

PLA Rocket Force Modernization and China's Military Reforms

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PLA Rocket Force Modernization and China's Military Reforms

Testimony of Michael S. Chase¹
The RAND Corporation²

Before the U.S.-China Economic and Security Review Commission

February 15, 2018

On December 31, 2015, as part of a major reorganization of the People's Liberation Army (PLA), China renamed the PLA Second Artillery Force the PLA Rocket Force and upgraded it from its previous status as an independent branch to the level of a full service.³ This reflected the importance China attaches to its strategic missile force, which is responsible for the PLA's land-based ballistic and cruise missiles and serves as the cornerstone of the Chinese military's strategic deterrence and conventional precision strike capabilities.

Chinese leader Xi Jinping, who serves concurrently as Chinese Communist Party General Secretary, Central Military Commission (CMC) Chair, and President, has described the PLA Rocket Force as "China's core force for strategic deterrence, a strategic buttress for China's position as a major power, and an important cornerstone for defending national security."⁴ This formulation reflects the PLA Rocket Force's importance not only as a provider of key military capabilities and as a potential source of coercive leverage for Beijing but also as a highly visible symbol of China's great-power status. Indeed, as China has modernized its strategic missile force, Beijing has used a variety of channels—including military parades, official media reports, social media, and even a music video—to highlight its growing strategic deterrence and

¹ The opinions and conclusions expressed in this testimony are the author's alone and should not be interpreted as representing those of the RAND Corporation or any of the sponsors of its research.

² The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest.

³ See "China Inaugurates PLA Rocket Force as Military Reform Deepens," *Xinhua*, January 1, 2016, http://news.xinhuanet.com/english/2016-01/01/c_134970418.htm; and Kenneth Allen, Dennis J. Blasko, and John F. Corbett, "The PLA's New Organizational Structure: What Is Known, Unknown and Speculation (Part I)" *China Brief*, February 4, 2016, <https://jamestown.org/program/the-plas-new-organizational-structure-what-is-known-unknown-and-speculation-part-1/>.

⁴ See, for example, "President Xi Expects Strong, Modern Rocket Force," *Xinhua*, September 26, 2016, http://news.xinhuanet.com/english/2016-09/26/c_135715273.htm.

conventional precision strike capabilities.⁵ Key recent developments include the following:

- During the PLA's 90th anniversary parade in 2017, China highlighted its transition to a more modern and survivable nuclear deterrent by unveiling the Rocket Force's new DF-31AG intercontinental ballistic missiles (ICBMs), which feature improved launchers and greater mobility.
- Beijing underscored the growing flexibility and sophistication of its regional nuclear and conventional strike options by revealing the deployment of the DF-26 intermediate-range ballistic missile (IRBM), which has nuclear and conventional precision strike capabilities, as well a conventional anti-ship version.
- China is continuing to modernize the Rocket Force by developing the DF-41, a road-mobile ICBM capable of carrying multiple independently targetable reentry vehicles (MIRVs), and hypersonic glide vehicles (HGVs) for strategic deterrence and regional strike missions.

The further strengthening of the Rocket Force's already formidable capabilities will pose serious strategic and operational challenges for the United States and its allies and partners. First, the PLA Rocket Force's growing nuclear capabilities could have implications for U.S. extended deterrence and assurance of allies and partners. Second, the Rocket Force's growing conventional ballistic and cruise missile capabilities could pose a serious threat to U.S. forces and those of its allies and partners, including not only fixed facilities such as air bases but also surface ships, such as U.S. aircraft carriers. The United States should consider responding in the following ways:

- The United States should invest in maintaining and modernizing its own nuclear deterrence capabilities for purposes of strategic deterrence and assurance of allies and partners.
- The United States should take an increasingly multidimensional approach to extended deterrence and assurance and should highlight military and diplomatic actions—such as bilateral and multilateral training and exercises, high-level visits and exchanges, and other working-level initiatives—to underscore the determination of the United States to protect its security interests and support its allies and partners.
- The United States should continue to enhance the survivability and resilience of its forces and to encourage its allies and partners to do the same. Potential areas of investment could include undersea warfare, dispersal and hardening of forward-deployed assets, integrated air and missile defense, denial and deception, and other means of countering People's Republic of China (PRC) command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) capabilities.
- The United States should adapt its traditional approach to deterrence and assurance and be prepared to respond to Chinese coercive signaling or other attempts at intimidation, such as by demonstrating the ability to operate from numerous, dispersed, and unexpected locations; emphasizing U.S. denial and deception capabilities; and

⁵ Andrew Erickson, "Must Watch, Don't Be Deterred! The Official PLA Rocket Force Music Video," AndrewErickson.com, February 15, 2016, <http://www.andrewerickson.com/2016/02/must-watch-dont-be-deterred-the-official-pla-rocket-force-music-video/>.

highlighting capabilities that enable the United States to interfere with Chinese military operations from longer distances.

This testimony draws substantially from multiple lines of research being conducted at the RAND Corporation, including two significant recent efforts cited below that focused on the creation of the PLA's Strategic Support Force and on China's evolving nuclear deterrent. It is organized in five sections. The first section analyzes the PLA reorganization's implications for the Rocket Force. The second section provides an overview of PLA Rocket Force missions. The third section reviews PLA Rocket Force modernization trends. The fourth section assesses PLA Rocket Force future capabilities. The final section considers implications and recommendations for the United States.

PLA Reorganization and Its Implications for the PLA Rocket Force

As noted, as part of a major military reorganization announced at the end of 2015, China renamed and upgraded the PLA Rocket Force, formally giving it service-level status.⁶ On the whole, the modernization of the Rocket Force's nuclear and conventional missile capabilities and its elevation to the level of a full service as part of the reorganization are likely to further strengthen its position as the cornerstone of China's nuclear deterrent and the leading edge of its regional conventional strike capabilities. Nevertheless, the modernization and the reorganization of the PLA could also present the Rocket Force with some challenges. The continuing modernization of other components of the PLA—most notably the PLA Air Force (PLAAF) and PLA Navy (PLAN)—will increase the prominence of other services in the two key areas that the Rocket Force has traditionally dominated: strategic deterrence and short-, medium-, and long-range conventional strike capabilities. Along with these improvements in capabilities, PLAAF and PLAN modernization will present Beijing with new strategic signaling options. Indeed, China already appears to be using long-range bomber flights and aircraft carrier operations to send messages. As China's air and naval capabilities continue to grow, it will have an increasing number of strategic signaling options in addition to relying on the PLA Rocket Force to display its capabilities or launch missiles.

Moreover, prior to the PLA reorganization, the strategic missile force appears to have aspired to play a larger role in space and cyber warfare, a desire that seems to have resulted in competition with the PLAAF, because it also desired to play the leading role in these areas. For example, the chapter on missile force strategy in the 2013 edition of the PLA's *Science of Military Strategy* highlights the missile force's role in enabling the PLA to expand its operations into other domains and suggests that the missile force should play an increasingly important role

⁶ See "China Inaugurates PLA Rocket Force as Military Reform Deepens," *Xinhua*, January 1, 2016, http://news.xinhuanet.com/english/2016-01/01/c_134970418.htm; and Kenneth Allen, Dennis J. Blasko, and John F. Corbett, "The PLA's New Organizational Structure: What Is Known, Unknown and Speculation (Part I)" *China Brief*, February 4, 2016, <https://jamestown.org/program/the-plas-new-organizational-structure-what-is-known-unknown-and-speculation-part-1/>.

in space and cyberspace.⁷ As part of the reorganization, however, the PLA Strategic Support Force was established to take charge of the space, cyber, and electronic warfare mission areas.⁸

Nonetheless, looking ahead, the PLA Rocket Force will likely retain its status as China's core force for strategic deterrence and continue to play a central role in the conventional short-, medium-, and long-range strike mission area for the PLA. The PLA Rocket Force will continue to develop and deploy new capabilities (such as HGVs), many of which will pose serious strategic and operational challenges for the United States and its allies and partners.⁹

PLA Rocket Force Missions

The main tasks of the recently renamed PLA Rocket Force are the same as those of the PLA Second Artillery Force, but the Rocket Force's upgraded status within the PLA makes it all the more critical to appreciate its mission and responsibilities. The PLA Rocket Force is currently charged with nuclear and conventional deterrence and strike missions. These missions include "detering other countries from using nuclear weapons against China" and "conducting nuclear counterattacks and precision strikes with conventional missiles."¹⁰ And, of course, China's defense white papers never miss an opportunity to remind the world that the PLA Rocket Force "sticks to China's policy of no first use (NFU) of nuclear weapons, implements a self-defensive nuclear strategy, strictly follows the orders of the CMC, and takes as its fundamental mission the protection of China from any nuclear attack."¹¹ The conventional missile capabilities of the Rocket Force are characterized as being intended to fulfill the mission of conducting conventional precision strikes "against key strategic and operational targets of the enemy."¹²

In practice, this means that the Rocket Force has two main types of missions: strategic deterrence and warfighting missions.¹³ As for strategic deterrence, the Rocket Force must be prepared to conduct deterrence operations, both on a day-to-day basis and in the event of a crisis

⁷ Michael S. Chase, "Nuclear Policy Issues in the 2013 Edition of The Science of Military Strategy: Part 2 on PLA Second Artillery Force (PLASAF) Strategy and Capabilities," *China Brief*, July 2, 2015, <https://jamestown.org/program/nuclear-policy-issues-in-the-2013-edition-of-the-science-of-military-strategy-part-2-on-pla-second-artillery-force-plasaf-strategy-and-capabilities/>.

⁸ Kevin Pollpeter, Eric Heginbotham, and Michael S. Chase, *The Creation of the PLA Strategic Support Force and Its Implications for Chinese Military Space Operations*, Santa Monica, Calif.: RAND Corporation, RR-2058-AF, 2017, https://www.rand.org/pubs/research_reports/RR2058.html.

⁹ Lora Saalman, "China's Calculus on Hypersonic Glide," Stockholm International Peace Research Institute, August 15, 2017, <https://www.sipri.org/commentary/topical-background/2017/chinas-calculus-hypersonic-glide>; Joshua H. Pollack, "Boost-Glide Weapons and U.S.-China Strategic Stability," *Nonproliferation Review*, Vol. 22, No. 2, February 2016, pp. 155–164.

¹⁰ State Council Information Office of the People's Republic of China, *China's National Defense in 2008*, Beijing, January 2009, http://eng.mod.gov.cn/publications/2017-04/11/content_4778231.htm.

¹¹ Ibid.

¹² Ibid.

¹³ The Rocket Force can also play a role in military operations other than war (MOOTW), such as earthquake relief operations. See, for example, "Frequent Disaster Relief Operations Temper PLA's Combat Capability," *China Military Online*, August 11, 2014, http://eng.chinamil.com.cn/news-channels/china-military-news/2014-08/11/content_6089285.htm.

or conflict. In terms of its warfighting missions, the Rocket Force must be prepared to conduct nuclear or conventional missile strikes, either independently or as part of a joint campaign.

PLA Rocket Force Deterrence Operations

Conducting deterrence operations is a core function of China's strategic missile force. In this context, it is important to understand Chinese strategic deterrence concepts. The Chinese term usually translated as *deterrence*, *weishe*, possesses a broader meaning than what most of the policy and scholarly communities in the West have come to associate with deterrence. The Chinese concept of *weishe* is closer to what Thomas Schelling referred to as "coercion," as it encompasses both deterrence and compellence. Chinese military publications reflect this important difference, and noted Chinese scholars, such as Li Bin, have reached similar conclusions. Similarly, China's concept of strategic deterrence should be understood more broadly in that it entails not only nuclear deterrence, which PLA strategists believe is essential for responding to the most-severe threats to Chinese national security interests, but also conventional deterrence, which they believe provides China's leaders more flexibility. Notably, these strategists also maintain that China's conventional deterrence is becoming more effective and credible as a consequence of China's growing conventional military power, especially its long-range strike capabilities. Finally, China's conception of strategic deterrence also includes deterrence in the space and information domains.

Chinese strategists stress the importance of linking deterrence actions to political objectives, seeing deterrence, like war, as a continuation of politics and thus as a tool for achieving policy objectives and supporting China's overall national strategy. In this context, Chinese military strategists see the Rocket Force's nuclear and conventional missiles as ideal instruments for strategic deterrence operations because of their ability to launch rapidly, penetrate enemy missile defense systems, and destroy key targets.

In peacetime, the PLA Rocket Force supports strategic deterrence objectives in several ways, including displaying new missiles in military parades, participating in military exercises, or revealing missiles when an adversary's satellites are passing overhead. For example, Beijing undoubtedly intended to signal the growing capability and credibility of its nuclear deterrent when it used the military parade marking the PLA's 90th anniversary to reveal the existence of the newly developed DF-31AG ICBM, which is equipped with an improved mobile launcher to enhance its mobility and survivability.¹⁴ In a crisis or conflict situation, the Rocket Force can conduct higher-intensity deterrence operations, such as raising the readiness level of missile units, conducting exercise launches, or carrying out warning strikes. Significantly, even though China officially maintains a strict nuclear NFU policy, some PLA publications suggest that "lowering the nuclear threshold" could deter an enemy from launching conventional attacks against certain types of strategic targets, and Chinese strategists clearly see nuclear deterrence as relevant in any crisis or conflict involving a nuclear-armed adversary.

¹⁴ See "New Chinese Missile a More Mobile Deterrent: PLA," *The Straits Times*, August 5, 2017, <http://www.straitstimes.com/asia/east-asia/new-chinese-missile-df-31ag-a-more-mobile-deterrent>; Jeremy Page, "China Parades New Missile System in Warning to Rivals Abroad—and at Home," *Wall Street Journal*, July 30, 2017, <https://www.wsj.com/articles/chinas-new-missile-a-warning-to-rivals-abroadand-at-home-1501409739>.

PLA Rocket Force Nuclear and Conventional Missile Strike Campaigns

The PLA Rocket Force prepares for two major types of warfighting campaigns: the nuclear counterattack campaign and the conventional missile strike campaign. In keeping with China's NFU policy, the nuclear counterattack campaign is the only type of nuclear strike campaign discussed in Chinese military publications. They also state that such a campaign could be carried out independently by the Rocket Force or as a major part of a "joint nuclear counterattack campaign" involving the other services—as of early 2018, that means the PLAN, which currently deploys four out of a total projected number of eight Type 094 *Jin*-class ballistic missile submarines (SSBNs). But, according to Chinese officials, the PLAAF appears poised to regain a nuclear role for its bomber force, which would provide China with a credible nuclear triad.¹⁵ In any case, the nuclear counterattack campaign requires the survivability of the missile force and the ability to strike key enemy targets, and it would be executed strictly under the authority of the highest level of China's leadership. Chinese military publications also indicate that the nuclear counterattack campaign could be a large-scale or small-scale nuclear counterattack campaign and could consist of both initial nuclear strikes and follow-on nuclear strikes. This requires a nuclear force that enables China to hold some portion of its nuclear weapons in reserve after an initial nuclear exchange, so that it can deter further escalation or launch follow-on strikes if required.¹⁶

The PLA has also developed concepts for the employment of the Rocket Force's conventional missiles, either as an independent conventional missile strike campaign or as a key part of joint campaigns involving the other services, such as the PLA's joint blockade, amphibious landing, and anti-air raid campaigns. In particular, PLA publications underscore the centrality of conventional missile attacks in joint operations aimed at achieving information dominance, air superiority, and sea control, as well as countering third-party intervention. Chinese military publications on campaigns envision coordinated missile and air strikes against critical enemy targets, such as command and control facilities, communications and transportation nodes, air and missile defenses, and air bases.¹⁷ These campaigns require the Rocket Force to have a variety of modern and accurate missiles capable of conducting precision strikes against land- and sea-based targets.

¹⁵ Michael S. Chase, "Nuclear Bomber Could Boost PLAF Strategic Role, Create Credible Triad," *China Brief*, Vol. 17, No. 9, July 6, 2017.

¹⁶ Eric Heginbotham, Michael S. Chase, Jacob Heim, Bonny Lin, Mark R. Cozad, Lyle J. Morris, Christopher P. Twomey, Forrest E. Morgan, Michael Nixon, Cristina L. Garafola, and Samuel K. Berkowitz, *China's Evolving Nuclear Deterrent: Major Drivers and Issues for the United States*, Santa Monica, Calif.: RAND Corporation, RR-1628-AF, 2017, https://www.rand.org/pubs/research_reports/RR1628.html.

¹⁷ See Ron Christman, "Conventional Missions for China's Second Artillery Corps: Doctrine, Training, and Escalation Control Issues," in Andrew S. Erickson and Lyle J. Goldstein, eds., *Chinese Aerospace Power: Evolving Maritime Roles*, Annapolis, Md.: Naval Institute Press, 2011, pp. 307–327; and Michael S. Chase and Andrew S. Erickson, "The Conventional Missile Capabilities of China's Second Artillery Force: Cornerstone of Deterrence and Warfighting," *Asian Security*, July 2012, pp. 115–137.

PLA Rocket Force Modernization Trends

Over approximately the past two decades, China has modernized and expanded the size of its nuclear and conventional missile forces. This has greatly improved the Rocket Force's ability to conduct the deterrence operations and missile strike campaigns outlined earlier.

Nuclear Missile Force Modernization

With respect to the nuclear missile force in particular, key drivers of these changes have included Chinese assessments of threats posed by advances in U.S. ISR, precision strike, and missile defense capabilities.¹⁸ China describes its desired force structure as a “lean and effective” nuclear deterrent, one that is capable of ensuring retaliation following an enemy attack against China.¹⁹ China's focus on the effectiveness of its nuclear missile force can be traced to concerns expressed in PLA publications dating to the late 1980s, which outlined plans to improve China's nuclear counterattack capability by moving toward mobile launchers, improving survivability, increasing the ability to penetrate missile defenses, increasing the numbers of missiles and launch units, and improving command and control and support systems.

Chinese nuclear force modernization continues to focus on making progress in all of these areas. The U.S. Department of Defense reports that China is “developing and testing several new variants of missiles, forming additional missile units, retiring or upgrading older missile systems; and developing methods to counter ballistic missile defenses.”²⁰ According to the U.S. Department of Defense, “China's ICBM arsenal to date consists of approximately 75–100 ICBMs.”²¹ This includes the silo-based DF-5A, the silo-based DF-5B, which is equipped with MIRVs, the road-mobile DF-31 and DF-31A, and the older, shorter-range DF-4. PLA Rocket Force nuclear missile force modernization continues to focus on enhancing survivability and countering missile defense developments.²² Recent examples of this continuing effort include the new DF-31AG ICBMs referred to earlier, which feature improved launchers and greater

¹⁸ Eric Heginbotham, Michael S. Chase, Jacob Heim, Bonny Lin, Mark R. Cozad, Lyle J. Morris, Christopher P. Twomey, Forrest E. Morgan, Michael Nixon, Cristina L. Garafola, and Samuel K. Berkowitz, *China's Evolving Nuclear Deterrent: Major Drivers and Issues for the United States*, Santa Monica, Calif.: RAND Corporation, RR-1628-AF, 2017, https://www.rand.org/pubs/research_reports/RR1628.html.

¹⁹ See Fiona S. Cunningham and M. Taylor Fravel, “Assuring Assured Retaliation: China's Nuclear Posture and U.S.-China Strategic Stability,” *International Security*, Fall 2015, pp. 7–50; Jeffrey Lewis, “China's Nuclear Modernization: Surprise, Restraint, and Uncertainty,” in Ashley J. Tellis, Abraham M. Denmark, and Travis Tanner, eds., *Strategic Asia 2013–14*, Seattle, Wash.: National Bureau of Asian Research, October 2013, pp. 67–96; Michael S. Chase, “China's Transition to a More Credible Nuclear Deterrent: Implications and Challenges for the United States,” *Asia Policy*, July 2013, pp. 69–101; and M. Taylor Fravel and Evan S. Medeiros, “China's Search for Assured Retaliation,” *International Security*, Fall 2010, pp. 48–87.

²⁰ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2017*, Washington, D.C., May 2017, p. 31,

https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF.

²¹ *Ibid.*

²² Eric Heginbotham, Michael S. Chase, Jacob Heim, Bonny Lin, Mark R. Cozad, Lyle J. Morris, Christopher P. Twomey, Forrest E. Morgan, Michael Nixon, Cristina L. Garafola, and Samuel K. Berkowitz, *China's Evolving Nuclear Deterrent: Major Drivers and Issues for the United States*, Santa Monica, Calif.: RAND Corporation, RR-1628-AF, 2017, https://www.rand.org/pubs/research_reports/RR1628.html.

mobility.²³

The PLA Rocket Force also deploys nuclear medium-range ballistic missiles (MRBMs) and IRBMs for regional deterrence and strike missions.²⁴ The deployment of the DF-26 IRBM, which has nuclear and conventional precision strike capabilities, as well as a conventional anti-ship version, is another very important development in PLA Rocket Force modernization.²⁵

China has also developed an extensive network of tunnels and underground facilities to support many parts of the PLA. Official media reports emphasize how these facilities contribute to the Rocket Force's efforts to conceal its operations and enhance its survivability. For example, a June 2017 Chinese media report highlighted the release of a PLA Rocket Force video depicting an ICBM brigade's participation in a "month-long underground survival exercise in an unidentified facility 'beneath mountains.'"²⁶

Conventional Missile Force Modernization

Meanwhile, modernization of the Rocket Force's conventional missiles has focused on expanding the range of conventional missiles, enhancing their accuracy and ability to overcome enemy missile defense systems, and improving the rapid-response capabilities of missile units. According to the U.S. Department of Defense, the Rocket Force deploys DF-16 missiles with a range of about 800–1,000 km, conventional DF-21 MRBMs, and the DF-21D anti-ship ballistic missile.²⁷ In addition, the Rocket Force has about 1,200 short-range ballistic missiles and a number of CJ-10 ground-launched cruise missiles with a range of about 1,500 km.²⁸

Improved C4ISR, Training, and Readiness

Importantly, improvements in PLA Rocket Force capabilities have not been limited to the development and deployment of new types of nuclear and conventional missiles. China's strategic missile force has also improved its C4ISR and command automation capabilities. Highlights mentioned in PLA publications include laying thousands of miles of fiber optic cable,

²³ "New Chinese Missile a More Mobile Deterrent: PLA," *The Straits Times*, August 5, 2017, <http://www.straitstimes.com/asia/east-asia/new-chinese-missile-df-31-ag-a-more-mobile-deterrent>; Jeremy Page, "China Parades New Missile System in Warning to Rivals Abroad—and at Home," *Wall Street Journal*, July 30, 2017, <https://www.wsj.com/articles/chinas-new-missile-a-warning-to-rivals-abroadand-at-home-1501409739>.

²⁴ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2017*, Washington, D.C., May 2017, https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF.

²⁵ Eric Heginbotham, Michael S. Chase, Jacob Heim, Bonny Lin, Mark R. Cozad, Lyle J. Morris, Christopher P. Twomey, Forrest E. Morgan, Michael Nixon, Cristina L. Garafola, and Samuel K. Berkowitz, *China's Evolving Nuclear Deterrent: Major Drivers and Issues for the United States*, Santa Monica, Calif.: RAND Corporation, RR-1628-AF, 2017, https://www.rand.org/pubs/research_reports/RR1628.html.

²⁶ Zhao Lei, "Rocket Force More Versatile," *China Daily*, June 21, 2017, http://www.chinadaily.com.cn/china/2017-06/21/content_29825134.htm.

²⁷ U.S. Department of Defense, *Military and Security Developments Involving the People's Republic of China 2017*, Washington, D.C., May 2017, p. 31, https://www.defense.gov/Portals/1/Documents/pubs/2017_China_Military_Power_Report.PDF.

²⁸ *Ibid.*

along with the deployment of mobile command systems and the “integrated command platform.”²⁹ These advances, along with the restructuring of the PLA, are intended to yield improvements in joint campaign command and control and operations. Additionally, Rocket Force training is becoming more realistic and complex, in line with PLA-wide directives aimed at improving the quality of military training. For the Rocket Force, this is a long-running project, one that includes such improvements as training in a “complex electromagnetic environment,” incorporation of opposing forces, cross-region mobility training, counter-ISR training, and more-rigorous examination and evaluation of missile force units. Finally, the Rocket Force appears to be focused on improving the readiness of its missile launch units. As a result, according to a recent official media report, “on-duty cells are ready to fire missiles immediately when ordered.”³⁰

PLA Rocket Force Future Capabilities

China’s 2015 defense white paper on military strategy highlights the importance of continuing to modernize the PLA Rocket Force’s capabilities in support of its nuclear and conventional deterrence and strike missions.³¹ The white paper states that the Rocket Force will “strengthen its capabilities for strategic deterrence and nuclear counterattack,” as well as improve its conventional precision strike capabilities. Additionally, the white paper indicates that, going forward, “in line with the strategic requirement of being lean and effective and possessing both nuclear and conventional missiles,” the Rocket Force “will strive to transform itself in the direction of informationization,³² press forward with independent innovations in weaponry and equipment by reliance on science and technology, enhance the safety, reliability and effectiveness of missile systems, and improve the force structure featuring a combination of both nuclear and conventional capabilities.”³³

²⁹ The “integrated command platform” is intended to strengthen joint command and control and improve the PLA’s ability to conduct networked operations. See Joel Wuthnow, “A Brave New World for Chinese Joint Operations,” *Journal of Strategic Studies*, Vol. 40, Nos. 1–2, February 2017, pp. 169–195; and Kevin Pollpeter, Eric Anderson, Joe McReynolds, Leigh Ann Ragland, and Gary L. Thomas, “Enabling Information-Based System-of-System Operations: The Research, Development and Acquisition Process for the Integrated Command Platform,” University of California, San Diego, Study of Innovation and Technology in China Policy Brief, January 2014, <https://escholarship.org/uc/item/6f26w11m>.

³⁰ Zhao Lei, “Rocket Force More Versatile,” *China Daily*, June 21, 2017, http://www.chinadaily.com.cn/china/2017-06/21/content_29825134.htm.

³¹ State Council Information Office of the People’s Republic of China, *China’s Military Strategy*, Beijing, May 2015, http://english.gov.cn/archive/white_paper/2015/05/27/content_281475115610833.htm.

³² For the PLA, according to Elsa Kania and John Costello, *informationization* (which is sometimes translated as *informatization*) is a concept that encompasses “the comprehensive integration of information technology into the PLA and the improvement of its ability to utilize information.” Elsa Kania and John Costello, “China Quest for Informatization Drives PLA Reforms,” *The Diplomat*, March 4, 2017, <https://thediplomat.com/2017/03/chinas-quest-for-informatization-drives-pla-reforms/>.

³³ State Council Information Office of the People’s Republic of China, *China’s Military Strategy*, Beijing, May 2015, http://english.gov.cn/archive/white_paper/2015/05/27/content_281475115610833.htm.

Looking ahead, the PLA Rocket Force has a number of new capabilities under development to support the modernization objectives outlined in official documents and other military publications. For example, China is developing the DF-41, a new road-mobile ICBM capable of carrying MIRVs. Some reports indicate that China might also deploy a rail-mobile version of the DF-41 ICBM.³⁴ And, as noted, China is developing HGVs for the PLA Rocket Force. The development of HGVs appears to be a high priority for China and is most likely aimed at countering missile defenses to enhance the Rocket Force's strategic deterrence and conventional precision strike capabilities.³⁵

Implications and Recommendations for the United States

The PLA Rocket Force has made impressive strides in the modernization of its nuclear and conventional missile force capabilities. It has moved from a nuclear missile force composed of outdated silo-based ICBMs and older regional nuclear strike capabilities to an upgraded force that features more-survivable road-mobile ICBMs and more-modern regional capabilities, such as the DF-26 IRBM. The PLA Rocket Force has also developed an imposing conventional ballistic and cruise missile force and elaborated concepts for its employment to conduct precision strikes and for deterrence and coercive diplomacy.

The PLA Rocket Force's growing nuclear capabilities raise important implications for U.S. extended deterrence and assurance of allies and partners. U.S. allies and partners will likely be concerned about the possibility they will become targets of Chinese threats. They are also likely to worry that China could wield the Rocket Force's growing capabilities in ways that are intended to undermine U.S. willingness or ability to intervene militarily to support allies and partners in the event of a crisis or conflict in the region.

As for the Rocket Force's growing conventional ballistic and cruise missile capabilities, they could pose serious challenges for the United States and its allies and partners in the region. In particular, these capabilities could pose an extremely grave threat to Taiwan in various cross-strait conflict scenarios. China's conventional missile force capabilities could also present serious challenges to the U.S. forces in the region if the United States intervened militarily in a conflict involving China. In particular, in a conflict around China's periphery, China's development of advanced conventional missiles highlights the potential vulnerability of fixed facilities, such as air bases, as well as surface ships, such as U.S. aircraft carriers.

In response, U.S. policymakers should consider the following recommendations. First, the United States will need to invest in maintaining and modernizing its own nuclear deterrence capabilities. Modern, survivable, reliable, and flexible nuclear forces are required for strategic deterrence and for assurance of U.S. allies and partners. Congress, through the appropriations

³⁴ Sun Wenyu, "China's Latest Intercontinental Missile Expected to Be Deployed Next Year," *People's Daily Online*, November 28, 2017, <http://en.people.cn/n3/2017/1128/c90000-9297997.html>.

³⁵ Lora Saalman, "China's Calculus on Hypersonic Glide," Stockholm International Peace Research Institute, August 15, 2017, <https://www.sipri.org/commentary/topical-backgrounder/2017/chinas-calculus-hypersonic-glide>; Joshua H. Pollack, "Boost-Glide Weapons and U.S.-China Strategic Stability," *Nonproliferation Review*, Vol. 22, No. 2, February 2016, pp. 155–164.

process and its oversight responsibilities, will continue to play a vital role in shaping the modernization of U.S. nuclear forces.

Second, the United States will also likely have to take an increasingly multidimensional approach to assuring its allies that it will continue to maintain the capability and the resolve to support them in a crisis. The United States should also take military and diplomatic actions—such as bilateral and multilateral training and exercises, high-level visits and exchanges, and other working-level initiatives—that help underscore its determination to protect U.S. security interests and support U.S. allies and partners in the region. Members of Congress, particularly those with an interest in national security issues, may also wish to show the United States’ commitment to its allies and partners through congressional delegation visits.

Third, the United States should enhance the survivability and resilience of its forces in the region, and Washington should encourage its allies and partners to do the same. The United States must also continue to develop new operational concepts and capabilities. Potential areas of investment could include undersea warfare, the dispersal and hardening of forward-deployed assets, integrated air and missile defense, and capabilities that would make it more difficult for China to locate and strike key platforms, such as by complicating PRC targeting through denial and deception and other means.

Fourth, the United States should study ways to adapt its traditional approach to deterrence and assurance of allies and partners. In particular, it will need to be able to demonstrate its willingness and ability to employ combat power that is both sufficient to influence the calculations of decisionmakers in Beijing and less vulnerable to preemptive missile strikes. The United States should be prepared to respond to Chinese coercive signaling or other attempts at intimidation by employing the Rocket Force’s formidable capabilities. For example, the United States should be prepared to respond by

- conducting exercises and demonstrating the ability to operate from numerous, dispersed, and potentially unexpected locations
- emphasizing U.S. denial and deception capabilities to generate uncertainty about China’s ability to observe and assess U.S. actions
- highlighting capabilities that enable the United States to interfere with Chinese military operations from longer distances, beyond the reach of the Rocket Force’s long-range conventional strike capabilities or at least at ranges where they are more limited.

In conclusion, the continuing modernization of the PLA Rocket Force will likely pose increasingly serious strategic and operational challenges to the United States and its allies and partners. As China’s sweeping military reforms continue to unfold, the United States will need to continue to closely monitor the development of China’s strategic missile force and to modernize and adapt in response to ensure its ability to protect its regional security interests.