each service’s progress toward achieving world-class capabilities. Third, we examine what role world-class capabilities might play in future contingencies. Last, we conclude with some thoughts about the trajectory of each service in its ambition to become world-class.

Requirements and Attributes of a World-Class Force

To begin our analysis, we identified concepts or approaches the PLA could be using to articulate what a world-class PLA Air Force and PLA Rocket Force will be capable of in the view of the civilian and military leaders of the People’s Republic of China (PRC) (see the Appendix). These concepts informed our review of broader PLA news media sources on world-class objectives, requirements, and progress. This section details our findings regarding the most relevant concepts.

Requirements for a World-Class PLA Air Force

We found key links between the PLA Air Force’s concepts for “world-class” requirements and its long-standing “strategic air force” (战略空军)

concept, which originated in 2004.¹ Official milestones for future years reference the PLA Air Force achieving strategic air force status as part of becoming a world-class air force. We found two examples of requirements specific to the air force articulated for milestone years.

The first originates from 2018 remarks by a senior PLA Air Force official, likely the then deputy commander Xu Anxiang, and lists three target dates for the force to achieve certain objectives.² By 2020, it was to “build a strategic force that integrates aviation and space power, and strike and defense capabilities” (or offensive and defensive capabilities, as this is often translated).³ This slogan is synonymous with the concept of the strategic air force approved by senior leaders in 2004. Another article elaborates that by 2020, the PLA Air Force should “basically cross the threshold of a strategic air force by 2020 [by] initially building a strategic air force architecture of ‘integrated air and space, both offensive and defensive capabilities,’ building a weapons and equipment system with fourth-generation [Western fifth-generation] equipment as the backbone and third-generation [Western fourth-generation] equipment as the bulk of the force, and continuously strengthening the system combat capability based on informatized systems.”⁴

By 2035, the PLA Air Force was to improve and modernize its “strategic capabilities.” This second step was to build on the 2020 “goals and tasks” in order to “further construct a new air force military forces system.” More than crossing the threshold of a strategic air force, the expectation was that by 2035 there would be “a significant improvement in the strategic capabilities of the air force,” although the official acknowledged that “it will take an additional period of time to fully realize the modernization of the air force’s military theory, organizational form, military personnel, and weapons and equipment, basically complete the strategic transformation of the air force, and initially build a modern strategic air force by 2035 with a higher level of

¹ Kenneth W. Allen and Cristina L. Garafola, *70 Years of The PLA Air Force* (Montgomery: China Aerospace Studies Institute, 2021).

² Chen Zhuo, “China to Create World-Class Air Force,” China Military, November 12, 2019, http://eng.chinamil.com.cn/2019special/2019-11/12/content_9673589.htm. The original Chinese-language statement cited in this article was not available, but both this and the next article date the senior PLA Air Force official’s remarks to November 2018. A Chinese-language article noted that the then deputy commander of the PLA Air Force, Xu Anxiang, provided remarks in November 2018 (likely the same official cited in the English-language article). Huang Shubo and Yu Xiaoquan, “中国空军公布建设强大现代化空军路线图” [China’s Air Force Releases Roadmap for Building a Strong, Modernized Air Force], Xinhua, November 11, 2018, http://www.xinhuanet.com/politics/2018-11/11/c_129991031.htm.

³ Chen, “China to Create World-Class Air Force.”

⁴ Huang and Yu, “中国空军公布建设强大现代化空军路线图.”

strategic capabilities.”⁵ Also of note, these 2035 modernization focus areas described for the PLA Air Force—theory, organization, personnel, and equipment—are consistent with PLA-wide objectives laid out for 2035 at the 19th Party Congress.

By 2049, the PLA Air Force was to achieve “full transformation into a world-class force.”⁶ One of the articles explains that this means “fully building a world-class strategic air force” (世界一流战略空军) and “becoming a powerful air and space force with overall strength that can support the status of a great power and national rejuvenation.”⁷ Despite the lack of an explicit space portfolio in the PLA Air Force, integration of space-based capabilities appears to remain important for achieving a world-class air force by midcentury.⁸

The second and more recent list of the two milestones comes from an August 2022 article framing the PLA Air Force’s status as benefiting from ten years of a “strong military” period, presumably referencing Xi Jinping’s tenure as general secretary beginning in 2012.⁹ Over this decade, according to the article, the PLA Air Force has already “historically crossed the threshold of the strategic air force, accelerating its progress toward building a modern strategic air force, and striving to build a world-class air force.”¹⁰ The three milestone years and goals are the following:

- By 2027, the PLA Air Force “will definitely be able to work with the entire military to achieve the centenary goal of the military’s founding as scheduled.”
- By 2035, “together with the entire military [the air force] will comprehensively modernize military theory, organizational structure of the armed forces, military personnel, and weapons and equipment, completing its strategic transformation.”

⁵ Huang and Yu, “中国空军公布建设强大现代化空军路线图.”

⁶ Chen, “China to Create World-Class Air Force.”

⁷ Huang and Yu, “中国空军公布建设强大现代化空军路线图.”

⁸ See Kenneth W. Allen, “Overview of the PLA Air Force’s Kongtian Yiti Strategy,” China Aerospace Studies Institute, December 2019, 11–14.

⁹ “乘风振翅正当时—写在中国人民解放军建军九十五周年之际” [The Time Is Right to Ride the Wind and Beat the Wings—Written on the Occasion of the 95th Anniversary of the Founding of China’s People’s Liberation Army], *Air Force News*, August 1, 2022.

¹⁰ Ibid. The article also offers that “to become world-class, you must first have a global view, a visionary character with the biggest picture in mind, and the ability to look at the world head-on.”

- By 2050, the PLA Air Force “will be fully built into a world-class air force and become a powerful air and space force capable of supporting the status of a great power and national rejuvenation.”¹¹

Together, the milestones offer useful details and context. First, at least some of the milestone years present concrete objectives for equipment modernization, such as generations of aircraft. Second, the PLA Air Force’s 2020 goal was either met or superseded by a PLA-wide goal to improve capabilities by 2027. However, the 2035 and 2049/2050 goals are largely consistent across the two lists, with both sets of 2035 objectives specifying the same key areas of needed progress—military theory, organization, personnel, and equipment.

Third, the milestones laid out are integrally connected to the PLA Air Force’s service-specific strategy concept of becoming a “strategic air force,” with its key descriptor of “integrated air and space capabilities and coordinated offensive and defensive operations” (空天一体、攻防兼备).¹² When the PLA Air Force is expected to officially achieve the status of a strategic air force is not entirely clear. Some of the milestone descriptions point to 2035 rather than the midcentury goal for becoming a world-class air force. Although not authoritative, a 2016 article by a researcher at the PLA Air Force Command College helps link the two concepts. Wang Mingliang states that due to China’s expanding national interests and the growing aerospace threats the country faces, “accelerating the improvement of the *strategic capabilities* of the air force and realizing the transformation from campaign and tactical to strategic has become the new connotation of the strategic transformation of the air force, and has become the proper essence of building a *world-class air force*” (emphases added).¹³ Wang further states that there are three tangible attributes of a world-class air force: “Building a strategic air force means building an air force with core capabilities of strategic strike, air and space defense, and strategic projection”

¹¹ “乘风振翅正当时—写在中国人民解放军建军九十五周年之际。”

¹² Wei Yao, ed. 中国空军百科全书 [China Air Force Encyclopedia], vol. 1 (Beijing: Aviation Industry Press, 2005), 57–59. See also Michael S. Chase and Cristina L. Garafola, “China’s Search for a ‘Strategic Air Force,’” *Journal of Strategic Studies* 39, no. 1 (2015): 23.

¹³ Wang Mingliang, “目标:世界一流空军” [Goal: A World-Class Air Force], *Military Weekly*, June 13, 2016, https://zqb.cyol.com/html/2016-06/13/nw.D110000zgqnb_20160613_1-12.htm.

(战略打击、空天防御和战略投送).¹⁴ Strategic and operational air and space threats from the United States inform the PLA Air Force's needed capabilities, and his discussion of strike and defense refers to advances by other militaries that require the air force to keep pace. Wang additionally states that "technology gaps, especially technology generation gaps, are more fatal to air forces [than to other services]. To construct an air force, it is necessary to maintain the advancement of equipment technology. The bottom line is not to have generation gaps."

As a result of the above streams of research, we examined a variety of PLA and PLA Air Force sources dating back to 2004 to understand whether and how recent articulations of "strategic air force" (战略空军) described that term's relationship to "world-class air force." We found references linking the development of a strategic air force to eventual world-class capability as early as 2009 (prior to Xi's leadership era) and 2013.¹⁵ *Air Force News* articles offered many descriptions of the PLA Air Force's current progress as standing on the threshold of a strategic air force on the path to world-class status.¹⁶ This emphasis was also reflected in Xi's comments and statements about a strategic air force. A 2021 *Air Force News* article notes his multiple visits to PLA Air Force facilities after the 18th Party Congress in 2012 and quotes his comments focused on the air force as "a strategic service...[that] plays a decisive role and use in national security and military strategy." He explained that "building a powerful People's Air Force that integrates air and space and with both offensive and defensive capabilities is a major mission assigned to the Air Force by the times and a necessary requirement of the new situation." Finally, he stated that the PLA Air Force should keep

¹⁴ Wang, "目标:世界一流空军." For strike specifically, the PLA Air Force needs to keep up with advancing aerospace technology trends, develop new ammunition and "new means of strike" [新质打击手段], and construct "long-distance information networks." It should also improve "far seas combat training...and develop new strike platforms...so as to form and enhance far-sea and far-area strike capabilities as soon as possible." Other components include building a "mutually assured strike in aerospace" mechanism, enriching our military's strategic strike means [and] improving our military's strategic deterrence system" in order to "achieve the most effective means of air and space strategic balancing." For air defense, speeding up improving capabilities is needed because "resisting aerospace attacks has become the most realistic and urgent new mission of the air force."

¹⁵ Zhu Hui, ed., 战略空军论 [Strategic Air Force] (Beijing: Blue Sky Publishing House, 2009), 77; and Shou Xiaosong, ed., 战略学 [Science of Military Strategy] (Beijing: Academy of Military Sciences, 2013), 222. We are thankful to Nathan Beauchamp-Mustafaga for raising these points.

¹⁶ Earlier sources reference the PLA Air Force "nearing" this threshold. See, for example, an article by PLA Air Force leaders Ma Xiaotian and Li Zhongfu, "牢记强军目标献身强军实践—向改革强军时代楷模李浩同志学习" [Firmly Remembering the Goal of Strengthening the Military, Dedicating Ourselves to the Practice of Strengthening the Military—Learning from Comrade Li Hao, the Paragon of Reforming and Strengthening the Military Today], *Qishi*, no. 13 (2017).

working to “comprehensively build the People’s Air Force into a world-class air force.”¹⁷

In sum, all roads (or perhaps runways) leading to a world-class air force appear to go through a “strategic air force”—referenced either directly (战略空军) or as “air and space integration with both offensive and defensive capabilities” (空天一体、攻防兼备). In other words, the discussion we reviewed described a world-class force in terms of either first by achieving the earlier concept of strategic air force (possibly by the 2035 milestone) or sometimes by merging the two concepts into one ultimate objective. Notably, the linkage of the two terms pre-dates both Xi’s tenure beginning in 2012 and guidance in 2017 laying out PLA-wide objectives for a world-class military.

The framing in the sources we reviewed suggests a potential “upper bound” and “lower bound” to how the PLA Air Force is responding to Xi’s guidance. In the former case, the air force might need to undertake new efforts to become a strategic and world-class air force tied to the 2035 goals of improving its military theory, organization, personnel, and weapons and equipment, which mirror Xi’s 2017 PLA-wide guidance. In the lower-bound case, it might have subsumed the new language of world-class into its existing strategic air force concept, with (potentially) relatively minimal changes to its approach, despite Xi’s 2017 guidance. We leverage the guidance conveyed by the 2035 goals to examine the upper-bound scenario in the assessment section later in this chapter.

Requirements for a World-Class Conventional PLA Rocket Force

Although the PLA Rocket Force explicitly discusses the attributes and requirements of being “modernized” and potentially a “world-class strategic military service,” specific requirements are vague and difficult to operationalize as measurable progress. When officially elevating the Second Artillery Command to the Rocket Force, Xi Jinping set the political expectation for the PLA Rocket Force to build a “powerful and modernized

¹⁷ “向着党指引的方向奋飞——庆祝中国共产党成立100周年” [Flying the Direction Guided by the Party—Celebrating the 100th Anniversary of the Founding of the Communist Party of China], *Air Force News*, June 28, 2021. Xi has reportedly made at least four visits to PLA Air Force organizations. He visited a test and training base in 2013, met with the PLA Air Force 12th Party Congress in 2014, visited a bomber regiment in 2015, and visited another air base in 2019. See Li Xueyong et al., “阳光照耀奋飞的航程——党中央、中央军委和习主席关心人民空军建设发展纪实” [The Sun Shines on the Journey of Striving for Success: A Record of the CPC Central Committee, the Central Military Commission and Chairman Xi’s Concern for the Development of the People’s Air Force], *Xinhua*, November 7, 2019, http://www.xinhuanet.com/politics/2019-11/07/c_1125205454.htm.

rocket force.”¹⁸ It was not until a year later, in May 2017, that the goal of becoming “world-class” appeared in official writings when the *People’s Daily* published an article that explicitly demanded the Rocket Force to become world-class.¹⁹ However, the article did not specify what would constitute “world-class” as opposed to “powerful and modernized.” Around the same time, the *PLA Daily* published a column dedicated to “building a world-class strategic service branch,” which also did not specify what “world-class” means for the PLA Rocket Force.²⁰ Nevertheless, the discussion of this concept that we explored often includes demands or goals for the Rocket Force and provides valuable insights into what it should prioritize in operational training, personnel development, and weapons-related innovation.

Chinese military writings discuss several concepts that lay out expectations for the PLA Rocket Force to carry out its duties. One specific and actionable set of requirements to gauge its ability to become world-class is the “three core standard requirements” (核心标准要求), which are “to fight anytime, launch on time, and deal effective damage” (随时能战、准时发射、有效毁伤).²¹ These requirements were initially discussed in March 2016 by Senior Colonel Tan Weihong, a PLA representative of the National People’s Congress, reflecting on Xi’s expectation for the PLA to build a “powerful and modernized rocket force.”²² The three core standard requirements were quickly recognized as a step for the PLA Rocket Force to become a world-class strategic service. On the tenth anniversary of Xi’s speech on the goal of strengthening the military in 2022, a *PLA Daily* article described the core standard requirements, along with Xi’s strategic demand of “dual-capable all-domain deterrence,” as guidelines for the entire Rocket

¹⁸ Li Xuanliang and Zhang Xuanjie, “牢记历史使命提升战略能力努力建设一支强大的现代化火箭军” [Bearing in Mind the Historical Mission and Upgrading Strategic Capabilities, We Are Striving to Build a Powerful and Modernized Rocket Force], CPC News, September 27, 2016, <http://cpc.people.com.cn/n1/2016/0927/c64094-28742359.html>.

¹⁹ “火箭军要打造世界一流战略军种” [The Rocket Force Must Build a World-Class Strategic Military Service], *People’s Daily*, May 21, 2017, http://www.xinhuanet.com/politics/2017-05/21/c_1121008037.htm.

²⁰ Wang Weidong et al., “军报推出专栏:火箭军勠力建设世界一流战略军种” [The PLA Daily Releases Column Article: The Rocket Force Strives to Build a World-Class Strategic Military Service], *PLA Daily*, May 18, 2017, <http://cpc.people.com.cn/n1/2017/0518/c64387-29285090.html>.

²¹ Liang Pengfei, “核常兼备全域慑战,现代火箭军怎么建?” [Dual-Capable and All-Domain Deterrence, How to Build a Modernized Rocket Force?], *PLA Daily*, March 10, 2016, http://www.xinhuanet.com/mil/2016-03/10/c_128788226.htm.

²² Li and Zhang, “牢记历史使命提升战略能力努力建设一支强大的现代化火箭军.”

Force to “improve strategic strike capabilities and move toward building a world-class strategic service branch.”²³

In practice, the three core standard requirements are upheld as the nominal training standard for Rocket Force units. Military news media have reported on several brigade-level training exercises that set their training objectives to meet these requirements. For example, in a story of a 2020 training exercise featuring several capable noncommissioned officers (NCOs), an article noted that being able to carry out three core standard requirements was “the mission and duty of Rocket Force service members,” highlighting the morale and enthusiasm of the soldiers.²⁴ Another story stated that an unnamed missile brigade that was decorated over 40 times and inspected at the 2019 military parade is striving to fulfill all three “core standard requirements.”²⁵

Among the concepts we reviewed, the three core standard requirements stand out as the most useful analytical tool for understanding the PLA Rocket Force’s progress toward world-class. To achieve the core standard requirements, the force must have reliable and cutting-edge missile technologies, well-conceived plans to maneuver and conceal launch positions, accurate intelligence gathering to ensure proper targeteering and weaponeering, and robust training and resilient command and control to promptly carry out launch orders at any time. If the conventional missile forces can perform these capabilities, the PLA Rocket Force will have reached a new level of combat effectiveness that positions it to be a capable and world-class military force.

Additionally, we explored other Rocket Force concepts related to the world-class goal. These, however, are vague and unlikely to guide the continued modernization efforts most relevant for the conventional missile forces. One early description of expectations for the missile forces was the “strategic requirement” (战略要求) of dual-capable all-domain deterrence. It emerged when the Rocket Force achieved full-service status. Xi asked the force to “enhance credible and reliable nuclear deterrence and retaliation

²³ Wei Bing and Li Bingfeng, “新型导弹方阵铸就大国长剑” [The New Missile Formation Forges the Long Sword of a Great Power Nation], *PLA Daily*, August 8, 2022, <http://www.mod.gov.cn/gfbw/wzll/hjj/4917537.html>; and “中国特色强军之路越走越宽广——写在习近平主席提出强军目标十周年之际” [The Road to a Stronger Military with Chinese Characteristics Grows Wider and Wider—on the 10th Anniversary of President Xi Jinping’s Goal of Strengthening the Military], *PLA Daily*, March 13, 2023, <http://military.people.com.cn/n1/2023/0313/c1011-32643000.html>.

²⁴ Zhou Ben, Wang Weidong, and Li Jiahao, “我们在战位报告:火箭军某导弹旅:浩荡东风推后浪” [We Report from the Battlefield: An Unnamed Missile Brigade of the Rocket Force: The Vast East Wind Pushes the Next Generation Forward], *PLA Daily*, October 6, 2020, <http://www.mod.gov.cn/gfbw/wzll/hjj/4872337.html>.

²⁵ Ibid.

capability, enhance the development of mid- to long-range precision-strike capability, and improve strategic balancing capabilities based on the strategic requirement of dual-capable, all-domain deterrence, striving to build a powerful, modernized rocket force.”²⁶ The requirements are repeated in numerous political and military instructional materials, including the latest two versions of the PLA National Defense University’s *Science of Military Strategy*.²⁷ Despite their high prominence in PLA discourse, however, the requirements did not engender substantive discussions on how they could inform efforts to modernize the Rocket Force. Similarly, the PLA advanced another set of concepts focused on making the force world-class called the “three strategic capabilities”: strategic counterbalancing (战略制衡), strategic deterrence and control (战略慑控), and strategic decisive victory (战略决胜). These concepts are also vague with respect to how they could guide the modernization of the Rocket Force. The three strategic capabilities are a relatively recent formulation, having appeared most frequently since the 2019 military parade.²⁸ Occasionally, the three terms describe the DF-41 nuclear intercontinental ballistic missile, with the exact phrasing borrowed directly from the official commentary used during the military parade.²⁹ However, we were unable to document the relationship between the three strategic capabilities, if any, and the PLA Rocket Force’s conventional modernization.³⁰ In fact, the details we found about the concept did

²⁶ “习近平向中国人民解放军陆军火箭军战略支援部队授予军旗并致训词” [Xi Jinping Confers Military Flag on PLA’s Army Rocket Force and Strategic Support Force and Delivers Exhortation Speech], *People’s Daily*, January 2, 2016, <http://cpc.people.com.cn/n1/2016/0102/c64094-28003839.html>.

²⁷ State Council Information Office of the People’s Republic of China (PRC), *China’s National Defense in the New Era* (Beijing, July 2019), http://www.xinhuanet.com/english/2019-07/24/c_138253389.htm; and Lu Zehua, “火箭军如何历练成慑敌制敌的杀手锏?” [How Has the Rocket Force Been Honed to Become an Assassin’s Mace to Deter and Control the Enemy?], *PLA Daily*, January 13, 2016, http://www.81.cn/depb/2016-01/13/content_6855245.htm. For reference of the concept in PLA instructional texts, see Xiao Tianliang, ed., *战略学* [Science of Military Strategy] (Beijing: PLA National Defense University Press, 2020), 80. Note that other mentions of “核常兼备” are taken directly from the 2015 edition. The addition of “核常兼备全域慑战” in the later editions seems to be for political reasons.

²⁸ Chen Xianping and Su Zheng, “高举伟大旗帜阔步时代征途:本报记者与火箭军第二次党代表大会代表连线” [Holding the Great Banner and Making Strides to the Journey of the Era: Our Reporting Connects with the Representatives of the Second Party Representative Meeting of the Rocket Force], *Rocket Force Daily*, September 27, 2021, sec. 3.

²⁹ Cheng Min, “盘点国庆阅兵中的战略导弹武器” [Taking Stock of the Strategic Missile Weapons in the National Day Parade], *Ordnance Knowledge*, November 1, 2019. Note that in one military propaganda piece covering the military parade the term “strategic counterbalance” is associated with three PLA Rocket Force systems: DF-17, CJ-100, and DF-41. See Wei and Li, “新型导弹方阵铸就大国长剑.”

³⁰ The three phrases were never used independently in military writings, nor were they incorporated into authoritative PLA instructional materials. In our review of authoritative PLA texts, the “three strategic capabilities” and the core standard requirements were not found in the 2015, 2017, or 2020 versions of the *Science of Military Strategy*.

not indicate a concrete operational demand shaping technological and operational improvements to the force.

Progress toward World-Class Capabilities

We adopt four criteria to assess the progress of the PLA Air Force and Rocket Force toward becoming world-class forces. Chinese military writings after the 19th Party Congress outline four areas on which military modernization efforts must focus: military theory, organizational structure, service personnel, and weapons and equipment.³¹ These four areas were explicitly linked to the 2035 modernization goals in a *PLA Daily* article by PLA Air Force Aviation University professor Chu Danyang and Academy of Military Sciences researcher Shen Hongxin, who argued that making progress on modernizing the four areas is a “key task” (重点任务) for the 2035 modernization goal.³² **Table 1** explains each objective and summarizes our findings for each service.³³

This section analyzes the changes and efforts required for the PLA Air Force and Rocket Force to modernize. We also note some areas where each service might already be considered world-class as well as areas where they will face continued challenges. Due to the lack of certain details in our sources, we opted not to focus on assessing advancements in service-specific military theory, even though we expect service-specific developments to flow out of the 2019 revisions to the military strategic guidelines as well as the joint operations trial guidelines adopted in 2020.³⁴ The following two

³¹ Xi Jinping, “习近平:决胜全面建成小康社会夺取新时代中国特色社会主义伟大胜利——在中国共产党第十九次全国代表大会上的报告” [Xi Jinping: Successfully Building a Moderately Prosperous Society in All Aspects and Seizing the Great Victory of Socialism with Chinese Characteristics in the New Era—Report at the 19th National Congress of the Communist Party of China], Central People’s Government of the PRC, October 27, 2017, https://www.gov.cn/zhuanti/2017-10/27/content_5234876.htm.

³² Chu Danyang, Shen Hongxin, and Gao Liping, “迈向世界一流的擘画——怎么看国防和军队现代化新三步走战略安排” [A Plan of Making Strides toward World-Class—How to Understand the Strategic Arrangement of the New Three-Step Approach to National Defense and Military Modernization], *PLA Daily*, September 2, 2022, sec. 7, http://www.81.cn/yw_208727/10182296.html.

³³ Ibid.

³⁴ Military theory appears to be an area currently undergoing major efforts, given that Xi Jinping spoke at a fall 2024 meeting on military theory work: “Xi Urges Developing System of Modern Military Theory,” Xinhua, October 15, 2024, http://eng.chinamil.com.cn/CHINA_209163/TopStories_209189/16345621.html. On recent revisions to documents important for military theory, see Joel Wuthnow and M. Taylor Fravel, “China’s Military Strategy for a ‘New Era’: Some Change, More Continuity, and Tantalizing Hints,” *Journal of Strategic Studies* 45, no. 6–7 (2022): 1–36; and David M. Finkelstein, “The PLA’s New Joint Doctrine: The Capstone of the New Era Operations Regulations System,” CNA, September 2021, <https://www.cna.org/reports/2021/09/The-PLA’s-New-Joint-Doctrine.pdf>.

TABLE 1 2035 objectives as described in the 19th Party Congress report and related PLA articles

Area of focus	Modernization requirements	Observable PLA Air Force progress	Observable conventional PLA Rocket Force progress
Military theory	"A system of military theories that have epochal, leading and unique characteristics."	N/A	N/A
Organizational structure	"The structure and layout of the military's forces are scientific and reasonable, its strategic deterrence capability has been reinforced and improved, its new combat forces in new areas and new domains are constantly growing, and elite combat, system support, and joint victory have become the basic modes of force employment."	Brigadization and new bases; forces transferred from PLA Naval Aviation to PLA Air Force; new operational <i>xitong</i> in development; focus on contributing to joint warfighting.	Growth of conventional force structure; development of new units serving new missions as improved missile systems go online; more joint exercises and operations.
Service personnel	"Comprehensive transformation and upgrading of the capability and quality, structural layout, development, and management of military personnel; the full emergence of groups of joint operation commanders, new types of combat force personnel, high-level scientific and technological innovation personnel, high-level strategic management personnel, forging a new type of high-quality, specialized service personnel who are both virtuous and talented."	Three-in-one reforms to military academy education, "troop training practice," and military vocational education; new personnel system; curricula restructured.	More technical training programs focusing on fostering technically capable NCOs (e.g., missile experts); reforms of recruitment, training, retention, and promotion regulations.
Weapons and equipment	"To have a strong momentum of indigenous innovation and original innovation in national defense science and technology; a great improvement in scientific and technological acumen, cognitive power, and responsiveness; a large number of strategic, cutting-edge, and disruptive technologies; the accelerated development of equipment and intelligentized weapons and equipment; and a greater number of strategic 'iron fists' that can overcome the enemy and win victories."	Significant Y-20 and J-20 inventory growth; H-20 bomber still many years away; "strategic" fighters increasing as a proportion of the fighter force; SAMs already world-class.	New weapons and capabilities: DF-17 hypersonic missile, DF-26, CJ-100, and DF-41 (nuclear) missile specifically mentioned; hypersonic systems already world-class.

subsections assess each service's accomplishments and struggles in the other three areas we reviewed tied to the 2035 modernization goals: organization, personnel, and weapon systems.

PLA Air Force Developments

Organization. A 2019 article by a PLA Air Force Command College researcher noted an imperative to “optimize [the PLA Air Force’s] force structure and realize the transformation to both offense and defense as soon as possible; and deepen the reform of human resources policies and systems.”³⁵ Key organizational developments have included the transition from a division-regiment structure to a brigade structure, and creating at least six new bases in recent years.³⁶ In 2023 the PLA Air Force absorbed significant force structure from PLA Navy Aviation, when at least three fighter brigades, two bomber regiments, three radar brigades, three air defense brigades, and multiple airfield stations were transferred to the air force.³⁷ Although the navy has retained its carrier aviation units and some limited land-based units, the transfer of these land-based fighters and bombers represents the culmination of efforts by the PLA Air Force to successfully grow its maritime roles over at least the past decade.³⁸

Some other areas of expansion appear to include operational systems of systems. One 2021 *Air Force News* article referenced developing an operational *xitong* (系统), or system, for unmanned systems to support a “revolution in strike” warfare.³⁹ Another 2021 *Air Force News* article referenced a new-type command automated *xitong*.⁴⁰ The U.S. Department

³⁵ Miao Runqi, “遵循习主席指示要求建设现代化人民空军” [Follow the Instructions of Chairman Xi and Build a Modernized People’s Air Force], *National Defense*, August 2019, 8–12; 18.

³⁶ Kenneth and Garafola, *70 Years of the PLA Air Force*; and U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023* (Washington, D.C., October 2023), 62, <https://media.defense.gov/2023/Oct/19/2003323409/-1/-1/1/2023-MILITARY-AND-SECURITY-DEVELOPMENTS-INVOLVING-THE-PEOPLES-REPUBLIC-OF-CHINA.PDF>.

³⁷ Rod Lee, “PLA Naval Aviation Reorganization 2023,” China Aerospace Studies Institute, July 2023, <https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/PLAN/2023-07-31%20PLAN%20Aviation%20Reorg%202023%20Clean.pdf?ver=N848BtqfMRRjocS2ThCtw%3d%3d>.

³⁸ See Mark Cozad and Nathan Beauchamp-Mustafaga, *People’s Liberation Army Air Force Operations over Water: Maintaining Relevance in China’s Changing Security Environment* (Santa Monica: RAND Corporation, 2017), https://www.rand.org/pubs/research_reports/RR2057.html; and Ian Burns McCaslin and Andrew S. Erickson, *Selling a Maritime Air Force: The PLAAF’s Campaign for a Bigger Maritime Role* (Montgomery: China Aerospace Studies Institute, 2019), <https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/PLAAF/2019-04-01%20Selling%20a%20Maritime%20Air%20Force.pdf>.

³⁹ Yang Caixia and Jia Daojin, “浅析当代战争方式演变的动力” [A Brief Analysis of the Drivers of the Evolution of Contemporary Warfare Methods], *Air Force News*, March 18, 2021, 3.

⁴⁰ “向着党指引的方向奋飞—庆祝中国共产党成立100周年.”

of Defense has also noted efforts by the current commander of the PLA Air Force, Chang Dingqiu, to continue improving its capabilities to “accomplish joint warfighting tasks.”⁴¹

Personnel. Recent reforms focus on the PLA Air Force’s personnel development system, including training as well as talent recruitment programs. PLA-wide changes also took place and appear to have affected the PLA Air Force as well as the PLA Rocket Force. Xi Jinping approved new guidance, which was issued by the Central Military Commission in 2020 under the title “Decision on Accelerating the Construction of a Three-in-One New Military Talent Training System” (关于加快推进三位一体新型军事人才培养体系建设的决定). The full document is not publicly available, but a *PLA Daily* article described its focus on improving and making more interconnected military academy education, troop training, and military vocational education.⁴² Another PLA article stated that the guidance aimed to address “shortcoming and weaknesses,” with some examples including the need to improve the relevance of military academy curricula, joint education, exchanges and training between military academies and units, NCO training, and education and training within the officer system.⁴³ The article noted there are also “Interim Regulations on the Education and Training of Active-Duty Officers.”⁴⁴

PLA Air Force sources discuss the development of a “new-type military personnel development system” in the context of building a strategic air force and making strides to achieve a world-class air force.⁴⁵ A 2022 *Air Force News* article describes a PLA Air Force Party Committee document titled “Opinion on Strengthening Air Force Talent Work in the New Era,” which requires the service to improve “talent development” by “expanding joint talent training channels, actively promoting the in-depth integration of air force talent development into the national talent training system, and promoting the in-depth expansion of Sino-foreign exchanges and

⁴¹ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 62.

⁴² Wang Yingchuan and Xie Yukun, “坚持构建三位一体新型军事人才培养体系” [Persistently Construct Three-in-One New Military Talent Training System], *PLA Daily*, October 6, 2022, <http://www.mod.gov.cn/gfbw/jmsd/4922588.html>.

⁴³ Yang Qinggang, “汇聚人才强军的磅礴力量——军队代表委员畅谈高素质专业化新型军事人才培养” [Gathering Talents to Strengthen the Military—Military Representative Speaks on High-Quality Professionalized Training of New Military Talent], *PLA Daily*, October 6, 2022, <http://www.mod.gov.cn/gfbw/jmsd/4922588.html>.

⁴⁴ *Ibid.*

⁴⁵ “赓续血脉谋战胜乘势而上启新程——写在人民空军成立72周年之际” [Continue the Bloodline to Seek Victory; Take Advantage of the Momentum to Begin a New Journey—Written on the 72nd Anniversary of the Founding of the People’s Air Force], *Air Force News*, November 11, 2021.

cooperation.” Listed examples of success include the air force’s partnerships with the China Academy of Sciences and the Chinese Academy of Engineering and joint training with Peking University, Tsinghua University, and Beihang University.⁴⁶ However, some of these programs only graduate a small number of students every year.⁴⁷

We also found evidence that the PLA Air Force is reforming the curriculum in at least one of its academic institutions. Due to changing needs for joint operations—possibly tied to the series of reforms that led to new joint doctrine issued in 2020—the PLA Air Force Command College restructured the curriculum in 2018 to relate more closely to combat.⁴⁸ One article noted that “nearly 70% of the courses in key classes were reconstructed and adjusted” over the year.⁴⁹

Weapons and equipment. We found three tiers of references in PLA and PLA Air Force writings to specific weapon systems and platforms explicitly tied to the development of a strategic air force or world-class air force.⁵⁰ First, the Y-20 transport and J-20 fighter are the aircraft most commonly

⁴⁶ “开门借智共育良才” [Open the Door to Borrow Wisdom and Cultivate Talented People], *Air Force News*, September 29, 2022.

⁴⁷ Gao Liying and Li Jianwen, “空军与清华、北大、北航等联姻十年培养飞行学员数百名” [The Air Force’s Decade-Long Marriage with Tsinghua, Peking, and Beihang Produced Hundreds of Pilot Trainee], *PLA Daily*, July 21, 2022, <http://www.mod.gov.cn/gfbw/wzll/kj/4916170.html>.

⁴⁸ Finkelstein, “The PLA’s New Joint Doctrine,” 7.

⁴⁹ Qiao Songbai and Dong Bin, “空军指挥学院教学模式改革:打造没有围墙的空战学院” [The PLA Air Force Command College’s Reform of Teaching Mode: Building an Air Force Command College without Walls], *PLA Daily*, July 27, 2021, http://www.81.cn/2021zt/2021-07/27/content_10067375.htm.

⁵⁰ Sources referenced to make this assessment are Chen, “China to Create World-Class Air Force”; “向着党指引的方向奋飞——庆祝中国共产党成立100周年”; Huang Linying et al., “怀凌云之壮志，聘未来之空天——2022年空军航空开放活动暨长春航空展闻思录” [Have High Ambitions That Reach the Clouds, Ride Free in the Sky and Space of Tomorrow—a Story and Reflection of the 2022 Air Force Open Event-Changchun Air Show], *Air Force News*, September 8, 2022, sec. 3; Gan Huan, “静若止水中的雷霆之威” [Under the Calm Appearance Like Still Water Lies a Thunder-Like Power], *Air Force News*, September 13, 2022, sec. 4; Gao Di and Liu Yirui, “空军举行向空军飞行人员英烈敬献花篮仪式常丁求郭普校马饶天于忠福郑元林纪多永洪庆江姜平姜鹏刘强出席” [The Air Force Held a Ceremony to Lay Wreaths to the Fallen Airmen of the Air Force; Chang Dingqiu Guo Puxiao, Ma Raotian, Yu Zhongfu, Zheng Yuanlin, Ji Duo, Yu Yonghong, Yu Qingjiang, Jiang Ping, Jiang Peng, Liu Qiang Attended], *Air Force News*, October 1, 2022; Gugu Zhang and Shubo Huang, “迈向世界一流空军的标志性步伐” [A Signature Step toward Becoming a World-Class Air Force], *Xinhua*, July 6, 2016, http://www.xinhuanet.com/mil/2016-07/06/c_1119174493.htm; “阳光照耀奋飞的航程——党中央、中央军委和习主席关心人民空军建设发展纪实” [The Sun Shines on the Journey of Striving for Success: A Record of the CPC Central Committee, the Central Military Commission and Chairman Xi’s Concern for the Development of the People’s Air Force], *Xinhua*, November 7, 2019, http://www.xinhuanet.com/politics/2019-11/07/c_1125205454.htm; and “中国空军历史性跨战略空军门槛究竟意味着什么?” [Chinese Air Force Historically Crosses the Threshold of a Strategic Air Force; What Does It Mean?], *Global Times*, September 2, 2021, <https://mil.news.sina.com.cn/2021-09-02/doc-iktzscyx1784132.shtml>. One 2014 article did not refer to the H-20 and Y-20 as strategic or world-class, but linked them to strike and delivery missions. See Lingyun Chen, “轰-20隐形轰炸机若存在将是中国空军重拳” [If the H-20 Stealth Bomber Exists, It Will Be the Chinese Air Force’s Strong Fist], *People’s Daily*, 2014, http://www.81.cn/jskj/2014-09/28/content_6157991.htm.

referenced as platforms associated with the development of a strategic or world-class air force. Nearly every PLA, state media, and *Air Force News* article that lists specific systems mentions one or both aircraft. Second, the H-20 bomber, YY-20 tanker, and some fourth-generation aircraft like the J-16 and J-10 (usually the J-10C variant) are sometimes mentioned in the context of a strategic or world-class air force.⁵¹ Third, platforms referenced only occasionally include airborne early-warning and control aircraft (KJ-2000 and KJ-200), the H-6N bomber, radars warning networks, indigenous SAM systems, unmanned systems, and new command systems. Nonetheless, how a platform is discussed does not necessarily reflect its contributions to achieving the status of a strategic or world-class air force. In some cases, a platform might be mentioned to highlight recent successful acquisition programs, while in other cases the need to protect potential sensitivities (or a lack of interest in the media) might lead to minimal discussion of a platform.

How do these systems stack up to the calls for PLA Air Force modernization? Recall that the original goal stated by a senior air force leader was to “build...a weapons and equipment system with fourth-generation equipment as the backbone and third-generation equipment as the bulk of the force” by 2020.⁵² Relatedly, a 2019 article by a PLA Air Force Command College researcher noted one goal to ensure that “major construction projects supporting the Air Force’s development strategy prior to 2035 get underway and are effective,” and later on to “accelerate the construction of new combat forces.”⁵³ Taking a look at aircraft inventories for 2020 and 2024 in **Table 2**, a number of trends are evident.⁵⁴

First, if fourth-generation aircraft by PLA standards (which are equivalent to Western fifth-generation aircraft) were supposed to be the “backbone” of the air force by 2020, this goal was likely not attained, given that only roughly one brigade of J-20s had entered service. By 2024, however, the proportion of J-20s and fourth-generation (J-16/J-10C) aircraft in the force had increased

⁵¹ The J-10C achieved initial operational capability in 2018 and is expected to “inject strong vitality into the effort of building a world-class air force,” according to a commentator who received his PhD from the Academy of Military Sciences. See Xie Yongliang, “新京报评歼-10C形成战斗力:中国空战体系迈上新台阶” [Beijing News Comments on J-10C Achieving Initial Operational Capability: A New Step Up in China’s Air Warfare System], China.com.cn, April 17, 2018, http://news.china.com.cn/2018-04/17/content_50898644.htm.

⁵² Huang and Yu, “中国空军公布建设强大现代化空军路线图.”

⁵³ Miao, “遵循习主席指示要求建设现代化人民空军.”

⁵⁴ International Institute for Strategic Studies (IISS), *The Military Balance: 2024* (London: Routledge, 2024).

TABLE 2 Inventory growth of PLA Air Force aircraft and SAMs tied to strategic and world-class PLA Air Force concepts (organized by system type)

System	2020	2024
J-20	22+	200+
J-16	100+	280
J-10C	100+	220
<i>Fighter totals</i>	<i>Over 1,500</i>	<i>Over 1,800</i>
H-20	0	0
H-6N	4+	12+
Y-20	8	50
YY-20	0	8
AEW&C	4 KJ-2000 4 KJ-200	4 KJ-2000 4 KJ-200 20 KJ-500
SAMs (long-range launchers)	516+	670+

NOTE: Fighter totals include IISS Military Balance–designated fighter and fighter ground attack aircraft, but not attack aircraft. Totals may include trainers.

from 15% to 39%.⁵⁵ The PLA Air Force is likely doing a better job of meeting this objective on its path to becoming a strategic air force.

Second, SAMs are clearly an area of world-class capability for the PLA Air Force and PLA more broadly. Over five hundred launchers are organized into batteries, and many of these systems are capable of ranging hundreds of kilometers from the Chinese mainland.

Third, the H-20 does not appear to be entering service soon, potentially due to reported engineering challenges faced by the program.⁵⁶ The U.S. Department of Defense’s 2023 report on China’s military noted that the H-20 may only “debut sometime in the next decade.”⁵⁷ This assessment is similar

⁵⁵ This proportion should further increase as the PLA Air Force retires J-7s. Liu Xuanzun, “China to Replace J-7 Fighter Jets with Advanced Models,” *Global Times*, March 14, 2021, <https://www.globaltimes.cn/page/202103/1218324.shtml>; and Liu Xuanzun, “China Expected to Retire Legacy J-7 Fighter Jets from Combat Service in 2023,” *Global Times*, January 29, 2023, <https://www.globaltimes.cn/page/202301/1284429.shtml>.

⁵⁶ On program challenges, see Michael Marrow, “China’s New H-20 Stealth Bomber ‘Not Really’ a Concern for Pentagon, Says Intel Official,” *Breaking Defense*, April 22, 2024, <https://breakingdefense.com/2024/04/chinas-new-h-20-stealth-bomber-not-really-a-concern-for-pentagon-says-intel-official>.

⁵⁷ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China* 2023, 92.

to the one made in the 2017 edition of the same report, potentially indicating that the H-20's development is taking longer than originally anticipated.⁵⁸ Whether the aircraft enters the force (either ceremonially or fully integrated) within the 2035 time frame is a key question.

Fourth, although key enablers like the Y-20 and YY-20 are coming online, the chief designer of the WS-20 indigenous engine planned for both aircraft has stated that the thrust performance is lower than the desired benchmark of the U.S. C-17.⁵⁹ The KJ-2000 and KJ-200 are already being supplanted by the KJ-500, but details on any requirements for sufficient inventories of these systems are unavailable.

Last, three key weapon types and platforms not mentioned in our review of sources on strategic and world-class air force concepts include beyond-visual-range missiles such as the PL-15 and PL-17, which some Western analysts see as extending the PLA Air Force's combat effectiveness to or potentially beyond the range of air-to-air missiles currently fielded by the United States.⁶⁰ Few details are known about the PLA Air Force's development of sixth-generation fighters beyond footage of early flight testing. The air force has developed and fielded a variety of unmanned aerial vehicle platforms, but these systems are not discussed in the context of a strategic or world-class air force.⁶¹

Areas of challenge. In addition to the issues regarding personnel and equipment raised above, whether some components of the PLA Air Force's growing inventory of new equipment match up to original expectations or requirements, such as engine performance, remains a question. Given the context of personnel reforms the PLA Air Force has been working on, training, "peace disease," and corruption also continue to be key issues for it. A 2021 *Air Force News* article mentioned three inspection tours that sought to understand five dynamics: (1) implementing CCP theory and Xi's decisions, (2) implementing the military strategic guidelines in the new era,

⁵⁸ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2017* (Washington, D.C., May 2017), 28.

⁵⁹ Tang Changhong and Zhang Weihong, "航空航天装备的轻量化:挑战与未来" [Lightweighting of Aerospace and Aeronautical Equipment: Challenges and Perspectives], *Acta Aeronautica et Astronautica Sinica* 44 (2023).

⁶⁰ Douglas Barrie, "Air-to-Air Missiles Push the Performance, Payload Envelope," IISS, January 29, 2024, <https://www.iiss.org/online-analysis/military-balance/2024/01/air-to-air-missiles-push-the-performance-payload-envelope>; and Tyler Rogoway, "Massive PL-17 Air-to-Air Missile Seen on Chinese J-16 Fighters," TWZ, December 2, 2023, <https://www.twz.com/massive-pl-17-air-to-air-missile-seen-on-chinese-j-16-fighters>.

⁶¹ See, for example, Hayley Wong, "China Says Drones and Counter-Drone Systems Will Dominate at Biggest Zhuhai Air Show Yet," *South China Morning Post*, September 26, 2024, <https://www.scmp.com/news/china/military/article/3279952/china-says-drones-and-counter-drone-systems-will-dominate-biggest-zhuhai-air-show-yet>

including to improve training by “deepening and promoting the reform of the training system, correcting the training style, exercise style, and examination style, and correcting peace disease and other situations,” (3) implementing new-era organizational political lines surrounding personnel selection and employment, (4) implementing comprehensive strict party governance and countering corruption, and (5) implementing inspections and audits to find and rectify problems.⁶² High-level PLA Air Force leaders have also been disciplined, with a recent former commander (Ding Laihang) and political commissar (Tian Xiusi) each having been placed under investigation.

Conventional PLA Rocket Force Developments

Organization. Key organizational developments in the PLA Rocket Force have included an increase in active-duty personnel, the reduction of leadership and administration workforce, and the creation of new units.⁶³ The Rocket Force added thirteen new brigades from 2010 to 2020, enhancing both the nuclear and the conventional missile forces.⁶⁴ In late 2018, it reorganized its regiment-level reconnaissance units into a single operational support group under the PLA Rocket Force Staff Department.⁶⁵ The group has a reconnaissance team, a targeting team, a survey and mapping team, a communications station, and an engineering maintenance team.⁶⁶ However, the signals intelligence service of the Rocket Force (the Technical Reconnaissance Bureau) was transferred to the then Strategic Support Force to improve the integration of the signals intelligence service within the PLA.⁶⁷

Personnel. The PLA's strategic missile forces have repeatedly emphasized the role of technically capable talents in its ranks and the imperative to address the “five incapables” (五个不会) with dedicated political work

⁶² “空军党委部署开展2021年第二批巡视” [The PLA Air Force Party Committee Begins the Second Round of Inspections of 2021], *Air Force News*, September 3, 2021. Although the strategic air force concept was not mentioned in this discussion, the inspection tours were linked to implementing the military strategic guidelines. This is evidence of the priority placed on these inspections for improving the PLA Air Force's capabilities in line with the military strategic guidelines.

⁶³ Qian Xiaohu and Han Cheng, “新时代国防和军队建设成就综述之二:书写改革强军的时代答卷” [Overview of Achievements in National Defense and Military Construction in the New Era No. 2: Giving the Answer of the Era of Reform and Strengthening the Military], *PLA Daily*, July 26, 2022, <http://www.xn--vcs074a3julibi48c.com/show-53-3436-1.html>.

⁶⁴ Ma Xiu, “PLA Rocket Force Organization,” China Aerospace Studies Institute, October 2022, 1, <https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/PLARF/2022-10-24%20PLARF%20Organization.pdf>.

⁶⁵ *Ibid.*, 13–14.

⁶⁶ *Ibid.*, 14.

⁶⁷ *Ibid.*

and inspection units to mitigate the lack of readiness in terms of technical skillsets and mindsets.⁶⁸ By mid-2016, the Rocket Force created talent cultivation programs to select and groom “missile experts” (导弹专家) for training, technological innovation, quality control, and decision-making, having certified over two hundred missile experts to cover all “front-line missile brigades.”⁶⁹ Based on exercises, the Rocket Force recognizes that technical degrees are not necessary for technical expertise. Thus, it has adopted training programs to enable NCOs with limited education to master technical skills for missiles. In two exemplary cases, the enlisted missile experts with only a high school education or lower were able to handle highly technical measurement and control tasks for missiles and perfectly carry out launch orders.⁷⁰ According to the *PLA Daily*, the technical training programs increased the number of experts in combat forces by 74.4%, with 90% of these missile experts being young and middle-aged service members.⁷¹ The effort to cultivate technical talents was further aided by the military-civil fusion strategy. According to a *PLA Daily* report, the Rocket Force established collaborative programs with over ten local civilian R&D institutions to train technical specialists in joint operational command, informatized management, and missile technology, ensuring that 100% of the missile brigades have missile experts assigned to the units.⁷²

Weapons and equipment. The PLA Rocket Force operates one of the world’s most sophisticated and diverse fleets of missiles. During the 2019 military parade, the PLA used the word “strategic” to describe advanced non-nuclear missiles such as the DF-26 (which has both nuclear and non-nuclear variants), the CJ-100, and the DF-17.⁷³ The China Aerospace Science

⁶⁸ Wang Weidong and Li Yongfei, “砥砺大国长剑锋芒——火箭军破除和平积弊锤炼新时代打赢能力纪实” [Sharpening the Great Power’s Long Sword—a Story of the Rocket Force’s Efforts to Eliminate the “Peace Disease” and Refine Its Winning Capability in the New Era], *PLA Daily*, July 18, 2018, http://www.81.cn/jfjbmap/content/2018-07/18/content_211178.htm.

⁶⁹ “火箭军超200导弹专家覆盖一线导弹旅一人仅36岁” [The PLARF Has over 200 Missile Experts That Cover All Frontline Missile Brigades; One of Whom Is Only 36 Years Old], *PLA Daily*, August 26, 2016, http://www.xinhuanet.com/mil/2016-08/26/c_129257010.htm.

⁷⁰ Zhou et al. “我们在战位报告:火箭军某导弹旅”

⁷¹ “火箭军超200导弹专家覆盖一线导弹旅一人仅36岁”

⁷² Zhang Xuanjie et al., “神剑啸天扬军威——火箭军加快提升战略能力纪实” [The Heavenly Sword Takes to the Sky to Show Our Military’s Might: A Story of the Rocket Force Accelerating the Improvement of Strategic Capabilities], *Xinhua*, September 25, 2017, http://www.xinhuanet.com/politics/2017-09/25/c_1121722035.htm.

⁷³ “东风-26核常兼备导弹方队:核常兼备的新型战略利器” [DF-26 Dual-Use Missile Squad: New Dual-Use Strategic Weapon], *Xinhua*, October 1, 2019, http://www.xinhuanet.com/politics/2019-10/01/c_1125063262.htm; and Wei and Li “新型导弹方阵铸就大国长剑”

and Technology Corporation wrote that the systems it produces (including the DF-17 and DF-26) “support the PLA becoming a world-class military.”⁷⁴

The PLA Rocket Force also possesses several cutting-edge systems that help the missile force fulfill the three core standard requirements. For the “fight any time” and “launch on time” requirements, the Rocket Force has been training its conventional missile brigades to conduct rapid-response exercises with road-mobile solid-fuel ballistic missiles that can be fired on demand.⁷⁵ It is difficult to assess whether the missiles achieve “effective damage,” but simulations run by PLA-affiliated authors showed that some researchers believe that anti-ship ballistic missiles can deal enough damage to sink major U.S. surface combatants.⁷⁶ Additionally, recently fielded conventional missiles have improved the PLA Rocket Force’s ability to conduct mid-to-long-range strikes. The DF-26’s long-range, dual-capable, and hot-swap features offer a one-stop solution to carry out “dual-capable all-domain deterrence.”⁷⁷ Chinese state media explicitly recognizes the DF-26 as a “next-generation mid-to-long-range ballistic missile.”⁷⁸ Based on estimates by the U.S. Department of Defense, the Rocket Force had approximately 250 DF-26 launchers as of the end of 2022 and may continue to grow this force in the future.⁷⁹ Other relevant systems are listed in **Table 3**.

The PLA Rocket Force is a global leader in terms of fielding a substantial number of mature systems, given its inventory of medium-range and intermediate-range ballistic missiles, long-range cruise missiles, and hypersonic missiles. The U.S. Department of Defense assesses that China

⁷⁴ “航天科技大国重器震撼亮相大阅兵” [CASC’s Instrument of Great Power Makes Debut at the Military Parade], China Aerospace Science and Technology Corporation, October 1, 2019, <https://www.spacechina.com/n25/n2014789/n2014804/c2738748/content.html>.

⁷⁵ Yang Yonggang and Mo Botao, “火箭军坚持从严按纲士施训保持枕戈待旦状态” [The Rocket Force Adheres to Strict Training in Accordance with the Program to Maintain the State of Being Ready to Fight], *PLA Daily*, February 23, 2020, <http://www.mod.gov.cn/gfbw/sy/15930594.html>; and Wang Weidong and Deng Dongrui, “火箭军常规导弹第一旅锤炼部队快反能力” [The PLARF First Conventional Missile Brigade Drills Rapid Response Capabilities], *PLA Daily*, December 14, 2017, http://military.china.com.cn/2017-12/14/content_41988387.htm.

⁷⁶ Stephen Chen, “China Lab Simulates Attack on U.S. Warships Using Space Weapons, Hypersonic Missiles,” *South China Morning Post*, January 19, 2024, <https://www.scmp.com/news/china/science/article/3249028/china-lab-simulates-attack-us-warships-using-space-weapons-hypersonic-missiles>. For the specific study to which the article refers, see Wang Guoyan et al., “基于墨子系统的对舰打击策略设计与分析” [Design and Analysis of Warship Strike Strategy Based on Mozi System], *Journal of Test and Measurement Technology* 37, no. 4 (2023).

⁷⁷ Ankit Panda, “A Closer Look at the PLARF’s DF-26,” *Diplomat*, May 19, 2020, <https://thediplomat.com/2020/05/a-closer-look-at-the-plarfs-df-26>.

⁷⁸ “火箭军新一代中远程弹道导弹正式加入战斗序列” [A Next-Generation Intermediate-to-Long-Range Ballistic Missile Is Officially Commissioned into Service], *Xinhua*, April 15, 2018, http://www.xinhuanet.com/politics/2018-04/15/c_1122685296.htm.

⁷⁹ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 67.

has “the world’s leading hypersonic arsenal and has dramatically advanced its development of both conventional and nuclear-armed hypersonic missile

TABLE 3 Key PLA Rocket Force systems relevant for world-class requirements

Missile system	Range	Quantity (launchers)	Authors’ assessment of how system may fulfill world-class requirements
DF-26	3,000–4,000 km	250 by end of 2022	• Dual-capable all-domain deterrence • Mid-to-long-range precision-strike capabilities • Fight anytime • Launch on time
CJ-10 (high-subsonic cruise missile)	Approximately 1,500 km	Approximately 72; DoD estimates a total of 150 ground-launched cruise missile launchers, including CJ-100s, by the end of 2022	• Mid-to-long-range precision-strike capabilities • Fight anytime • Launch on time
DF-21D	1,500–1,870 km	Approximately 30	• Mid-to-long-range precision-strike capabilities • Fight anytime • Launch on time • Deal effective damage
CJ-100	Approximately 2,000 km	Approximately 54	• Mid-to-long-range precision-strike capabilities • Fight anytime • Launch on time
DF-17 (hypersonic glide vehicle)	Up to 2,000 km	Approximately 48	• Fight anytime • Launch on time • Deal effective damage (through defense penetration)

SOURCE: U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China* 2023, 66, 69; and International Institute for Strategic Studies, *The Military Balance: 2024* (London: Routledge, 2024), 254.

NOTE: The U.S. Department of Defense estimates approximately 300 total medium-range ballistic missile launchers as of 2022. One nongovernmental analysis estimates 108 to 144 DF-17 launchers by 2028. See Decker Eveleth, “People’s Liberation Army Rocket Force Order of Battle 2023,” James Martin Center of Nonproliferation Studies, July 2023, 37.

technologies during the past 20 years.”⁸⁰ While the exact effectiveness of Chinese ballistic missiles is not publicly known, China’s advancement in accuracy, terminal guidance, and defense penetration is likely world-class.

Areas of challenge. Even as impressive hardware improvements may elevate the PLA Rocket Force to world-class status, some persistent institutional and organizational challenges might keep it from attaining its goals. Our understanding of these intangible “software” issues is based on what Western analysts can observe and identify using the limited publicly available information on what the Rocket Force strives to correct among its ranks. The first is corruption. The purge of top military and defense industry leaders who led missile R&D efforts showed not only Xi Jinping’s distrust of the force’s generals but also the deep-rooted corruption within the missile industry.⁸¹ Recently, the anticorruption apparatus took down the former chief engineer of the PLA Rocket Force’s top research institute, Xiao Longyu, indicating egregious corruption in China’s most prestigious weapons programs. Eliminating corruption at the top, however, does not necessarily address the institutional roots of corruption and could further degrade morale when capable officers and scientists see that their mentors have been swiftly arrested and replaced by outsiders. Thus, the Rocket Force must work on bringing the “people factor” up to world-class standards.

Second, the operational effectiveness of Chinese missiles heavily depends on real-time target acquisition and tracking. Earlier live-fire missile tests likely did not include active target acquisition, as the missiles were fired against targets either fixed on the ground or on a track with known locations.⁸² Given that future tests will likely include moving targets, integrating intelligence, surveillance, and reconnaissance (ISR) capabilities across service branches will require time and multiple exercises.⁸³ The recent restructuring of the former Strategic Support Force, for example, could be due to the failure to synergistically integrate information support systems,

⁸⁰ U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 166.

⁸¹ Joel Wuthnow, “Why Xi Jinping Doesn’t Trust His Own Military,” *Foreign Affairs*, September 26, 2023, <https://www.foreignaffairs.com/china/why-xi-jinping-doesnt-trust-his-own-military>; and Elliot S. Ji, “Rocket-Powered Corruption: Why the Missile Industry Became the Target of Xi’s Purge,” *War on the Rocks*, January 23, 2024, <https://warontherocks.com/2024/01/rocket-powered-corruption-why-the-missile-industry-became-the-target-of-xis-purge>.

⁸² For an example, see H. I. Sutton, “China Builds Missile Targets Shaped Like U.S. Aircraft Carrier, Destroyers in Remote Desert,” *USNI News*, November 7, 2021, <https://news.usni.org/2021/11/07/china-builds-missile-targets-shaped-like-u-s-aircraft-carrier-destroyers-in-remote-desert>.

⁸³ The 2023 China Military Power Report notes, for example, that China “fired anti-ship ballistic missiles against a moving target in the SCS” in 2020. U.S. Department of Defense, *Military and Security Developments Involving the People’s Republic of China 2023*, 67.

including ISR and space and cyber warfare.⁸⁴ As such, the ISR infrastructure of the PLA as a whole could be a “joint” issue that the missile forces must work to integrate in order to take full advantage of existing world-class missile capabilities.

World-Class Capabilities in Key Contingencies

This section considers how PLA Air Force and conventional PLA Rocket Force capabilities that appear linked to achieving world-class status could be relevant for regional contingencies involving China and the United States in both the 2027 and 2035 time frames.⁸⁵ It does not evaluate long-established capabilities, such as the role of short-range ballistic missiles for a Taiwan scenario. In all three scenarios we examined (Taiwan, the South China Sea, and the Sino-Indian border), unmanned aerial systems would likely play a significant role as well, although it is unclear which systems would be the most important for a specific time frame.

In a Taiwan scenario, the PLA Air Force could seek to contest opposing air packages near Taiwan, conduct long-range land-attack and anti-ship strikes against U.S. forward-deployed forces, defend China’s mainland from air and missile threats, and use its growing fleet of tankers to support fighter packages and transport aircraft to conduct airlift for airborne operations and resupply. The air force’s SAMs are already world-class, and by 2027 growing fighter inventories with beyond-visible-range missiles will be available. Moreover, airborne early-warning and control aircraft and tankers may be able to support fighters over or possibly east of Taiwan. By 2035, a sixth-

⁸⁴ Joe McReynolds and John Costello, “Planned Obsolescence: The Strategic Support Force In Memoriam (2015–2024),” Jamestown Foundation, China Brief, April 26, 2024, <https://jamestown.org/program/planned-obsolescence-the-strategic-support-force-in-memoriam-2015-2024>; and “国防部举行信息支援部队成立专题新闻发布会” [The Ministry of Defense Held a Press Conference on the Establishment of the Information Support Force], Ministry of Defense (PRC), April 19, 2024, http://www.mod.gov.cn/gfbw/sy/tt_214026/16302057.html.

⁸⁵ The sources for this assessment are Yuliang Zhang, ed., *战役学* [Science of Campaigns] (Beijing: National Defense University Press, 2006); and Allen and Garafola, *70 Years of The PLA Air Force*. For the role of ballistic missiles in a Taiwan situation, see Stephen Biddle and Ivan Oelrich, “Future Warfare in the Western Pacific: Chinese Anti-Access/Area Denial, U.S. AirSea Battle, and Command of the Commons in East Asia,” *International Security* 41, no. 1 (2016): 7–48; and Brendan Rittenhouse Green and Caitlin Talmadge, “Then What? Assessing the Military Implications of Chinese Control of Taiwan,” *International Security* 47, no. 1 (2022): 7–45. On the most escalatory PLA activities and infrastructure supporting China’s broader South China Sea operations, see Bonny Lin et al., *Competition in the Gray Zone: Countering China’s Coercion Against U.S. Allies and Partners in the Indo-Pacific* (Santa Monica: RAND Corporation, 2022), https://www.rand.org/pubs/research_reports/RR594-1.html. On the Sino-Indian border, see “How Is China Expanding Its Infrastructure to Project Power along Its Western Borders?” Center for Strategic and International Studies, ChinaPower, March 16, 2022, <https://chinapower.csis.org/china-tibet-xinjiang-border-india-military-airport-heliport>.

generation fighter could come online and many more enabler aircraft as well, but the H-20 will likely only be available by 2035 or later. The PLA Rocket Force's medium- and intermediate-range missiles would play a critical role in denying the U.S. forces access to areas near Taiwan and keeping high-value assets far from Taiwan's shores. The growing fleet of anti-ship and land-attack intermediate-range systems can threaten U.S. carrier strike groups and airfields that support continuous air operations, reducing the quantity of U.S. forces available to intervene in a Taiwan scenario.

In a South China Sea scenario, the PLA Air Force could contest any operating adversary air packages, strike disputed features and opposing forces, and help defend and resupply PRC artificial islands. In 2027, combat aircraft could play a role in these operations, more SAMs could be deployed to islands, and transports could help resupply forces. The PLA Rocket Force's conventional anti-ship ballistic missiles could deny areas that are critical for opposing forces to resupply and intervene. Any support infrastructure, including forward bases, airstrips, and ports, would be well covered by the Rocket Force's diverse fleet of conventional ballistic missiles and cruise missiles, bolstering the PLA's ability to project power to the South China Sea.

In a Sino-Indian border scenario, the PLA Air Force could posture air and air defense packages near the border, help obtain ISR near or over disputed areas, and resupply austere locations. Fixed-wing aircraft have played a limited role in border skirmishes to date, but key fighters could presumably play some role by 2027. Unmanned aerial vehicles could support ISR missions in the future, and transports could help provision border forces. The PLA Rocket Force's large arsenal of land-mobile short-range ballistic missiles could be effective in the mountainous terrain and deliver precision-fire coverage over key positions if required. Furthermore, even though a Sino-Indian border conflict is unlikely to escalate into a nuclear crisis, the PLA Rocket Force could provide strategic deterrence by maneuvering and posturing its road-mobile nuclear missiles.

Conclusion

For the PLA Air Force, a force-wide generational modernization of combat aircraft and the arrival of key enabler aircraft increasingly provide some of the desired capabilities of a strategic air force. In particular, its impressive SAM forces and perhaps some beyond-visual-range air-to-air missiles can be considered leading capabilities. However, the lack of clarity regarding whether the air force has truly moved beyond its 2004 "strategic

air force” concept to implement Xi Jinping’s “world-class” objectives from 2017 could call into question whether PLA leaders can be satisfied by the PLA Air Force’s progress. There is also evidence that some elements of hardware, along with personnel issues, training, “peace disease,” and corruption, continue to remain challenges. A third dynamic explicitly raised in some sources and implicitly in others is the extent to which the PLA Air Force could benchmark strategic or world-class capability against the U.S. Air Force, particularly due to the fear of falling behind leading aerospace developments. Whether such benchmarking is appropriate to guide its modernization progress by 2035 or 2049 and ultimately to support PLA joint operations in both time frames is also an open question. Interestingly, the areas in which the PLA Air Force is pushing ahead of other militaries, particularly SAMs, are the least symmetrical with U.S. capabilities in inventory and also receive little “world-class” limelight in PLA sources.

The PLA Rocket Force is closer to achieving world-class status, given that it has no immediately comparable competition and has invested decades into amassing a quiver of long-range, accurate, and increasingly survivable missiles. However, translating new weapon systems to combat effectiveness now hinges on elements beyond technology. Not only must the Rocket Force address corruption and the recent leadership reshuffle, but it likely also recognizes that building missiles is only one part of the equation. To realize the missiles’ maximum potential on the battlefield, the Rocket Force will have to integrate joint ISR capabilities with its missile brigades. In this sense, it will take more than rockets to achieve a world-class rocket force.

APPENDIX Options to identify detailed requirements for “world-class” air and conventional missile forces

#	Concept	Years present in the literature	Authors’ findings
Concepts specific to the PLA Air Force			
1	Official milestones stated for specific years	2018; 2022	Details most explicit for 2035 goals; milestones include the PLA Air Force becoming a strategic air force.
2	Strategic strike, air defense, and strategic projection	2016 through at least 2021	Scattered discussion; the most repeated terms focused on “strategic strike” and “strategic projection” as components of a strategic air force.
3	“Bright eyes, strong fists, and long arms” of early warning, bomber, and support aircraft	Occasional references, peaking from 2013 to 2016	Probably not integral to articulating requirements, but appears to describe some capabilities; may have drawn inspiration from a 2013 U.S. Air Force concept “global vigilance, global reach, global power.”
Concepts specific to the PLA Rocket Force			
4	“Dual-capable all-domain deterrence,” with three areas of focus: • Nuclear deterrence and retaliatory capabilities • Mid-to-long-range precision-strike capabilities • Strategic counterbalancing capabilities	2015, when the PLA Rocket Force became a full service	Predated the discussion of a world-class PLA Rocket Force, but frequently appears in writings that describe expectations for the force.
5	“The three core standard requirements”: “fight anytime, launch on time, and deal effective damage”	Since 2016–17	Often mentioned in descriptions of PLA Rocket Force training exercises; implicit connection between fulfilling these three requirements and becoming world-class.
6	“The three strategic capabilities”: “strategic counterbalancing, strategic deterrence and control, and strategic decisive victory”	Since 2019	Only appeared after the 2019 military parade; the terms are rarely used independently outside the context of “three strategic capabilities.”

Appendix continued

#	Concept	Years present in the literature	Authors' findings
Cross-PLA concepts			
7	Goals stated for 2035: further modernization in military theory, organizations, personnel, and equipment	Formalized at the 19th Party Congress in 2017	Applies across both the PLA Air Force (same emphases listed in PLA Air Force–specific milestones as the PLA-wide guidance) and PLA Rocket Force.
8	Political reliability, such as a component of “political loyalty and readiness for war” for the PLA Rocket Force	Always present	Frequent discussions for both services tied to “world-class,” and political reliability is the most fundamental expectation for the PLA Rocket Force; however, discussion was too numerous to scope; decided not to pursue further.
9	Identify service-specific accomplishments since the term “world-class” was first used	From 2012 or 2017 to present	Too hard to scope; decided not to pursue further.
10	Assessment of each service’s ability to carry out its <i>Science of Military Strategy</i> “strategic tasks”	From 2013 and/ or 2020 <i>Science of Military Strategy</i> to present	Too hard to scope; decided not to pursue further.

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