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The Chinese Military: Overview and Issues for Congress

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Summary

China is building a modern and regionally powerful military with a limited but growing capability for conducting operations away from China's immediate periphery. The question of how the United States should respond to China's military modernization effort is a central issue in U.S. defense planning and foreign policy. Congress' decisions on this issue could affect U.S. defense strategy, budgets, plans, and programs, and the U.S. defense industrial base.

China has engaged in a sustained and broad effort over more than 25 years to transform its military, the People's Liberation Army (PLA), from an infantry-heavy, low-technology military into a high-technology, networked force with an increasing emphasis on joint operations and naval and air power. China has emphasized quality over quantity during this modernization: the number of military personnel and certain platforms (e.g., aircraft, tanks, certain vessels) has declined even as overall capabilities have improved.

From 2005 through 2014, China's official military budget increased at an average rate of 9.5% per year in real terms, allowing the PLA to improve its capabilities in many dimensions. PLA naval forces feature quieter submarines, large surface combatants with improved air defenses and long-range anti-ship cruise missiles, and a nascent aircraft carrier program. New air power capabilities include modern fighter aircraft, more supporting platforms and a variety of unmanned aerial vehicles (UAVs) in production and under development. The PLA has increased the number and accuracy of its ballistic missiles for both nuclear and conventional strike missions. China has launched numerous satellites for military communications, surveillance, and navigation, and also has developed a variety of counter-space capabilities. The cyber operations of the PLA are harder to characterize, but reports indicate that China has invested heavily in this area.

Despite the acquisition of modern equipment, the PLA has weaknesses and limitations that constrain the effectiveness of its operations, including training, jointness, human capital, and logistics. The short war with Vietnam in 1979 was China's last major conflict, and the PLA has not been involved in sustained combat since the Korean War (1950-1953) and a limited border war with India (1962). Although PLA planning and force posture is concentrated on contingencies in China's periphery, including the East China Sea and South China Sea, since the late 2000s the PLA has expanded the geographic scope of its operations.

Many American China-watchers assert that China's main reason for strengthening the PLA is to ensure that the status of Taiwan is resolved on terms favorable to Beijing. Experts believe that other reasons for China's military modernization are to weaken the U.S. network of alliances and to become the leading regional power in a more multipolar East Asia. Experts emphasize the improvements in China's anti-access/area-denial (A2/AD) capabilities—modern aircraft, vessels, and missiles that can prevent opposing militaries from operating freely in the skies and seas near China, and can prevent reinforcements from arriving.

Congress could choose to address the issue of China's changing military capabilities through hearings, authorizing and policy legislation, defense budget allocations, and other means. Some examples of past legislation with significant, continuing impacts include the 1979 Taiwan Relations Act; the 1991 law prohibiting U.S. arms exports to China; and the National Defense Authorization Act (NDAA) for FY2000, which sets guidelines for U.S.-China military-to-military contacts. In recent hearings, resolutions, and laws, especially NDAA's, Congress has provided prescriptions and guidance regarding U.S. policy toward Asia-Pacific security issues. Budget allocations for specific U.S. defense programs might also be tied to assessments of China's military capabilities and intentions.

Contents

Introduction	1
Sources	1
Background	2
Overview of the Chinese Military	2
China’s Military Modernization	4
Date of Inception.....	4
Broad Modernization Effort.....	5
Quality vs. Quantity	6
Goals of Military Modernization Effort.....	7
China’s Security Strategy and Perceptions.....	7
China’s Perceptions of Its Security Environment	9
China’s Intentions for Its Military.....	10
Selected Elements of Military Modernization	12
Air Power	12
Naval Power.....	13
Ground Forces.....	14
Ballistic Missile and Nuclear Forces	16
Space Capabilities.....	17
Cyber Capabilities.....	18
Weaknesses and Limitations	19
China’s Defense Budget.....	21
The Official Defense Budget and Outside Analyses.....	22
China’s Defense Industry	23
Geographic Scope of China’s Military Operations	25
Taiwan Strait	25
Hotspots in East Asia	26
Global Operations of the PLA	27
U.S.-China Military-to-Military Relations.....	28
U.S. Responses to China’s Changing Military Capability	29
Issues for Congress.....	31
Assessing China’s Military Capability.....	31
Assessing China’s Intentions for Its Military.....	33
Responding to China’s Changing Military Capability	34

Figures

Figure 1. Chinese Military and Security Personnel.....	2
Figure 2. Map of China’s Theater Commands and Surrounding Area	4
Figure 3. PLA Modernization by Type of Forces, 2000-2010.....	5
Figure 4. Numbers of Modern and Legacy PLA Fighter Aircraft, 1990-2014	6
Figure 5. Percentage of GDP Spent on the Military	22

Appendixes

Appendix A. Past Legislative Activity	36
Appendix B. China’s Strategic Culture	40

Contacts

Author Contact Information	42
Acknowledgments	42

Introduction

China (officially known as the People's Republic of China, PRC) is building a modern and regionally powerful military with a limited but growing capability for conducting operations away from China's immediate periphery. The question of how the United States should respond to China's military modernization effort is a central issue in U.S. defense planning and foreign policy. Congress' decisions on this issue could affect U.S. defense strategy, budgets, plans, and programs, and the U.S. defense industrial base.

This report provides a brief overview of the Chinese military. In order to cover a wide range of issues in a concise format, the report does not go into great depth on many topics and omits other topics that might be considered germane. CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke, provides more in-depth discussion of China's naval modernization effort. A partial list of CRS reports on related topics includes:

- CRS Report R43894, *China's Air Defense Identification Zone (ADIZ)*, by Ian E. Rinehart and Bart Elias
- CRS Report R42784, *Maritime Territorial and Exclusive Economic Zone (EEZ) Disputes Involving China: Issues for Congress*, by Ronald O'Rourke
- CRS Report R44072, *Chinese Land Reclamation in the South China Sea: Implications and Policy Options*, by Ben Dolven et al.
- CRS Report R43116, *Ballistic Missile Defense in the Asia-Pacific Region: Cooperation and Opposition*, by Ian E. Rinehart, Steven A. Hildreth, and Susan V. Lawrence
- CRS Report R41108, *U.S.-China Relations: An Overview of Policy Issues*, by Susan V. Lawrence
- CRS Report R41007, *Understanding China's Political System*, by Susan V. Lawrence and Michael F. Martin
- CRS Report RL33534, *China's Economic Rise: History, Trends, Challenges, and Implications for the United States*, by Wayne M. Morrison

Sources

This report is based on unclassified open-source information, such as Chinese defense white papers, the annual U.S. Department of Defense (DOD) report to Congress on military and security developments involving China,¹ standard published reference sources such as those from the International Institute for Strategic Studies (IISS), *IHS Jane's*, and press reports.

¹ Department of Defense, *Annual Report to Congress [on] Military and Security Developments Involving the People's Republic of China 2015*, Washington, DC, undated but released May 2015. Hereinafter *2015 DOD CMSD*. The 2010-2014 editions of the report are cited similarly. The 2009 and earlier editions of the report were known as the *Annual Report to Congress [on the] Military Power of the People's Republic of China*, hereinafter *DOD CMP*.

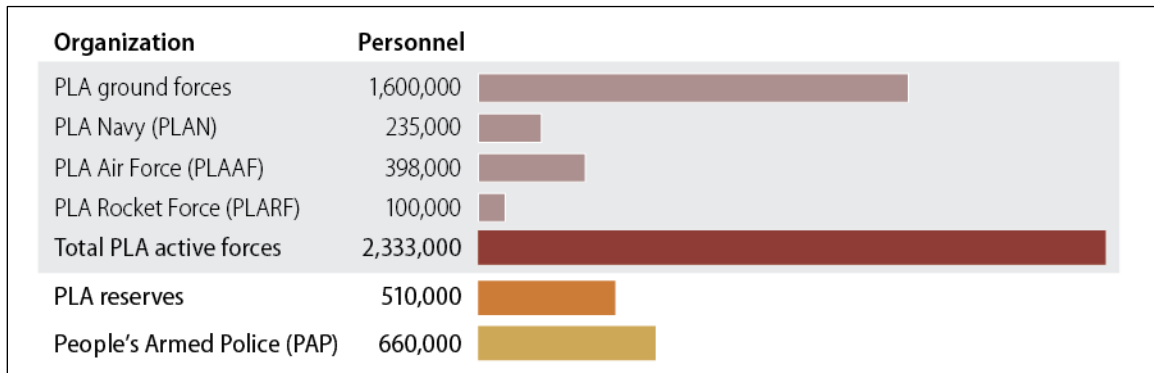
Background

Overview of the Chinese Military

China’s military is formally called the People’s Liberation Army (PLA). The PLA shares many features in common with militaries around the world, but its organization has many unique features. The PLA is divided into four services (for ground, naval, air, and missile forces) and the Strategic Support Force, which appears to be responsible for logistics, space and cyber capabilities, and development of information technology (Figure 1).² Two-thirds of the PLA currently is composed of ground forces, and generals from the ground forces have historically dominated top PLA leadership. China’s plan to cut 300,000 troops in the near future may shift force structure and leadership ratios in favor of the naval and air forces. Although an earlier incarnation of the PLA fought against Imperial Japan (1937-1945) and won its signature victory in the Chinese Civil War (1945-1949) against the Nationalist (Kuomintang) forces of Chiang Kai-shek, it has no recent combat experience. The short war with Vietnam in 1979 was China’s last major conflict, and the PLA has not been involved in sustained combat since the Korean War (1950-1953) and the brief border war with India (1962). China does not have military allies, effectively.³

Figure 1. Chinese Military and Security Personnel

Figures are approximate



Source: *The Military Balance 2016*, International Institute for Strategic Studies (London: Routledge, 2016).

Alongside the PLA active and reserve forces, China maintains the People’s Armed Police Force (PAP), a paramilitary police force whose primary mission is to provide internal security (e.g., as riot police for major disturbances). China also has a formal “militia” composed of citizens who would be called on to assist the PLA with domestic security and logistics functions during war.

The allegiance of the PLA to the ruling Chinese Communist Party (CCP, or the Party) has shaped the PLA’s history and its present functions. Unlike the U.S. Department of Defense’s relationship with the U.S. military, China’s Ministry of National Defense does not govern the PLA, but instead manages PLA interactions with foreign militaries and defense agencies. The CCP exercises civilian oversight of the PLA through the Central Military Commission (CMC), a

² David Finkelstein, *Initial Thoughts on the Reorganization and Reform of the PLA*, Center for Naval Analyses, CNA China Studies, January 2016.

³ China and North Korea are nominal allies, dating from the Korean War, but some analysts assess that neither country views this alliance necessarily as a strong commitment to defend the other.

powerful body in the Chinese political system currently chaired by Party General Secretary Xi Jinping.⁴ In late 2015 and early 2016, China outlined major reforms to the organization of the PLA. The reforms have several stated objectives, including: rationalize the force structure for China's current security environment, improve joint (inter-service) command and control structures, centralize administrative authority under the CMC, increase oversight to eliminate corruption, and improve the professional military education system.⁵ Many details of the organizational reforms remain unclear as of March 2016, but the far-reaching scope of the changes indicates that China's defense elites have a desire to address deep-rooted problems. The timing of the reforms could suggest that Chinese leaders see their country's external security environment as stable enough to allow a period of internal disorganization during the implementation process.⁶

China divides its territory into five large Theater Commands (战区, sometimes translated as "theater" or "battle zone"), each covering at least three provinces or autonomous regions (**Error! Not a valid bookmark self-reference.**). Prior to the PLA organizational reforms announced in late 2015 and early 2016, there were seven areas, called Military Regions, which functioned as administrative organizations in charge of training and other preparations during peacetime and may have constituted temporary operational war zone headquarters during a national security emergency.⁷ The new Theater Commands reportedly will have fewer administrative functions and instead focus on integrating inter-service (joint) operations in the operational chain of command.⁸

⁴ The CCP has separate processes to appoint its General Secretary and the CMC Chairman. Xi also holds the title of President of the PRC. For information and analysis on the place of the Chinese military within China's political system, see CRS Report R41007, *Understanding China's Political System*, by Susan V. Lawrence and Michael F. Martin.

⁵ Kenneth Allen, Dennis Blasko, and John Corbett, "The PLA's New Organizational Structure: What Is Known, Unknown and Speculation," *China Brief*, vol. 16, no. 3 (February 8, 2016).

⁶ David Finkelstein, *Initial Thoughts on the Reorganization and Reform of the PLA*, Center for Naval Analyses, CNA China Studies, January 2016.

⁷ Dennis J. Blasko, *The Chinese Army Today: Tradition and Transformation for the 21st Century*, 2nd ed. (New York: Routledge, 2012), pp. 38-40.

⁸ Kenneth Allen, Dennis Blasko, and John Corbett, "The PLA's New Organizational Structure: What is Known, Unknown and Speculation," *China Brief*, vol. 16, no. 3 (February 8, 2016).

Figure 2. Map of China's Theater Commands and Surrounding Area
Boundaries of Theater Commands are unofficial and approximate



Source: “Army Adjustment and Establishment Completed in Five Theater Commands,” *China Military Online*, February 4, 2016, http://english.chinamil.com.cn/news-channels/china-military-news/2016-02/04/content_6890499.htm. Map created by CRS from ESRI data.

Notes: Boundaries of Theater Commands are unofficial and approximate.

China’s Military Modernization

China has engaged in a sustained and broad effort to transform the PLA from an infantry-heavy, low-technology, ground forces-centric military into a high-technology, networked force with an increasing emphasis on joint operations and naval and air power projection.

Date of Inception

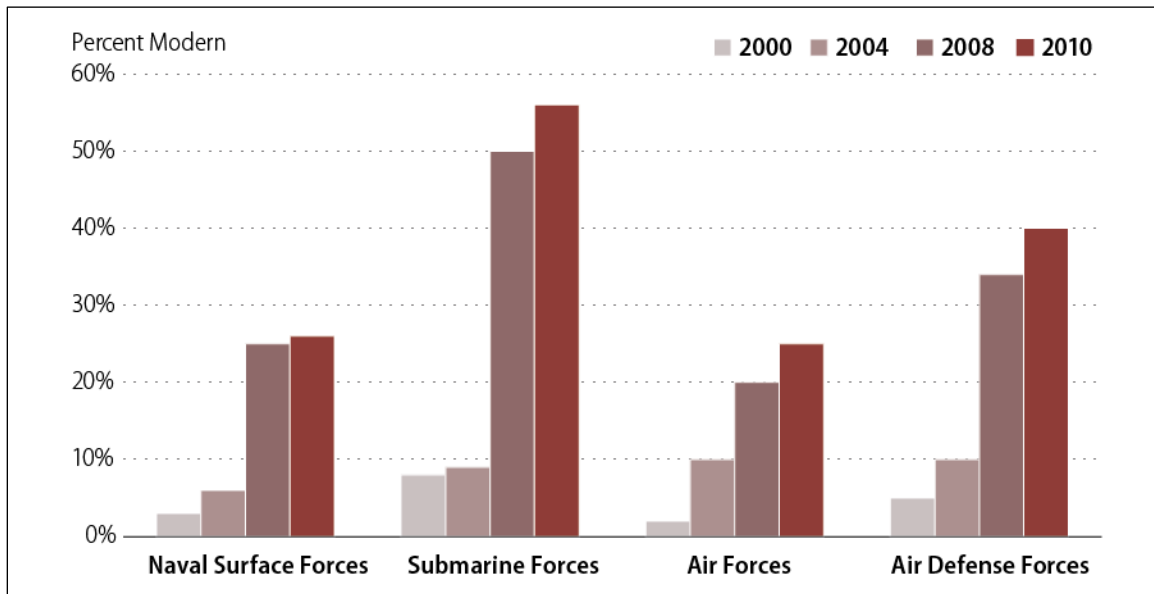
The opening and reform of the Chinese economy, beginning in 1978 under Chinese leader Deng Xiaoping, provided the economic and fiscal conditions for the PRC to increase its defense spending. Modernization of national defense was one of Deng’s “Four Modernizations,” albeit the third, after agriculture and industry. The success of U.S. military operations against Iraq in

Operation Desert Storm in 1991 demonstrated to Chinese strategists the enormous advantage that a high-technology force has over less-advanced adversaries.⁹ China increased its defense investments in the early 1990s with the stated goal of building a military that could prevail in a limited conflict “under high-technology conditions.” The 1995-1996 Taiwan Strait crisis, in which the United States sent two aircraft carriers near Taiwan (officially known as the Republic of China, ROC) as a show of resolve, reinforced to Beijing the lesson that China must develop a modern military to secure its national interests.¹⁰

Broad Modernization Effort

Certain aspects of China’s military modernization receive international media attention, especially high-tech weapons, but the PLA is modernizing nearly every aspect of its warfighting equipment, personnel system, training practices, and more. The process of replacing Cold War-era equipment and systems with new, high-tech stock has been uneven, however, because the PLA is so large and organizationally segmented, because new equipment is continually upgraded or made obsolete, and because the PLA has prioritized certain technologies for strategic reasons (see **Figure 3**). Nevertheless, through a combination of foreign acquisition and indigenous development, the PLA is gradually modernizing its forces in all domains of combat (see the section “Selected Elements of Military Modernization”).

Figure 3. PLA Modernization by Type of Forces, 2000-2010



Source: 2011 DOD CMSD, p. 43.

Notes: The DOD report notes, “For surface combatants ‘modern’ is defined as multi-mission platforms with significant capabilities in at least two warfare areas. ‘Modern’ for submarines is defined as those platforms capable of firing an anti-ship cruise missile. For air forces, ‘modern’ is defined as 4th generation platforms (Su-27, Su-30,

⁹ See, for example, Robert Farley, “What Scares China’s Military: The 1991 Gulf War,” *National Interest*, November 24, 2014.

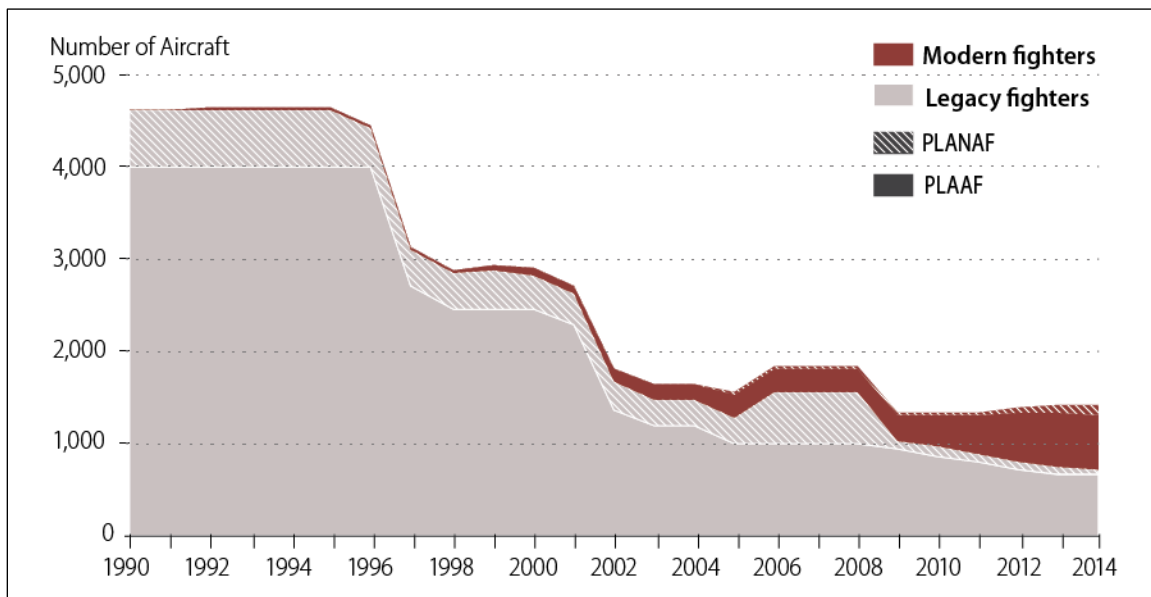
¹⁰ “The U.S. response in the 1995-96 Taiwan Strait crisis underscored to Beijing the potential challenge of U.S. military intervention and highlighted the importance of developing a modern navy, capable of conducting A2AD [anti-access/area-denial] operations....” 2011 DOD CMSD, p. 57.

F-10) and platforms with 4th generation-like capabilities (FB-7). ‘Modern’ SAMs are defined as advanced, long-range Russian systems (SA-10, SA-20), and their PRC indigenous equivalents (HQ-9).”

Quality vs. Quantity

China’s military modernization efforts have emphasized quality over quantity, in both equipment and personnel. Total numbers of platforms (e.g., surface vessels, tanks, fighter aircraft) have declined from their 1990s levels in many categories, but the PLA’s overall capabilities have increased. Many of the PLA’s older major weapons systems are legacy platforms from the Cold War era, a time when Chinese defense technology lagged far behind, but the ratio of modern to older platforms is steadily increasing. For example, China’s inventory of fighter aircraft has declined sharply since the mid-1990s to about 1,500 aircraft, but the percentage of that inventory that is composed of modern, fourth-generation-and-above fighters has grown to nearly 50% (see **Figure 4**). In personnel terms, the PLA has shrunk significantly from its estimated size of 3.03 million active personnel in 1992.¹¹ However, in the past decade the PLA has reportedly made progress in recruiting more educated and qualified personnel and in raising the quality of its professional military education.

Figure 4. Numbers of Modern and Legacy PLA Fighter Aircraft, 1990-2014



Source: Michael S. Chase, Jeffrey Engstrom, and Tai Ming Cheung, et al., *China’s Incomplete Military Transformation: Assessing the Weaknesses of the People’s Liberation Army (PLA)*, RAND Corporation, Santa Monica, CA, 2015, p. 102; data from IISS, various years.

Notes: PLANAF stands for PLA Navy Air Forces, i.e., naval aviation. PLAAF stands for PLA Air Force. The RAND report notes, “Modern fighters are fighter aircraft in the PLAAF or PLANAF inventories that fall under the Western convention of fourth-generation or above and include the fourth-generation J-10 and Su-30 and the 4.5-generation J-11. Legacy fighters are fighter aircraft within the Western convention of third generation or below. For the periods examined, these include the first-generation J-5, the second-generation J-6 and some J-7 variants, the third-generation J-7 variants, and the J-8.”

¹¹ *The Military Balance 1992-1993*, International Institute for Strategic Studies (London: Brassey’s, 1992), p. 145.

Goals of Military Modernization Effort

Chinese leaders have long called for the PLA to become a modern military with the capability to secure China's national interests from external and internal threats. The PLA began its transformation with the goal of being able to fight and win limited conflicts near China “under high-technology conditions”—merely an aspiration for the Chinese military in the 1990s. DOD and other analysts assess that the security challenge of prevailing in a military contingency related to Taiwan has been the “main strategic direction” of the PLA and the focus of its planning and modernization efforts since the early 1990s.¹² Although the PRC has never controlled Taiwan, it claims sovereignty over the island democracy and has long threatened to use force to prevent Taiwan from formalizing independence from mainland China. One observer states, “In [the PLA's] central planning efforts focused on Taiwan, the potential for U.S. involvement has weighed heavily in force modernization and the development of operational concepts designed to counter key U.S. technological advantages.”¹³ DOD and other analysts argue that China's military modernization was explicitly designed to keep the U.S. military from sending reinforcements to a conflict by controlling access to naval approach routes through a variety of stand-off attacks.¹⁴

As the PLA becomes more capable of executing a broader and more complex range of missions, China's goals for the PLA are evolving as well. In the near term, the PLA aims to improve its capabilities in “diverse spatial and functional areas, including information warfare, trans- and extra-regional mobility, long-distance maneuverability, effective counterterrorism, extended maritime depth, strategic air projection, and robust strategic nuclear deterrence.”¹⁵ The PRC 2015 defense white paper titled *China's Military Strategy* lays out a range of expectations to include international security cooperation activities in distant areas and joint ground, naval, and air operations to defend China's expanding national interests.

China's Security Strategy and Perceptions

China's strategic culture is grounded in ancient military strategy combined with the strategic principles (referred to as “military thought” or 军事思想 in Chinese) of early CCP leader Mao Zedong (leader of the PRC 1949-1976). Successive generations of Chinese leaders have built upon these pillars so that they apply to the current age of modern warfare. Classic texts such as Sun Tzu's *The Art of War* continue to guide Chinese strategists in using deception, leveraging all aspects of national power, disrupting the enemy's alliances, attacking the enemy's strategy, and the preference for achieving the state's objectives without using force.¹⁶ For more discussion, see **Appendix B**.

The principle of “Active Defense” is China's strategic stance of not attacking unless attacked, but seizing the initiative on the “operational level” once China is under attack on the “strategic level.” Active Defense continues to be the strategic guideline for China's national defense. Chinese

¹² 2012 DOD CMSD, p. 6, and other editions of the DOD CMSD.

¹³ Mark Cozad, “The PLA and Contingency Planning,” in *The People's Liberation Army and Contingency Planning in China*, ed. Andrew Scobell, Arthur Ding, Phillip Saunders, and Scott Harold (Washington, DC: National Defense University Press, 2015), pp. 15-32.

¹⁴ Ashley Tellis, “Uphill Challenges: China's Military Modernization and Asian Security,” in *Strategic Asia 2012-13: China's Military Challenge*, ed. Ashley Tellis and Travis Tanner (Seattle: National Bureau of Asian Research, 2012), p. 12.

¹⁵ Tellis, “Uphill Challenges: China's Military Modernization and Asian Security” (2012), p. 12.

¹⁶ Dennis J. Blasko, *The Chinese Army Today: Tradition and Transformation for the 21st Century*, 2nd ed. (New York: Routledge, 2012), pp. 115-138.

military leaders describe Active Defense as being “on the whole” strategically defensive but “on the specifics” operationally offensive in order to achieve goals that are perceived as strategically defensive.¹⁷ This understanding might be used to justify a pre-emptive strike if China’s leaders deem that the country’s strategic interests are under threat. American experts on the PLA have suggested that China might carry out a military first strike in response to foreign non-military actions, such as those in the political domain, if Beijing sees those actions as an attack on China at the strategic level.

In the nuclear realm, however, China asserts a doctrine of “no first-use,” meaning that it would not launch a nuclear attack on another country unless that country has struck first with nuclear weapons. The PRC has described its doctrine for response to a nuclear attack as “limited nuclear retaliation,”¹⁸ and outside assessments concur that the size of China’s nuclear weapons arsenal is far below that of the U.S. or Russian arsenals (see “Ballistic Missile and Nuclear Forces,” below). Many observers note that the no first-use doctrine may be subject to change under the pressure of war or depend on circumstances, although there are indications that Chinese leaders are sincere in promoting this policy.¹⁹

In 2004, Hu Jintao, CCP leader 2002-2012, tasked the military with a new mission set called the New Historic Missions, which expanded the definition and geographic scope of China’s security interests. The missions can be summarized as: (1) reinforcing the PLA’s loyalty to the CCP; (2) ensuring China’s economic development by defending China’s sovereignty, territorial integrity (prevent Taiwan’s “secession”), and domestic security; (3) defending China’s expanding national interests, especially in the maritime, space, and cyberspace domains; and (4) preventing the outbreak of conflict by improving deterrence and through international security cooperation.²⁰

Current leader Xi Jinping is pursuing the development of a strong military as a necessity for realizing the “Chinese Dream,” which is Xi’s aspirational phrase for a modern, strong, and prosperous China.²¹ Xi emphasizes developing the PLA’s actual fighting capabilities as the main goal of military modernization efforts,²² calling on the military to enhance its “real combat awareness” and be able to “fight and win wars.”²³ Xi has carried out an intense anti-corruption campaign throughout the armed forces, investigating and punishing high-level officers across the military’s leadership. Analysts have posited that corruption investigations are being used to solidify support for Xi and his military reform plan, which is meant to reinforce loyalty to the CCP.²⁴ Other areas of emphasis for military reform include accelerating the pace of

¹⁷ “章沁生上将纵论积极防御战略思想 [General Zhang Qinsheng Talks Freely on Active Defense Strategic Thought],” *Xinhua Net*, July 18, 2011.

¹⁸ John W. Lewis and Xue Litai, *Imagined Enemies: China Prepares for Uncertain War* (Stanford, CA: Stanford University Press, 2006), pp. 207-209.

¹⁹ Greg Kulacki, “China’s Nuclear Threshold and No First-Use,” Union of Concerned Scientists, All Things Nuclear blog, September 24, 2014, <http://allthingsnuclear.org/chinas-nuclear-threshold-and-no-first-use>.

²⁰ Daniel M. Hartnett, “The ‘New Historic Missions’: Reflections on Hu Jintao’s Military Legacy,” in *Assessing the People’s Liberation Army in the Hu Jintao Era*, ed. Roy Kamphausen et al. (Carlisle, PA: U.S. Army War College Press, 2014), pp. 33-34.

²¹ “Xi Jinping: Pursuing Dream for 1.3 Billion Chinese,” *Qiushi Journal*, March 17, 2013.

²² Chen Fei, “论新形势下加强军队党的建设- 学习习近平关于加强军队党的建设重要论述 [On Strengthening the Role of the Communist Party of China in the Armed Forces in the New Situation—A Study of Xi Jinping’s Important Expositions on Strengthening the Role of the Communist Party of China in the Armed Forces],” *China Military Science*, no. 4 (2014), pp. 86-92.

²³ “Xi Jinping Calls for PLA ‘Real Combat’ Awareness,” *China Central Television*, December 12, 2012.

²⁴ Kevin McCauley, “President Xi Clears the Way for Military Reform: PLA Corruption, Clique Breaking and Making, and Personnel Shuffle,” *China Brief*, vol. 15, no. 3, February 4, 2015, pp. 9-13; “Reshuffle Brings in Younger (continued...)”

modernization, creating an effective joint command system, improving training to reflect the conditions of real combat, cultivating skilled and qualified personnel, and improving oversight of the military through the CMC.

China's Perceptions of Its Security Environment

The Chinese leadership's view of national security is based on its understanding of overarching global trends combined with its domestic situation. The 2015 defense white paper's assessment of the national security situation reaffirms that Beijing expects an overall favorable external environment to exist for at least several more years.²⁵ Chinese leaders consider their country to be in a period of "strategic opportunity" when China can increase its comprehensive national strength, international competitiveness, and influence with few serious threats and many opportunities. However, some Chinese observers have also noted that after 2020 China may have to adjust to new realities and challenges, including US strategic attention, perceived threats from a militarily stronger Japan, a fragile world economy, and the need to upgrade China's own economic development model.²⁶

China sees as another favorable trend the continued trajectory toward a multipolar world, which China ties to the perceived decline of the United States' superpower status. Likewise, the 2015 defense white paper recognizes China's increasing comprehensive national strength and international influence.²⁷ It asserts that the U.S. strategic rebalancing to the Asia-Pacific region, with an enhanced military presence and alliance network, is the main cause of regional instability, rather than China's efforts to enhance control over its expansive territorial claims. The white paper also continues to recognize the threat of conflicts around East Asia that fall short of large-scale war. The white paper references "meddling" in its South China Sea affairs and surveillance missions aimed at China—presumably a reference to U.S. actions—as necessary reasons for China to safeguard its maritime interests. Other perceived threats noted in the white paper include those from Japan's perceived remilitarization, "offshore neighbors" that provoke Beijing in maritime areas, allegedly separatist forces in Taiwan, Tibet, and Xinjiang, and allegedly "anti-China" forces pursuing a democratic revolution in China.

Notably, China states that its vulnerabilities have grown as its overseas interests have expanded, referencing energy, sea lines of communication, and assets abroad.²⁸ Chinese analysts emphasize how China's increasing demands for natural resources from overseas, especially oil and gas, create security challenges that call for a stronger navy.²⁹ China's 2015 defense white paper states that a new focus for military preparation will be the maritime domain.³⁰ Another trend that Beijing

(...continued)

Officers," *China Military Online*, August 4, 2015.

²⁵ "China's Military Strategy," State Council Information Office of the People's Republic of China, May 2015, <http://eng.mod.gov.cn/Database/WhitePapers>.

²⁶ Xu Jian, "Rethinking China's Period of Strategic Opportunity," *China International Studies*, March/April 2014, pp. 51-70. http://www.ciis.org.cn/english/2014-05/28/content_6942258.htm.

²⁷ "China's Military Strategy," State Council Information Office of the People's Republic of China, May 2015.

²⁸ "China's Military Strategy," State Council Information Office of the People's Republic of China, May 2015.

²⁹ Zhang Xiaolin and Cao Yang, "推进海军战略转型，维护海洋安全 [Promote the Transformation of Naval Strategy, Safeguard Maritime Security]," *Navy Today* [当代海军], June 2015, pp. 20-23. Translation by the China Maritime Studies Institute, U.S. Naval War College.

³⁰ M. Taylor Fravel, "China's New Military Strategy: 'Winning Informationized Local Wars,'" *China Brief*, vol. 15, no. 13, June 23, 2015.

says is a continuing challenge to China's security is the proliferation of increasingly sophisticated long-range, precision, smart, unmanned, and stealthy weapons. The 2015 defense white paper reaffirms outer space and cyberspace as decisive battle domains and indicates that the integration of information technology into warfighting (so-called "informationization") is accelerating.³¹

China's Intentions for Its Military

The intentions of China's leaders regarding their use of the PLA are a key factor, alongside the PLA's capabilities, in assessing the Chinese military. However, unlike material capabilities, which change relatively slowly and cannot be concealed fully, strategic intentions may or may not shift rapidly and are difficult to assess with a high degree of confidence. China's lack of transparency regarding its military has exacerbated the concerns of other countries about its military modernization efforts.³² China's leadership is not monolithic, so it possible that different factions may have different strategic goals. Intentions may also be more responsive to the broader context of international relations (including U.S.-China relations) and external pressures than are plans to improve PLA capabilities.

The PRC government has announced its strategic intent in numerous official statements, although the meaning of some concepts remains unclear and China's rhetoric does not always comport with reality. China asserts that its foreign policy is defensive in nature and that it follows "the path of peaceful development." The report of the 18th CCP Congress, held in 2012, declared that China's national defense aims are to safeguard the country's sovereignty, security, and territorial integrity, and ensure its peaceful development.³³ Building a "powerful armed forces that are commensurate with China's international standing" is given as a strategic task of China's modernization. The report also conveys Beijing's intention to increase the PLA's international cooperation activities. In Xi Jinping's speech at China's September 2015 military parade, he stated, "No matter how much stronger it may become, China will never seek hegemony or expansion."³⁴

American Perspectives on China's Intentions

Some outside observers concur that Beijing's aims are generally peaceful and defensive, but others argue that China's security strategy involves the use or threat of military force beyond national defense. There appears to be agreement among many American China-watchers that Beijing's main reason for strengthening the PLA is first to ensure the Communist Party's survival in power and then to defend China's "territorial integrity," primarily its claim to Taiwan. China seeks to have the status of Taiwan resolved on terms favorable to Beijing (i.e., that Taiwan eventually unifies with mainland China instead of becoming a formally independent country). Experts believe that other reasons for China's military modernization are its ambitions to become the leading regional power in a more multipolar East Asia and to defend China's expanding economic interests, including shipping lanes. There is a plethora of opinions about other drivers of China's military modernization, as well as views that ascribe more hostile intent to Chinese leaders.

³¹ "China's Military Strategy," State Council Information Office of the People's Republic of China, May 2015.

³² Adam P. Liff and G. John Ikenberry, "Racing Toward Tragedy? China's Rise, Military Competition in the Asia Pacific, and the Security Dilemma," *International Security*, vol. 39, no. 2. (Fall 2014), pp. 52-91.

³³ Hu Jintao, "Report to the Eighteenth National Congress of the Communist Party of China," November 8, 2012.

³⁴ Xi Jinping, Remarks as prepared for delivery, Beijing, September 3, 2015.

Some analysts believe that China is not building up its military to push the U.S. military out of the Western Pacific, but rather is strengthening the PLA to shape the regional strategic environment in China's favor. Beijing intends for its growing military power to serve as a deterrent to negative outcomes on what it considers core interests—the status of Taiwan, Tibet, and perhaps other territorial claims—these experts argue.³⁵ The gap between Beijing's views of its rightful territorial possessions and outsiders' views of these territorial claims leads to friction and distrust of Chinese aims.³⁶ The PRC does not consider its desire to unify with Taiwan and to consolidate control over islands in the South China Sea as strategically offensive, whereas many in the United States and other countries see such ambitions as inherently offensive. To execute those types of missions, China is enhancing the PLA's power projection capabilities, exacerbating friction and distrust. Many observers agree that China does not seek war—after all, it has benefited enormously from the existing international order—but its growing desire to enforce territorial claims may lead to friction and even conflict.³⁷

Other analysts assess that China's intentions are to achieve a regional hegemony that would exclude or minimize a security role for the United States in East Asia.³⁸ One U.S. expert on Asian security wrote in 2012, “The military investments currently pursued by China, therefore, reflect its interests in larger goals beyond simply territorial integrity...”³⁹ Pointing to elements of Chinese strategic thought such as the “New Security Concept,” which suggests that Asians alone should be responsible for security affairs in Asia, some analysts believe that over time Beijing will seek to minimize the U.S. forward military presence and “dominate” East Asia.⁴⁰ In such a future, the preponderant power of the PLA could intimidate China's smaller neighbors and place them in a “constant state of latent coercion,” according to one analyst.⁴¹

There appears to be less agreement about China's ambitions to wield military power on a global scale. Some analysts believe that the trend of increasing PLA force projection capabilities and activities in distant areas of the globe will continue unabated, and that China may seek to become a global military power by 2050.⁴² Other analysts assert that China will continue to eschew the responsibilities of a world power and will focus narrowly on defending Chinese interests in a few strategically important areas, especially energy-exporting regions.⁴³ Regardless of Beijing's intentions, the cost and practical difficulties of global force projection will make it nearly

³⁵ Interview with Bonnie Glaser, CSIS, May 11, 2015. See also Michael Swaine, “Beyond American Predominance in the Western Pacific: The Need for a Stable U.S.-China Balance of Power,” Carnegie Endowment for International Peace, April 20, 2015, <http://carnegieendowment.org/2015/04/20/beyond-american-predominance-in-western-pacific-need-for-stable-u.s.-china-balance-of-power>.

³⁶ Interview with Phillip Saunders, National Defense University, August 6, 2015. See also Liff and Ikenberry (2014).

³⁷ “Developing a Strategy for Dealing with China—Now and into the Future,” RAND Corporation, Research Brief RB-9802-A, 2014, http://www.rand.org/pubs/research_briefs/RB9802.html.

³⁸ See, for example, Aaron Friedberg, *A Contest for Supremacy: China, America, and the Struggle for Mastery in Asia* (New York: W.W. Norton & Company, 2011).

³⁹ Ashley Tellis, “Uphill Challenges: China's Military Modernization and Asian Security,” in *Strategic Asia 2012-13: China's Military Challenge*, ed. Ashley Tellis and Travis Tanner (Seattle: National Bureau of Asian Research, 2012), p. 13.

⁴⁰ Robert Blackwill and Ashley Tellis, “Revising U.S. Grand Strategy Toward China,” Council on Foreign Relations, Council Special Report No. 72, March 2015.

⁴¹ Dan Blumental, presentation to the U.S.-China Congressional Working Group, Rayburn House Office Building, April 28, 2015.

⁴² Richard D. Fisher, *China's Military Modernization: Building for Regional and Global Reach*, paperback ed. (Stanford, CA: Stanford University Press, 2010).

⁴³ Interview with Roy Kamphausen, National Bureau of Asian Research, July 31, 2015.

impossible, some say, for China to achieve global force projection capabilities before 2030, at the earliest.⁴⁴

Selected Elements of Military Modernization

Over the past two decades, the PLA has improved its capabilities in every domain of warfare. The following sections discuss China's current and emerging military capabilities in five domains (air, naval, ground, space, and cyber) and its ballistic missile and nuclear weapon capabilities, with a focus on PLA defense equipment and technology that has generated concern among U.S. officials and analysts. Although the PLA's deployment of new equipment may indicate to some observers that its overall capabilities are advancing rapidly, institutional weaknesses and inexperience may mitigate the effectiveness of this new hardware.⁴⁵ A PLA senior colonel wrote in 2011, "[The PLA's] capabilities still lag far behind those of the US military in terms of equipment, organization, doctrine, training, and information. It will take at least 20 years for the PLA to achieve what the U.S. military has now."⁴⁶

Air Power

The PLA's modernization efforts in the air domain have concentrated on improving air defenses, developing cutting-edge fighter aircraft, and developing supporting aircraft to fulfill several roles. To date, long-range strike aircraft have been the lowest priority. DOD reports that the PLA Air Force (PLAAF) is "rapidly closing the gap with western air forces across a broad spectrum of capabilities...."⁴⁷ China's 2015 defense white paper states that the PLAAF "will endeavor to shift its focus from territorial air defense to both defense and offense." *IHS Jane's* assesses, "The principal goal [of air power modernization] is to facilitate conduct of modern, all-weather, offensive operations within the context of a joint-forces campaign."⁴⁸ In recent years, the PLAAF has increased the complexity and realism of its pilot training, moving beyond scripted exercises to improvisational exercises and training in bad weather conditions and darkness. In February 2016, a U.S. Air Force General stated that the technology gap between the U.S. and Chinese militaries "certainly is closing," but she asserted that the training and support systems of U.S. Air Force pilots give them an "unbelievably huge" edge over their Chinese counterparts.⁴⁹

China's defense industry has struggled to develop reliable, high-performance jet engines for use in military aircraft, a hurdle that has hampered overall progress in modernizing the PLAAF. The most advanced combat aircraft in service in the PLAAF are the domestically produced J-10 and J-11 multi-role fighters, and the Su-30MKK fighter purchased from Russia, all generally considered fourth-generation fighters. Roughly half of PLAAF fighters are third-generation or older models, but this proportion is shrinking steadily as new fighters enter the force (see **Figure 4**). Since 2009, China has been developing two fifth-generation stealth fighter aircraft, the J-20 and J-31 programs, which could have comparable capabilities to the U.S. F-35 Joint Strike

⁴⁴ Ely Ratner, Elbridge Colby, Andrew Erickson, et al., "More Willing and Able: Charting China's International Security Activism," Center for a New American Security, May 2015.

⁴⁵ Dennis J. Blasko, *The Chinese Army Today: Tradition and Transformation for the 21st Century*, 2nd ed. (New York: Routledge, 2012), p. 138.

⁴⁶ Eric Sayers and Gaoyue Fan, "AirSea Battle: An Exchange," *PacNet*, no. 17, Pacific Forum CSIS, March 17, 2011.

⁴⁷ 2015 DOD CMSD, p. 11.

⁴⁸ "China: Air Force," *Jane's Sentinel Security Assessment*, July 23, 2015.

⁴⁹ Rosalind Mathieson, "China Closing Tech Gap with U.S., Pacific Air Chief Says," *Bloomberg News*, February 15, 2016.

Fighter, according to some reports.⁵⁰ These aircraft could attain operational status as early as 2018, improving China's ability to carry out strike operations and contest air superiority in the nearby region.⁵¹ The aircraft carrier-based J-15 fighter, which appears to be modeled on the Russian Su-33 Flanker, could also improve PLA power projection capabilities in the near future.

China has selectively modernized several types of aircraft that play a key role in supporting combat operations. The PLAAF recently introduced two new types of AWACS (airborne warning and control system) aircraft into service. China is also investing heavily in developing a number of different UAV (unmanned aerial vehicle) platforms.⁵² The BZK-005, a medium-altitude, long-endurance reconnaissance UAV is already in service, and the Shenyang "Divine Eagle" UAV, which reportedly would be the largest UAV in the world, is one of dozens of unmanned platforms in development.⁵³ New UAVs and other intelligence, surveillance, and reconnaissance (ISR) assets could be an important enabling factor for China's emerging power projection capabilities. In addition, the PLAAF began testing its first indigenously-developed heavy lift aircraft, the Y-20, in 2013.

The only long-range bomber aircraft in the PLAAF is the H-6 bomber, a Cold War-era model that has received limited upgrades. DOD reports that the H-6K variant has an extended range and the capacity to carry six land-attack cruise missiles (LACMs), giving the PLAAF a long-range stand-off air capability.⁵⁴ Reportedly, China may soon begin developing a new long-range bomber.⁵⁵

Alongside modernization of aircraft, the PLA has invested in improvements to its air defenses. According to reports, China will acquire the Russian S-400 surface-to-air missile (SAM) system, which has a range of 400 km and is effective against stealth aircraft, ballistic missiles, and cruise missiles.⁵⁶ This cutting-edge system would substantially upgrade China's existing air defenses, such as the domestically produced HQ-9 long-range SAM and the Russian import S-300 SAM system, which are already quite capable.

Naval Power

The PLA Navy (PLAN) has been modernizing its maritime forces to extend China's seaward defense perimeter, enhance China's nuclear deterrent, and, eventually, operate along distant sea lines of communication in defense of China's interests. For a deeper analysis of the PLA's naval capabilities, see CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke. The PLAN is developing new vessels in several categories, with a focus on improving quality over increasing fleet size. The main areas of investment have been submarines, large multi-mission surface

⁵⁰ Dave Majumdar, "U.S. Pilots Say New Chinese Stealth Fighter Could Become Equal of F-22, F-35," *USNI News*, November 5, 2014.

⁵¹ 2015 DOD CMSD, p. 36.

⁵² Michael S. Chase, Kirsten A. Gunness, and Lyle J. Moriss, et al., *Emerging Trends in China's Development of Unmanned Systems*, RAND Corporation, Santa Monica, CA, 2015, http://www.rand.org/pubs/research_reports/RR990.html.

⁵³ Jeffrey Lin and P.W. Singer, "A Closer Look at China's Divine Eagle Drone," *Popular Science*, Eastern Arsenal blog, July 10, 2015, <http://www.popsci.com/closer-look-chinas-divine-eagle-drone>.

⁵⁴ 2015 DOD CMSD, p. 12.

⁵⁵ Zhao Lei, "Long-Range Bomber May Be in China's Plans," *China Daily*, July 7, 2015.

⁵⁶ Peter W. Singer and Jeffrey Lin, "China Signs Huge Arms Deal With Russia, Buys World's Best Missile," *Popular Science*, Eastern Arsenal blog, April 24, 2015, <http://www.popsci.com/china-and-russia-sign-biggest-arms-deal-decade-buy-worlds-best-missile>.

vessels, aircraft carriers, and arming PLAN vessels with modern anti-ship cruise missiles (ASCMs). In terms of operations, the PLAN is seeking to master more complex missions, such as carrier-based aviation and integrated joint operations.

Submarines are a strength of the PLA, although it is relatively weak at anti-submarine warfare (ASW), which is a complex mission. DOD reports that China's submarine force likely will grow from its present fleet of 62 submarines—5 nuclear-powered attack submarines (SSN), 4 nuclear-powered ballistic missile submarines (SSBN), and 53 diesel-powered attack submarines (SS/SSP)—to between 69 and 78 submarines in 2020.⁵⁷ The advanced Shang-class (Type 093) SSN are to replace older, noisier attack submarines over the next decade. The PLAN is also developing the Type 095 SSBN to improve its anti-surface warfare capabilities and possibly to provide a more clandestine land-attack platform.

Since the 1990s, the PLAN surface fleet has shrunk in size while making significant strides in quality. China's robust program of constructing modern surface combatants has provided several new classes of guided missile destroyers and frigates capable of conducting multiple missions. The modern Luyang-III class (Type 052D) guided missile destroyer and Jiangkai-II class (Type 054A) guided missile frigate have advanced anti-ship and anti-air weapons and sensors, boosting the PLAN's area air-defense and anti-surface warfare capabilities. Smaller and faster combatants, in particular the Jiangdao-class (Type 056) corvettes, also pose a threat to adversary surface vessels near China's coast.

China's first aircraft carrier, the *Liaoning*, was built on the refurbished hull of the *Varyag*, an incomplete ex-Soviet carrier purchased from Ukraine. Reportedly, China is constructing its own fully indigenous aircraft carriers while it learns the many techniques and tactics associated with operating one. DOD assesses that, although the *Liaoning* "possesses a full suite of weapons and combat systems, [it] will likely play a significant role in training China's carrier pilots, deck crews, and developing tactics that will be used with later, more capable carriers."⁵⁸

Complementing its modernization of several naval platforms, China is also investing intensively in modern cruise missiles to augment its naval power. The PLAN's newest anti-ship cruise missile (ASCM), the YJ-18, has a range of 290 nm, greater than the range of ASCMs in the U.S. military's inventory at present. One expert on the PLA noted in July 2015 testimony to Congress,

Experts at the annual conference we convened at [the China Maritime Studies Institute] earlier this year generally agreed that by 2020, China is on course to deploy greater quantities of missiles with greater ranges than those systems that could be employed by the U.S. Navy against them. China is on track to have quantitative parity or better in surface-to-air missiles (SAMs) and ASCMs, parity in missile launch cells, and quantitative inferiority only in multi-mission land-attack cruise missiles (LACMs).⁵⁹

Alongside cruise missiles, China has been developing improved "smart" sea mines to add to its large inventory of older, simpler mines.

Ground Forces

Although China has emphasized the maritime and air domains in its modernization campaign, the ground forces have not been excluded from these efforts, as Beijing still sees security challenges

⁵⁷ 2015 DOD CMSD, pp. 8-9.

⁵⁸ 2015 DOD CMSD, p. 11.

⁵⁹ Testimony of Andrew Erickson, in U.S. Congress, House Committee on Foreign Affairs, Subcommittee on Asia and the Pacific, *America's Security Role in the South China Sea*, 114th Cong., 1st sess., July 23, 2015.

along its land borders. PLA ground forces are pursuing the development of small, mobile, multifunctional units and a force structure that can carry out joint operations. The goal is to enhance force capabilities for multi-dimensional, trans-theater, and sustainable operations, emphasizing mobility.⁶⁰ The short-term modernization goal is the basic mechanization of the ground forces by the year 2020; complete integration of information technology into the force by the year 2049 remains the long-term ambition.⁶¹ Experts expect that the planned force reductions of the PLA (first announced by Xi in September 2015) will disproportionately come from ground force units fielding outdated equipment.

China's ground forces are deployed throughout the five Theater Commands (see **China divides its territory into five large Theater Commands (战区, sometimes translated as “theater” or “battle zone”), each covering at least three provinces or autonomous regions (Error! Not a valid bookmark self-reference.). Prior to the PLA organizational reforms announced in late 2015 and early 2016, there were seven areas, called Military Regions, which functioned as administrative organizations in charge of training and other preparations during peacetime and may have constituted temporary operational war zone headquarters during a national security emergency. The new Theater Commands reportedly will have fewer administrative functions and instead focus on integrating inter-service (joint) operations in the operational chain of command.**

Figure 2) and comprise 18 Group Army Headquarters, with most group armies made up of approximately 30,000 to 50,000 personnel.⁶² The majority of group armies possess a combination of two or three infantry divisions or brigades; one armored division or brigade; one artillery division or brigade; a reconnaissance battalion; one anti-aircraft artillery or air defense brigade; an engineer regiment; a communications regiment; a chemical defense regiment or battalion; and units for logistics and armaments support.⁶³ The PLA has expanded its army aviation units in recent years and may seek to establish a separate aviation brigade for each group army.⁶⁴ China's defense modernization does not prioritize the ground forces, but production of new equipment, including tanks, armored personnel carriers (APCs), artillery systems, and air defense artillery systems continues to advance.⁶⁵ The heavily armored ZTZ-99A main battle tank is the largest tank outside of U.S. or U.S.-allied forces. While the PLA has increased infantry fighting vehicles (IFVs) and APCs in the 2010 to 2015 period, a main issue for China's ground forces remains mobility.⁶⁶ The PLA is still deficient in transport helicopters and relies heavily on trains for long-distance, large-scale transportation.⁶⁷

⁶⁰ “China's Military Strategy,” State Council Information Office of the People's Republic of China, May 2015.

⁶¹ Roy Kamphausen, “China's Land Forces: New Priorities and Capabilities,” in *Strategic Asia 2012-13: China's Military Challenge*, ed. Ashley Tellis and Travis Tanner (Seattle: National Bureau of Asian Research, 2012), pp. 27-58.

⁶² *The Military Balance 2016*, International Institute for Strategic Studies (London: Routledge, 2016), p. 241.

⁶³ Dennis J. Blasko, *The Chinese Army Today: Tradition and Transformation for the 21st Century*, 2nd ed. (New York: Routledge, 2012), pp. 50-51.

⁶⁴ *The Military Balance 2016: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2016), p. 223.

⁶⁵ *2015 DOD CMSD*, p. 52.

⁶⁶ According to the International Institute for Strategic Studies (IISS), from 2010 to 2015 IFVs increased from 1,140 to 3,850 and APCs increased from over 3,300 to 5,020. *The Military Balance 2010: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2010), p. 400 ; *The Military Balance 2015: The Annual Assessment of Global Military Capabilities and Defence Economics* (London: Routledge, 2015), p. 239.

⁶⁷ Interview with Roy Kamphausen, National Bureau of Asian Research , July 31, 2015.

PLA ground forces continue to prepare for a Taiwan-related contingency. The force's possession of armed attack helicopters and other modern platforms, improved networks that enable real-time data transmission, continued strengthening of advanced air defense assets, and more realistic training exercises including amphibious landing training, have contributed to the PLA's ability to mount an amphibious invasion. However, China does not seem to be pursuing the amphibious lift capacity that would be necessary for a large-scale Taiwan island invasion.⁶⁸

Ballistic Missile and Nuclear Forces

The PLA's ballistic missile forces, under the control of the PLA Rocket Force (PLARF, formerly the PLA Second Artillery Corps), have steadily improved their range, accuracy, and survivability in the past decades. Compared to other systems that China has developed indigenously during the modernization campaign, its ballistic missiles are relatively sophisticated. DOD states that the PLA is "developing and testing several new classes and variants of offensive missiles, including hypersonic glide vehicles; forming additional missile units; upgrading older missile systems; and developing methods to counter ballistic missile defenses."⁶⁹ The PLARF fields numerous types and ranges of ballistic missiles, from nuclear-armed intercontinental-range ballistic missiles (ICBMs) to conventionally-armed short-range ballistic missiles (SRBMs). China is also developing ballistic-missile defense (BMD) systems, but DOD reports that a number of issues need to be addressed before this capability is ready for deployment.⁷⁰ For more information and analysis, see CRS Report R43116, *Ballistic Missile Defense in the Asia-Pacific Region: Cooperation and Opposition*, by Ian E. Rinehart, Steven A. Hildreth, and Susan V. Lawrence.

According to reports, the PLARF possesses at least 1,200 SRBMs with conventional warheads, mostly deployed at missile bases in the southeastern region of China, near Taiwan. China is developing a new SRBM and medium-range ballistic missiles (MRBMs), which could expand the PLA's ability to strike regional targets. The DF-21 MRBM is the "centerpiece" of the PLARF's extended-range conventional strike capability, with a range of at least 1,750 km.⁷¹ The DF-21D variant has a maneuverable warhead, which gives it the ability to target moving ships within 1,500 km of China's coast.⁷² An American expert on the PLA wrote in 2012, "[The PLARF] is central to the PLA's emerging capacity to not only complicate U.S. power projection and freedom of operations in the Asia-Pacific region but also challenge regional powers' attempts to deny the PLA air superiority and command of the seas."⁷³ Reportedly, the PLA is developing boost-glide hypersonic missiles, perhaps with the intent to evade adversary missile defense systems.⁷⁴

Most observers judge that China's nuclear force structure and public statements about nuclear policy are broadly consistent with a nuclear strategy known as "minimum deterrence." While

⁶⁸ 2015 DOD CMSD, p. 59.

⁶⁹ 2015 DOD CMSD, p. 37.

⁷⁰ 2015 DOD CMSD, p. 71.

⁷¹ Some MRBMs may also be deployed with nuclear warheads. Mark Stokes, "The Second Artillery Force and the Future of Long-Range Precision Strike," in *Strategic Asia 2012-13: China's Military Challenge*, ed. Ashley Tellis and Travis Tanner (Seattle: National Bureau of Asian Research, 2012), pp. 126-160.

⁷² National Air and Space Intelligence Center, *Ballistic & Cruise Missile Threat*, NASIC-1031-0985-13, Wright-Patterson Air Force Base, OH, 2013.

⁷³ Mark Stokes, "The Second Artillery Force and the Future of Long-Range Precision Strike," in *Strategic Asia 2012-13: China's Military Challenge*, ed. Ashley Tellis and Travis Tanner (Seattle: National Bureau of Asian Research, 2012), pp. 126-160.

⁷⁴ James Acton, "China's Offensive Missile Forces," Testimony to the U.S.-China Economic and Security Review Commission, April 1, 2015.

public sources offer a range of estimates of the size of the Chinese nuclear force, most unclassified studies of China's fissile material stockpile conclude that China produced enough material for a nuclear arsenal numbering around 200-300 warheads before ceasing production of fissile material around 1991.⁷⁵ The PLARF is responsible for the command and control of China's nuclear weapons, the vast majority of which are deployed onto silo-based and road-mobile ICBMs and MRBMs. DOD estimates that China possesses 50-60 ICBMs.⁷⁶ After eschewing multiple independently-targetable re-entry vehicle (MIRV) technology for decades, the PLA has recently armed its ICBMs with MIRV warheads, possibly to evade ballistic missile defenses.⁷⁷

China's efforts to field a reliable submarine-launched ballistic missile (SLBM) over the past several years appear to have been at least partly successful; in 2015, DOD described the JL-2 SLBM as the PLA's "first credible, sea-based nuclear deterrent."⁷⁸ The reported range of the JL-2 SLBM is 7,400 km. The nuclear deterrent sea patrols by Jin class (Type 094) SSBNs may pose command and control challenges for the PLA, because of potential overlapping chains of command between the PLAN and the PLARF.

Space Capabilities

DOD assesses that China's space program is the most rapidly maturing one in the world, with space capabilities being used to advance the country's economic, civil, political, and military objectives.⁷⁹ The PLA plays a large role in all of China's space activities, including manned space missions, and is developing a wide array of its own space assets as well as counter-space capabilities.

One key lesson that Chinese strategists have learned from observing American military operations is that U.S. military power depends on space assets to a great degree, and the PLA could take advantage of this fact for both its offense and defense.⁸⁰ China is building capabilities to deny potential adversaries the use of satellites in a conflict through the use of directed-energy weapons and satellite jammers,⁸¹ and U.S. officials assess that China continues to develop and test anti-satellite systems.⁸²

Despite the assessment that space assets are a vulnerability of the U.S. military, the PLA appears to acknowledge that space capabilities are also a major force multiplier for modern military operations. China possesses nearly 70 satellites used for military purposes that include communications; navigation, positioning and timing; ISR; meteorology; and electronic and signals intelligence. China's Zhongxing communications satellites are dual use,⁸³ and are assessed to enable secure communications for the PLA.⁸⁴ China has a limited satellite navigation system

⁷⁵ Jeffrey Lewis, *Paper Tigers: China's Nuclear Posture* (New York: Routledge, 2014), p. 93.

⁷⁶ National Air and Space Intelligence Center, *Ballistic & Cruise Missile Threat*, NASIC-1031-0985-13, Wright-Patterson Air Force Base, OH, 2013.

⁷⁷ James Acton, "China's Offensive Missile Forces," Testimony to the U.S.-China Economic and Security Review Commission, April 1, 2015.

⁷⁸ 2015 DOD CMSD, p. 9

⁷⁹ 2015 DOD CMSD, p. 13

⁸⁰ Ashley J. Tellis, "China's Military Space Strategy," *Survival: Global Politics and Strategy*, vol. 49, no. 3 (Autumn 2007), pp. 41-72.

⁸¹ 2015 DOD CMSD, p. 14.

⁸² Mike Gruss, "U.S. State Department: China Tested Anti-satellite Weapon," *Space News*, July 28, 2014.

⁸³ *The Military Balance 2015*, International Institute for Strategic Studies (London: Routledge, 2015), p. 238.

⁸⁴ Stephen Clark, "Chinese Military Communications Satellite Reaches Orbit," *Space.com*, November 29, 2010.

called Beidou, which is expected to become fully operational around 2020 with capabilities comparable to the U.S. Global Positioning System (GPS). A completed Beidou satellite constellation could support target positioning at the tactical level, be used in coordination with guidance systems by precision strike weapons, and allow for a common operating picture of friendly force locations. Beidou is expected to play an important role in providing the PLAAF, PLAN, and PLARF with operational support farther from China's borders as the system achieves global coverage near the end of the decade.⁸⁵ China's Ziyuan, Yaogan, Huanjing, and Haiyang satellite series all provide remote sensing capabilities, and are linked with the Tianlian data relay satellite system in order to provide coverage over the majority of the globe.⁸⁶ The Shijian series is believed to augment China's ground-based electronic intelligence capacity.⁸⁷ Additionally, China has reportedly constructed a large variety of ground infrastructure enabling spacecraft and space launch vehicle manufacture, launch, command and control, and data downlink.

Cyber Capabilities

DOD reports that the PLA's cyber capabilities are a key part of its modernization and serve multiple purposes: collecting intelligence, constraining and confusing an adversary, and acting as a force multiplier during conflict.⁸⁸ PLA offensive cyber operations could disrupt adversary networks to facilitate strategic and tactical goals as part of a broader anti-access/area-denial (A2/AD) campaign. On the other hand, one observer argued in May 2015 that China's military cyber capabilities have been exaggerated.⁸⁹

The cyber operations of the PLA are difficult to disentangle from overall PRC government authorized or sponsored cyber activities, according to reports. However, a general picture of Chinese military capabilities in the cyber domain has emerged in public research. The 2013 edition of *The Science of Military Strategy*, a key PLA text, reportedly describes China's network attack forces and how they might be employed. China has three types of cyber forces: (1) specialized military network warfare forces in the PLA, (2) PLA-authorized teams of network warfare specialists in government organizations, and (3) non-governmental forces that may be mobilized for network warfare operations.⁹⁰ This third category constitutes a cyber militia of private-sector personnel that the PLA can task with computer network operations, and perhaps patriotic hackers that the PRC government could direct loosely.⁹¹

⁸⁵ Kevin N. McCauley, "Putting Precision in Operations: Beidou Satellite Navigation System," *China Brief*, vol. 14, no. 16 (August 22, 2014), pp. 11-14.

⁸⁶ Kevin Pollpeter, "Controlling the Information Domain: Space, Cyber, and Electronic Warfare," in *Strategic Asia 2012-13: China's Military Challenge*, ed. Ashley Tellis and Travis Tanner (Seattle: National Bureau of Asian Research, 2012), pp. 163-196.

⁸⁷ Ian Easton and Mark A. Stokes, *China's Electronic Intelligence (ELINT) Satellite Developments: Implications for U.S. Air and Naval Operations*, Project 2049 Institute, February 23, 2011.

⁸⁸ *2015 DOD CMSD*, p. 37.

⁸⁹ "[T]here is little evidence of skill or subtlety in China's military cyber operations. Although Chinese strategists describe cyberspace as a highly asymmetric and decisive domain of warfare, China's military cyber capacity does not live up to its doctrinal aspirations." Jon R. Lindsay, "Exaggerating the Chinese Cyber Threat," Harvard University, Belfer Center for Science and International Affairs, Policy Brief, May 2015.

⁹⁰ Joe McReynolds, "China's Evolving Perspectives on Network Warfare: Lessons from the Science of Military Strategy," *China Brief*, vol. 15, no. 8, April 16, 2015.

⁹¹ Kevin Pollpeter, "Controlling the Information Domain: Space, Cyber, and Electronic Warfare," in *Strategic Asia 2012-13: China's Military Challenge*, ed. Ashley Tellis and Travis Tanner (Seattle: National Bureau of Asian Research, 2012), p. 185.

The PLA has employed network warfare units since the 1990s and announced in 2003 that it would incorporate these units in all PLA armies.⁹² According to analysts, prior to the 2016 organizational reforms the General Staff Department Third Department exercised executive authority over PLA's cyber espionage, broadly speaking.⁹³ Under this authority, the Beijing North Computing Center planned and coordinated PLA computer network operations, including “exploitation of foreign networks, and possibly denying an adversary access to his networks.”⁹⁴ Following the elimination of the General Departments in the early 2016 PLA reorganization, analysts believe that responsibility for cyber and space capabilities resides in the newly established PLA Strategic Support Force.⁹⁵ In addition, there are many groups within the PLA that conduct computer network operations on a semi-autonomous basis. Reportedly, Chinese military and non-military entities have conducted cyber espionage on a large scale and stolen U.S. defense contractor data that Chinese defense firms used to develop advanced aircraft and other platforms.⁹⁶ In May 2014, the U.S. Department of Justice charged five members of the PLA with conducting cyber espionage for commercial gain, and related crimes.⁹⁷

Weaknesses and Limitations

The rapid improvement in the overall capability of the PLA has been the main narrative of outside observers for many years, but persistent weaknesses and limitations hamper the PLA's effectiveness.⁹⁸ Despite the significant progress of the PLA over the last two decades, Chinese military analysts assess that it is not yet capable of carrying out complex operations overseas or fighting and winning a “local war under informationized conditions,” their term for the type of conflict that they perceive China is most likely to face.⁹⁹ Although the PLA may overcome certain limitations in capacity or training realism in the near term, other weaknesses could remain for decades while the PLA attempts to correct them.

By its own assessments, the PLA has weaknesses in training, jointness, administration, human capital, force development, and logistics.¹⁰⁰ The organizational practices and relationships that developed in the course of the PLA's history are poorly suited to current requirements.¹⁰¹ PLA officers must spend hours each week studying CCP pronouncements and burnishing their loyalty to the Party. Compared to other militaries, the PLA has underutilized its non-commissioned

⁹² Timothy L. Thomas, *The Dragon's Quantum Leap: Transforming from a Mechanized to an Informatized Force* (Fort Leavenworth, KS: Foreign Military Studies Office, 2009), p. 180.

⁹³ Mark A. Stokes and L.C. Russell Hsiao, “Countering Chinese Cyber Operations: Opportunities and Challenges for U.S. Interests,” Project 2049 Institute, October 29, 2012.

⁹⁴ Stokes and Hsiao (2012).

⁹⁵ David Finkelstein, “Initial Thoughts on the Reorganization and Reform of the PLA,” Center for Naval Analyses (CNA), CNA China Studies, January 2016.

⁹⁶ Ellen Nakashima, “Confidential Report Lists U.S. Weapons System Designs Compromised by Chinese Cyberspies,” *Washington Post*, May 27, 2013.

⁹⁷ For more information and analysis, see CRS Insight IN10079, *Alleged Chinese Government Cyber Theft of U.S. Commercial Trade Secrets*, by Wayne M. Morrison, Susan V. Lawrence, and John W. Rollins.

⁹⁸ Michael S. Chase, Jeffrey Engstrom, and Tai Ming Cheung, et al., *China's Incomplete Military Transformation: Assessing the Weaknesses of the People's Liberation Army (PLA)*, RAND Corporation, Santa Monica, CA, 2015, http://www.rand.org/pubs/research_reports/RR893.html, p. 70.

⁹⁹ See, for example, Xie Xinping, “新的历史征程的强军脉动 [Pulsation of Strong Army in New Historical Journey],” *Jiefangjun Bao Online*, July 28, 2014, translation by Open Source Center.

¹⁰⁰ Chase, Engstrom, Cheung, et al. (2015), p. 71

¹⁰¹ Chase, Engstrom, Cheung, et al. (2015), p. 43.

officers (NCOs),¹⁰² and its lower-level officers are not as empowered to improvise decisions during battle. Historically, PLA training and exercises were highly scripted and did not foster a culture of honest self-examination and improvement. Corrupt PLA officials diverted military resources for personal profit and bribed senior PLA leaders in exchange for promotions, according to reports.¹⁰³ PLA and external commentators have noted the PLA's slow progress in executing truly joint operations (with multiple services coordinating in a synergistic manner). The lack of combat experience for nearly all PLA personnel may be one reason that organizational problems were allowed to fester, and it could continue to inhibit rapid learning and incorporation of organizational improvements.¹⁰⁴

The PLA has limitations in its ability to project power outside China's immediate periphery, although the PLA appears focused on overcoming this problem.¹⁰⁵ The farther that the PLA reaches over the horizon, the more it is likely to encounter problems with command and control, ISR coverage and targeting, logistics, and limited inventories of longer-range weapons. Learning the requirements of long-distance, long-duration operations was one motivation for China to send PLAN vessels to participate in multinational anti-piracy operations in the Gulf of Aden.¹⁰⁶ The lack of overseas military facilities constrains China's ambition to enhance its naval presence along strategic sea lines of communication. To address this challenge (and to provide support to Chinese peacekeeping forces in Africa), China reached an agreement with Djibouti in late 2015 to establish a PLA logistics facility in the small African country.

Analyzing the Chinese military's weaknesses by comparison to other militaries (especially to militaries with global reach) may not always be appropriate, because different militaries have different missions to perform. In the near future, China's leaders may judge that the PLA is sufficiently capable of performing its assigned missions, despite persistent problems. On the other hand, as noted in a 2015 RAND assessment, PLA weaknesses in areas like logistics and amphibious lift could render the PLA unable to carry out assigned missions, in particular an invasion of Taiwan.¹⁰⁷ Both air lift and sea lift capacity remain major shortcomings for the PLA, constraining significantly its ability to carry out large-scale power projection operations.

Political and economic problems may also constrain the Chinese military. A significant increase in domestic unrest, or security risks from terrorism and transnational crime, may cause PRC leaders to divert more PLA resources toward managing these issues. Low levels of economic growth could reduce China's available resources to increase the defense budget. The persistence of the one-child policy and China's aging demographic (its fertility rate has been below replacement level since 1995)¹⁰⁸ may both exacerbate economic challenges and make it increasingly difficult for the PLA to recruit and retain qualified personnel.

¹⁰² Dennis J. Blasko, *The Chinese Army Today: Tradition and Transformation for the 21st Century*, 2nd ed. (New York: Routledge, 2012), pp. 226-228.

¹⁰³ Charles Clover, "China's Military Goes to War on Corruption," *Financial Times*, July 6, 2015.

¹⁰⁴ Chase, Engstrom, Cheung, et al. (2015), pp. 76, 81, 105.

¹⁰⁵ Ely Ratner, Elbridge Colby, Andrew Erickson, et al., "More Willing and Able: Charting China's International Security Activism," Center for a New American Security, May 2015.

¹⁰⁶ Andrew Erickson and Austin Strange, *Six Years at Sea ... and Counting: Gulf of Aden Anti-Piracy and China's Maritime Commons Presence* (Washington, DC: Jamestown Foundation, 2015).

¹⁰⁷ Chase, Engstrom, Cheung, et al. (2015).

¹⁰⁸ The World Bank database, accessed September 1, 2015, <http://data.worldbank.org/indicator/SP.DYN.TFRT.IN>.

China's Defense Budget

China has the second largest officially reported defense budget in the world, after the United States, and has increased its defense spending every year for over two decades. In 2016, China announced a defense budget of \$146 billion (954 billion yuan), a 7.6% increase from 2015. From 2005 through 2014, the official military budget increased at an average rate of 9.5% per year, after adjusting for inflation.¹⁰⁹ Analysts outside China assert that the actual figure for China's defense spending is larger than the Chinese government officially acknowledges (see next section). The growth of the defense budget is seen as having enabled the PLA to improve its capabilities at a rate unmatched by any other military in recent history. Two experts on Chinese defense issues wrote in 2013, "The growth in spending over the past two decades is driven primarily by a desire to modernize and professionalize the PLA after decades of neglect and military backwardness."¹¹⁰

The steady rise in defense spending has been roughly consistent with the overall growth of the Chinese economy. The percentage of Chinese GDP that is spent on defense, roughly 2%, is comparable to most other countries and lower than the proportion spent by the United States, Russia, and South Korea (see **Figure 5**), according to the Stockholm International Peace Research Institute (SIPRI).¹¹¹ Analysts believe that defense modernization will remain subordinate to economic development, in line with China's overall national strategy.¹¹² Indeed, the 7.6% defense budget increase in 2016 is smaller than in recent years and follows the trajectory of China's economy. If China's officially disclosed defense spending increases at a faster rate than GDP growth, that would be one sign that CCP leadership is raising the priority of the military versus other national policy concerns.¹¹³

¹⁰⁹ 2015 DOD CMSD, p. 49.

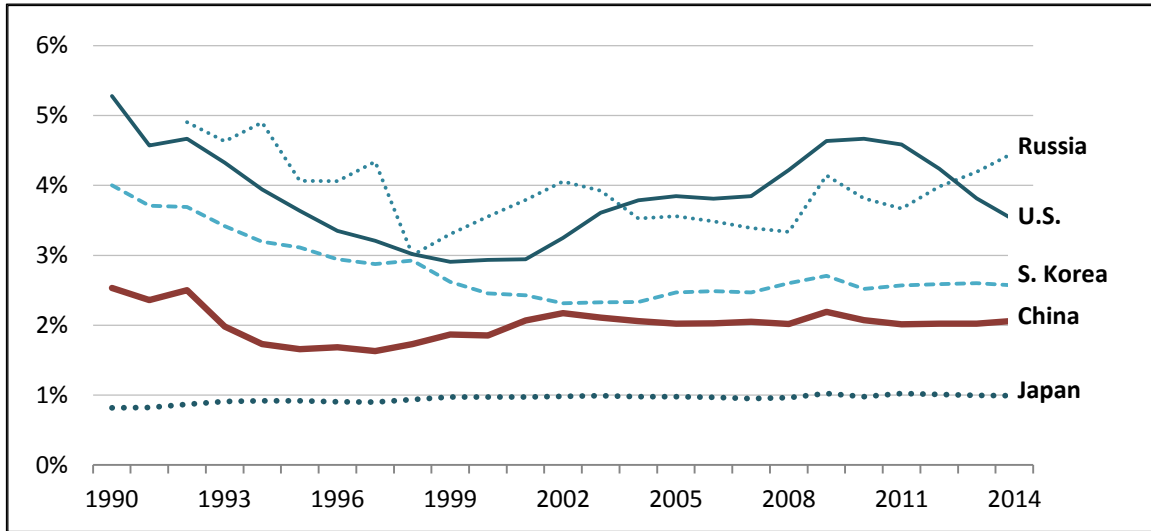
¹¹⁰ Andrew Erickson and Adam Liff, "Demystifying China's Defence Spending: Less Mysterious in the Aggregate," *The China Quarterly*, vol. 216 (December 2013), pp. 805-830.

¹¹¹ Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database, http://www.sipri.org/research/armaments/milex/milex_database.

¹¹² Dennis J. Blasko, *The Chinese Army Today: Tradition and Transformation for the 21st Century*, 2nd ed. (New York: Routledge, 2012), p. 10.

¹¹³ Elbridge Colby, "Why China's Growing Defense Budget Matters," *Real Clear Defense*, March 9, 2015.

Figure 5. Percentage of GDP Spent on the Military
Comparison Among Major Asia-Pacific Countries



Source: Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database.

Notes: SIPRI uses its estimate of China’s actual military spending, not the PLA’s official budget.

The Official Defense Budget and Outside Analyses

The discrepancies between what the PRC government announces as its official defense budget and the amount that outside observers count as China’s defense spending have drawn scrutiny and criticism. According to DOD, China’s actual military-related spending exceeded the official defense budget by at least 20% in 2014.¹¹⁴ SIPRI estimates that China’s total military spending in 2014 was \$216 billion, 1.6 times as large as the official figure (**Figure 5** uses SIPRI’s estimate of actual spending).¹¹⁵

Observers assess that the gap between actual and official military spending is decreasing. DOD reported in 2008 that actual spending was 2.1-3.0 times as large as the official budget, and in 2002 DOD stated that “China’s defense spending may be some four times larger” than the official budget.¹¹⁶ Two China security experts argued in 2013, “Beijing’s official defense budget increasingly captures actual PLA funding and the PLA’s widely criticized opacity is improving gradually and is not as exceptional among countries at its stage of development as is widely believed.”¹¹⁷

There are several reasons for the discrepancy between China’s official and estimated defense spending.¹¹⁸

- There is no global standard for measuring defense spending; different countries calculate defense budgets in different ways. For example, spending on veterans’

¹¹⁴ 2015 DOD CMSD, p. 49.

¹¹⁵ Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database, http://www.sipri.org/research/armaments/milex/milex_database.

¹¹⁶ 2008 DOD CMP, p. 7; 2002 DOD CMP, p. 1.

¹¹⁷ Erickson and Liff (2013).

¹¹⁸ 2015 DOD CMSD, p. 49.

- benefits, nuclear weapons development and maintenance, and military construction costs are not included consistently across countries. Procurement of foreign-produced weapons systems, for example, is not included in the PLA budget and thus the discrepancy can fluctuate on a year-to-year basis.
- China may seek to diminish concerns about the growth of its defense budget by under-reporting defense spending.
 - Elements of centralized state planning within China's economic structure make it difficult to value certain inputs and activities.
 - Poor accounting practices and incomplete information within China's defense bureaucracy make it difficult for China itself to determine an accurate amount.
 - The profits of companies owned or controlled by the PLA are not part of the official budget. However, after the CCP ordered the PLA to divest its commercial assets in the 1990s, this source of off-the-books funding for the PLA has shrunk.

China's white papers state, and one external study confirmed, that the defense budget is split roughly evenly among three categories: personnel, training and maintenance, and equipment, but the PLA does not provide any further breakdown of spending.¹¹⁹ Lower per-capita personnel costs and lower costs of many goods and services in China, compared to most developed countries, amplifies the spending power of each yuan in the budget. A comparison of U.S. and Chinese defense budgets on an exchange-rate basis understates the true purchasing power of the Chinese budget. A comparison that controls for the large difference in Chinese and U.S. per-capita personnel costs would close some (perhaps most) of the apparent difference in the two countries' defense budgets.

China's Defense Industry

China's leaders believe that the country needs to possess a self-sufficient, advanced and innovative defense industry in order to safeguard vital national interests. Accordingly, Beijing plans for the nation to become a top-tier power in defense science and technology before the year 2030.¹²⁰ China's defense sector had its roots in Soviet industrial assistance and organization dating back to the 1950s, but has since been reorganized over the years to improve efficiency and quality.¹²¹ Nevertheless, the results remain mixed. China's space and missile industries have made notable progress, but other industries lag behind in key areas. The shipbuilding and aircraft industries are still largely involved in "creative adaptation" of foreign products rather than true indigenous innovation, evident through the need to acquire the Liaoning aircraft carrier frame from Ukraine and the Su-33 fighter from Russia.¹²² This follows a long-term trend of making incremental improvements on earlier systems rather than technological leaps to qualitatively new products.¹²³

¹¹⁹ Dennis J. Blasko, *The Chinese Army Today: Tradition and Transformation for the 21st Century*, 2nd ed. (New York: Routledge, 2012), p. 12.

¹²⁰ Tai Ming Cheung, "Introduction," in *Forging China's Military Might: A New Framework for Assessing Innovation*, ed. Tai-Ming Cheung (Baltimore: Johns Hopkins University Press, 2014), pp. 1-14.

¹²¹ David L. Shambaugh, "Defense Industries and Weapons Procurement," in *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley : University of California Press, 2002), pp. 225-283.

¹²² Tai Ming Cheung, "Conclusions," in *Forging China's Military Might: A New Framework for Assessing Innovation*, ed. Tai-Ming Cheung (Baltimore: Johns Hopkins University Press, 2014), pp. 273-284.

¹²³ Keith Crane, Roger Cliff, and Evan Medeiros, et al., *Modernizing China's Military: Opportunities and Constraints*, RAND Corporation, Santa Monica, 2005, pp. 135-187.

When assessing the defense industry's production strategy, a two-pronged approach can be discerned: producing Chinese versions of arms that cannot match foreign models qualitatively but are affordable and can overwhelm through superior numbers; and producing arms that can match their foreign counterparts in quality. Given the lack of technological and scientific capabilities in most sectors of the defense industry, China has been able to catch up in a few selected areas only.¹²⁴ China is a large arms exporter—over the period 2010-2015, China ranked third worldwide in arms exports by value, according to SIPRI—but the bulk of its exports have been low-cost, low-tech armored vehicles and aircraft to developing and middle-income countries.¹²⁵

Partnerships between China's commercial sector and the defense sector are an important aspect of the country's efforts to boost production capabilities and improve its technological prowess. Implementation of this civil-military integration (CMI) started under Deng as he promoted the fusion of civilian resources and goals with those of the military.¹²⁶ In the current era, CMI aids the defense sector by leveraging the science and technology base in the civilian domain. This includes providing civilian technologies for military use and providing new sources of capital to the defense sector. Reform efforts aim to facilitate private company participation in the defense sector in order to generate increased competition, innovation, and capital.¹²⁷ While enjoying widespread understanding and support, implementation of CMI has met strong obstacles stemming from deficient implementation guidance, entrenched status-quo interests, and a history of civil-military segregation and an independent PLA.¹²⁸ Private sector involvement in the defense sector has also been hindered by the fact that state owned enterprises (SOEs) have advantages in areas such as taxes and priority bid consideration. Overall, CMI has taken root but remains underdeveloped.¹²⁹

Other serious issues in China's defense sector remain, including widespread corruption; inadequate quality control; limited competition due to domination of the market by SOEs; an inefficient "cost-plus" pricing system that reduces incentives to innovate; bureaucratic fragmentation that fosters risk-adverse consensus-based decisionmaking; and restricted access to advanced Western technologies after the United States and European countries imposed arms embargoes in response to the 1989 Tiananmen Square crackdown.¹³⁰ Despite these difficulties, the DOD assesses that progress is being made. China's missile manufacturers produce a range of cruise, ballistic, air-to-air, and surface-to-air missiles that are comparable to top-tier foreign models. China's naval and shipbuilding industry is now utilizing more advanced ship design and construction program management techniques, supporting increased shipbuilding capabilities in surface combatants, submarines, naval aviation, and sealift assets. Industries serving the ground forces can produce a variety of weapon systems close to world standards, and advances are being made in tanks, armored personnel carriers, air defense artillery systems, and artillery pieces.

¹²⁴ Tai Ming Cheung, "Conclusions" (2014), pp. 273-284.

¹²⁵ SIPRI Arms Transfer Database, <http://www.sipri.org/databases/armstransfers>.

¹²⁶ Kathleen A. Walsh, "Civil-Military Dynamics in Chinese Defense Industry and Arms Policy: An Approaching Tipping Point," in *Chinese Civil-Military Relations: The Transformation of the People's Liberation Army*, ed. Nan Li (Taylor & Francis e-Library, 2010), pp. 55-79.

¹²⁷ Daniel Alderman, Lisa Crawford, and Brian Lafferty, et al., "The Rise of Chinese Civil-Military Integration," in *Forging China's Military Might: A New Framework for Assessing Innovation*, ed. Tai-Ming Cheung (Baltimore: Johns Hopkins University Press, 2014), pp. 109-135.

¹²⁸ Daniel Alderman, Lisa Crawford, and Brian Lafferty, et al. (2014).

¹²⁹ Daniel Alderman, Lisa Crawford, and Brian Lafferty, et al. (2014).

¹³⁰ Michael S. Chase, Jeffrey Engstrom, and Tai Ming Cheung, et al., *China's Incomplete Military Transformation: Assessing the Weaknesses of the People's Liberation Army (PLA)* (Santa Monica, CA: RAND Corporation, 2015), pp. 125-133.

China's aviation industry is now producing indigenously improved versions of older aircraft, a large transport aircraft, fighter aircraft that have stealth features, and attack helicopters.¹³¹

Often with the purpose of reverse engineering, China augments its own military production capabilities with foreign acquired technologies such as engines for aircraft, tanks, and naval vessels, electronics and microprocessors, and guidance and control systems. Russia remains a large source for foreign arms; its concerns over intellectual property protection are balanced with its need for economic stimulus. According to reports, Beijing has agreed to purchase Russia's advanced S-400 SAM system and Su-35 fighter aircraft, and is pursuing deals for a jointly designed and produced diesel-electric submarine, IL-76 transport aircraft, and Mi-171 helicopters.¹³² China is gradually shifting from acquiring complete foreign systems to obtaining military and dual-use sub-systems and components through trade, open sources, and espionage. Reports indicate that espionage has proven particularly effective in securing sensitive U.S. technologies; methods include cyber espionage, collection by Chinese agents, and joint-ventures.¹³³

Geographic Scope of China's Military Operations

From the founding of the PRC in 1949 through the end of the 20th century, the PLA primarily has focused on defending what the PRC claims as its territory and maintaining a favorable balance of power in the PRC's immediate vicinity. As the PLA modernization campaign has progressed in recent years, the PLA has become more active in Asia and, to a limited extent, around the world. However, the only major combat campaigns that the PLA has conducted since the end of the Chinese civil war have been in the Korean War (1951-1953), as the Chinese People's Volunteer Army; the border war with India (1962); and in Vietnam (1979). China fought limited skirmishes against the Soviet Union in 1969 over a disputed land border.

Taiwan Strait

Over the past two decades, the main focus of the PLA's military planning and short-term operational readiness has been a potential conflict over Taiwan. The PRC has vowed to unify with Taiwan, which it considers a breakaway province, using force if necessary.¹³⁴ The PLA's planning for a potential conflict over Taiwan also may deter Taiwan from declaring independence. The PLA has a high concentration of forces based in China's southeast, near Taiwan, especially amphibious and airborne assault units and SRBMs.¹³⁵ Although the military balance across the Taiwan Strait has steadily been shifting in favor of the PRC as its defense spending has dwarfed the ROC's, an invasion of Taiwan would be a daunting undertaking. The potential intervention of the United States to defend Taiwan would present enormous challenges for the PLA. DOD assesses that China "continues to develop capabilities that serve to specifically dissuade, deter, or

¹³¹ 2015 DOD CMSD, pp. 51-52.

¹³² "Russia, China Sign \$2 Billion Contract over Su-35 Fighter Jets," *Reuters*, November 19, 2015; DOD CMSD, p. 52.

¹³³ 2014 Report to Congress of the U.S.-China Economic and Security Review Commission. Washington, DC: U.S.-China Economic and Security Review Commission, 2014.

¹³⁴ Beijing contends that Taiwan is a province that was seized from it by Japan during a time of Chinese weakness, and that Taiwan must eventually reunify with the mainland. However, the CCP has never ruled Taiwan, which instead has been led by the ROC government ever since the defeat of Japan in 1945. After losing the Chinese civil war to the communists, the Kuomintang (KMT)-ruled ROC retreated across the Taiwan Strait in 1949. Since that time, Taiwan's political system has evolved from a one-party state under KMT rule into a multi-party democracy.

¹³⁵ 2015 DOD CMSD, pp. 78-84.

if ordered, defeat possible third-party intervention during a large-scale, theater campaign such as a Taiwan contingency.”¹³⁶

Hotspots in East Asia

Besides Taiwan, other hotspots in East Asia could involve the PLA in a potential conflict. Tensions remain high on the Korean Peninsula. China and North Korea share a long land border, and a conflict or full-scale war there would have implications for China’s security. Depending on the nature of the scenario, the PLA could intervene in a Korean conflict to protect what China sees as its national interests relating to: mass migration of North Koreans into northeast China, the disposition of North Korean nuclear facilities and weapons, the presence of U.S. military forces near the Chinese border, and possibly the ultimate end-state of Korean reunification, among other aspects of such a conflict.¹³⁷

In the East China Sea, China’s territorial dispute with Japan has intensified since 2010, and observers on both sides have speculated about the possibility of a military struggle over the small, uninhabited Senkaku/Diaoyu Islands. U.S. officials at all levels, including President Obama in April 2014, have stated that the U.S.-Japan Security Treaty applies to these disputed islands because Japan administers them.¹³⁸ Incidents between the Chinese and Japanese militaries in recent years have highlighted the risks of an accident, provocation, or miscalculation sparking a more serious conflict.¹³⁹ China usually uses China Coast Guard (CCG) ships, rather than PLAN ships, to assert and defend its maritime territorial claims and fishing interests in the East China Sea and South China Sea, although PLAN ships are available as backup forces.

China’s maritime territorial disputes in the South China Sea have involved PLA operations in the past, and these disputes remain a source of serious contention.¹⁴⁰ China has seized several South China Sea geographic features using force, causing (and taking) casualties and destroying enemy vessels in each case. In 1974, the PLA seized several islands in the Paracel Islands from South Vietnamese forces; in 1988, China wrested control of Fiery Cross Reef in the Spratly Islands from Vietnam; and in 1994 the PLA seized Mischief Reef in the Spratly Islands from the Philippines.¹⁴¹ The PLA has not used lethal force in the South China Sea for the past 20 years, although the CCG has gained control of other features after confrontations, such as the Scarborough Shoal incident in 2012.

Beginning in 2013, China has built up several reefs and rocks in the South China Sea into artificial islands, raising concerns throughout the Asia-Pacific region and in the United States. The PRC government acknowledges that these expanded facilities in the Spratly Islands will serve civilian and military purposes, suggesting that the PLA will enhance its presence in the

¹³⁶ 2015 DOD CMSD, p. 33.

¹³⁷ Bruce W. Bennett, *Preparing for the Possibility of a North Korean Collapse*, RAND Corporation, Santa Monica, CA, 2013, pp. 87-91.

¹³⁸ For more information and analysis, see CRS Report R42761, *Senkaku (Diaoyu/Diaoyutai) Islands Dispute: U.S. Treaty Obligations*, by Mark E. Manyin.

¹³⁹ For example, in separate incidents in early 2013, PLAN vessels locked their fire-control radar on a Japanese vessel and a Japanese helicopter, according to reports. “Chinese Officials Admit to MSDF Radar Lock Allegations,” *Kyodo News Agency*, March 18, 2013.

¹⁴⁰ For more information and analysis, see CRS Report R42784, *Maritime Territorial and Exclusive Economic Zone (EEZ) Disputes Involving China: Issues for Congress*, by Ronald O’Rourke.

¹⁴¹ For a more complete history of clashes, see the database “Flashpoints: Security in the East and South China Seas,” maintained by the Center for a New American Security, <http://www.cnas.org/flashpoints/timeline>.

South China Sea in the coming years. Airstrips on China's artificial islands appear to be capable of supporting military aircraft, and new radar installations were spotted in early 2016.¹⁴² China has deployed fighter aircraft and SAMs to its facilities on the Paracel Islands for brief periods. For more information and analysis, see CRS Report R44072, *Chinese Land Reclamation in the South China Sea: Implications and Policy Options*, by Ben Dolven et al.

Along China's land borders, the risks of conflict are lower but nevertheless present. China and India have not resolved their territorial disputes in the Himalayas region, and skirmishes between the PLA and the Indian military continue to the present day. Reportedly, Beijing is concerned about the spillover of terrorism and transnational crime from unstable areas in Central Asia and Southeast Asia, in particular Afghanistan and Burma.

Global Operations of the PLA

In the past 15 years, the PLA has engaged in peacekeeping operations, humanitarian assistance, and other global security activities with greater frequency and proficiency. A major turning point was President Hu Jintao's instruction to the PLA in 2004 to prepare for the New Historic Missions (see the section "China's Security Strategy and Perceptions"). China's 2009 defense white paper describes the new tasks for the PLA that derive from the New Historic Missions: counterterrorism, stability maintenance, emergency rescue of overseas Chinese nationals, and international peacekeeping. Improvements in several dimensions of force projection—including the key factor, logistics—have enabled the PLA to operate to some degree on a global scale, although analysts assert that it will likely be another decade or more before the PLA has even a limited expeditionary capability.¹⁴³

The PLA has sent over 27,000 military personnel to 24 U.N. peacekeeping operations around the world and was deploying roughly 3,000 troops on peacekeeping operations as of March 2016.¹⁴⁴ Of the five permanent members of the U.N. Security Council, China has provided the most peacekeeping personnel. The PLAN has contributed vessels to the international efforts to combat piracy in the Gulf of Aden since 2008; the 22nd PLAN escort task force sailed from China in early 2016. To date, the PLA's large-scale disaster relief operations have been within China's borders, for example the response to the 2008 earthquake in Sichuan Province, but the PLA's capability to conduct disaster relief operations overseas is growing.¹⁴⁵ The PLAN also operates a hospital ship called the *Peace Ark* that has provided medical assistance to developing countries around the world.

As the PLA has improved its ability to sustain operations outside of China's immediate vicinity, especially since the mid-2000s, it has incrementally increased the quantity and complexity of distant area operations. The PLAN more frequently conducts exercises in areas of the Western Pacific beyond the first island chain (east of Japan), in the Indian Ocean, and in the southern reaches of the South China Sea. China has conducted relatively large multilateral military exercises with Russia and Central Asian states under the auspices of the Shanghai Cooperation

¹⁴² Asia Maritime Transparency Initiative, "Spratly Airstrip Update: Is Mischief Reef Next?" Center for Strategic and International Studies, September 17, 2015; Asia Maritime Transparency Initiative, "Another Piece of the Puzzle: China Builds Radar Facilities in the Spratly Islands," Center for Strategic and International Studies, February 22, 2016

¹⁴³ Ely Ratner, Elbridge Colby, Andrew Erickson, et al., "More Willing & Able: Charting China's International Security Activism," Center for a New American Security, May 2015, p. 37.

¹⁴⁴ United Nations Peacekeeping, "Troop and police contributors," accessed on March 22, 2016, <http://www.un.org/en/peacekeeping/resources/statistics/contributors.shtml>.

¹⁴⁵ Ratner, Colby, Erickson, et al. (2015), p. 38.

Organization. In 2011, China evacuated over 35,000 Chinese citizens from Libya during the uprising against Muammar al Qadhafi. This effort, the largest non-combatant evacuation operation in China's history, was the PLA's first operational deployment to Africa and the Mediterranean and the first use of long-range military transport aircraft to rescue Chinese citizens from a foreign conflict zone (most evacuees were transported by chartered private vessels).¹⁴⁶ In March 2015, PLA vessels evacuated hundreds of Chinese and other foreign nationals from Yemen.

U.S.-China Military-to-Military Relations

The U.S. and Chinese militaries interact in a variety of ways to pursue their security objectives and in support of overall bilateral diplomacy. DOD reports that the main U.S. objectives at present are to (1) build sustained and substantive dialogue, (2) build concrete, practical cooperation in areas of mutual interest, and (3) diminish the risks of accidents and miscalculation. The military-to-military (abbreviated as mil-mil) relationship has produced some results, such as the two Memorandums of Understanding (MOUs) signed in October 2014. Supporters of U.S.-China mil-mil exchanges contend that these contacts contribute to U.S. national security, but critics argue that the costs of maintaining mil-mil relations outweigh the benefits for the United States.¹⁴⁷

The U.S. military and the PLA conduct bilateral exchanges and dialogues from the most senior levels down to lower-level officers and officials. The U.S. Secretary of Defense and the U.S. Joint Chiefs of Staff exchange visits with their Chinese counterparts annually or biennially. (Observers note that the senior officials that China has designated as hosts for U.S. delegations often do not carry the same authority within their respective defense institutions as their U.S. guests.) There are recurrent exchanges in such fora as the U.S.-China Strategic Security Dialogue, a sub-dialogue of the two countries' Strategic and Economic Dialogue; the Defense Consultative Talks; the Military Maritime Consultative Agreement Working Group, and other ongoing dialogues. The U.S. and Chinese militaries also conduct limited academic and functional exchanges, reciprocate port visits, and participate in multilateral conferences, such as the Western Pacific Naval Symposium. In addition, the U.S. military and the PLA conduct limited bilateral military exercises and participate in some of the same multilateral military exercises. The U.S. military invited the PLA to the biennial RIMPAC exercises in 2014, for the first time, and invited the PLA to participate again in the 2016 exercises. Since 2008, the PLA and DOD have had a defense telephone link (a.k.a. a "hotline") to allow immediate, direct communication, although it has been used infrequently.

Congress has restricted U.S.-China mil-mil contacts through legislation. In response to concerns that mil-mil exchanges were revealing too much information to the PLA, in 1999 Congress placed restrictions in the National Defense Authorization Act (NDAA) for FY2000 (P.L. 106-65). Section 1201(a) of that law states that the Secretary of Defense may not authorize any mil-mil contact with the PLA if that contact would "create a national security risk due to an inappropriate exposure" of the PLA to 12 operational areas (with exceptions granted only to search and rescue or humanitarian operations or exercises). The 12 areas include nuclear operations, advanced combined-arms and joint combat operations, surveillance and reconnaissance operations, military

¹⁴⁶ Gabe Collins and Andrew Erickson, "Implications of China's Military Evacuation of Citizens from Libya," *China Brief*, vol. 11, no. 4, March 10, 2011.

¹⁴⁷ See the January 2015 CRS Report RL32496, *U.S.-China Military Contacts: Issues for Congress*, by Shirley A. Kan for more information on mil-mil relations up to January 2015.

space operations, and access to a DOD laboratory. The FY2000 NDAA requires the Secretary of Defense to inform Congress annually about any contacts with the PLA that breached the restrictions on inappropriate exposure.

Some observers argue that mil-mil relations with the PLA have been detrimental to U.S. national interests and that the U.S. military should change its approach toward these contacts. These observers argue that access to U.S. military assets and facilities aided PLA modernization efforts in the past and that the U.S. military did not gain reciprocal access from the PLA.¹⁴⁸ Furthermore, they argue, the PLA could use the information that it has learned about U.S. equipment and operations against the United States in a potential future conflict. Another criticism is that high-level dialogues and participation in high-profile exercises like RIMPAC give unwarranted status to the PLA, which, these analysts contend, has behaved in destabilizing ways that merit reprimand rather than reward.¹⁴⁹ Some observers argue that the U.S. military's eagerness for good mil-mil relations with the PLA has led U.S. policymakers in some cases to defer or dilute actions that would upset Chinese leaders.

Other observers, including current DOD officials and U.S. military officers, assert that the mil-mil relationship with the PLA provides a number of benefits to the United States. The high-level dialogues are the only channel for senior U.S. military officers and officials to interact directly with their counterparts. Proponents note that these dialogues are a good setting to deliver deterrent messages to senior PLA leaders and to foster understanding of U.S. defense policies. Some observers argue that these talks could open up channels of communications to defuse crises or to improve operational coordination between the two militaries, although a 2015 study concluded that individual and institutional barriers prevented U.S.-China mil-mil relations from creating "operational value" in that sense.¹⁵⁰

The United States and China in October 2014 signed two MOUs that are intended to improve transparency and decrease the risk of accidents and miscalculation through confidence-building measures. These non-binding agreements largely reaffirm existing commitments made by the two sides. DOD contends that the MOUs reflect a "shared objective of the two militaries to improve relations, reduce risk, and expand cooperation in areas of mutual interest while managing our differences through sustained and substantive engagements."¹⁵¹ The MOU on Notification of Major Military Activities relates to exchange of information about defense policies and strategies and the observation of military exercises, and it calls for the creation of a mechanism to improve information exchange. The MOU on Rules of Behavior for Safety of Air and Maritime Encounters outlines a framework for prescribed behavior in encounters between surface vessels. In September 2015, the United States and China concluded the framework for air-to-air encounters as an annex to the original MOU.

U.S. Responses to China's Changing Military Capability

As China's military capabilities have improved after the end of the Cold War, the U.S. government appears to have addressed this development in a variety of ways. This section

¹⁴⁸ Larry Wortzel, "Why Caution Is Needed in Military Contacts with China," Heritage Foundation, Backgrounder #1340, December 2, 1999.

¹⁴⁹ Josh Rogin, "Calls to Punish China Grow," *Bloomberg View*, Declassified blog, May 5, 2015, <http://www.bloombergview.com/articles/2015-05-05/second-thoughts-on-inviting-china-to-rimpac-naval-exercises>.

¹⁵⁰ James P. Nolan, "Why Can't We Be Friends? Assessing the Operational Value of Engaging PLA Leadership," *Asia Policy*, No. 20 (July 2015), pp. 45-79.

¹⁵¹ 2015 DOD CMSD, p. 65.

summarizes the main elements of these responses, with a focus on recent actions. Although U.S. officials state that many of the actions described below are not directed at any particular country, many observers believe they are, at least in part, responses to China's changing military capabilities and China's assertive behavior regarding its maritime territorial claims in the East and South China Seas. (Some of them may also be responses to concerns about North Korean and Iranian military capabilities.)

U.S. diplomatic engagement has sought to alleviate Chinese security concerns while emphasizing deterrent messages regarding American interests. In 2011, the Obama Administration initiated its policy of "strategic rebalancing" to the Asia-Pacific region, partly to reassure allies about strength of the U.S. military presence in East Asia and to prevent conflict through enhanced deterrence.¹⁵² The State Department and DOD developed frameworks to enhance significantly the security relationships with Australia, the Philippines, Japan, and South Korea. In addition to bolstering treaty alliances, the United States has enhanced its security cooperation with other countries in the region, notably Malaysia, Singapore, and Vietnam, alongside efforts to engage constructively with China.

In May 2015, Secretary of Defense Ashton Carter announced the five-year, \$425 million Southeast Asia Maritime Security Initiative, a new capacity-building effort focused on improving maritime law enforcement and information sharing in Southeast Asia. The United States has sold arms and other defense equipment to Taiwan, partly in response to China's improving military capabilities and the cross-strait military balance, according to reports.

A 2012 DOD strategic guidance document¹⁵³ and DOD's report on the 2014 Quadrennial Defense Review (QDR)¹⁵⁴ state that U.S. military strategy will place an increased emphasis on the Asia-Pacific region. This increased emphasis constitutes the military component of the strategic rebalancing to the Asia-Pacific region that also includes economic and political components. In 2012, DOD announced that 60% of U.S. Navy vessels will be based in the Pacific theater by 2020, shifting from the previous 50/50 split between the Pacific and Atlantic theaters.¹⁵⁵ The U.S. military has arranged for additional deployments of U.S. forces on a rotational basis to U.S. allies Australia, the Philippines, and South Korea. DOD states that it will deploy its most advanced defense platforms (for example, the F-35 Joint Strike Fighter and the Zumwalt (DDG-1000) class destroyer) to the Asia-Pacific region before other areas.¹⁵⁶

DOD's budget includes a number of programs for investing in weapons and systems for so-called "high-end" warfare, meaning technologically sophisticated, high-intensity warfare against capable adversary forces. To address concerns that the U.S. military technological edge over potential adversaries may be diminishing, DOD in November 2014 announced a new Defense Innovation Initiative.¹⁵⁷ In a related effort, DOD has also announced that it is seeking a new general U.S. approach—a "third offset strategy"—for maintaining U.S. superiority over opposing

¹⁵² For additional background information on the U.S. strategic rebalancing to the Asia-Pacific region, also sometimes known as the "pivot," see CRS Report R42448, *Pivot to the Pacific? The Obama Administration's "Rebalancing" Toward Asia*, coordinated by Mark E. Manyin.

¹⁵³ U.S. Department of Defense, *Sustaining U.S. Global Leadership: Priorities for 21st Century Defense*, January 2012.

¹⁵⁴ U.S. Department of Defense, *Quadrennial Defense Review 2014*, March 2014.

¹⁵⁵ For a more complete discussion of responses in the maritime domain, see the section "DOD Response to China Naval Modernization" in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke.

¹⁵⁶ U.S. Department of Defense, *The Asia-Pacific Maritime Security Strategy: Achieving U.S. National Security Objectives in a Changing Environment*, Washington, DC, August 2015.

¹⁵⁷ Jake Richmond, "Work Explains Strategy Behind Innovation Initiative," *DOD News*, November 24, 2014

military forces that are numerically large and armed with precision-guided weapons.¹⁵⁸ In testimony to Congress in February 2016, the commander of U.S. Pacific Command highlighted DOD efforts to increase the lethality of surface-to-surface missiles.¹⁵⁹ Alongside advances in defense technologies, DOD is crafting new operational concepts to leverage its advantages, especially in joint operations. The AirSea Battle operational concept, subsumed within the Joint Concept for Access and Maneuver in the Global Commons in 2015, is an attempt to counter the types of A2/AD capabilities that the PLA has developed.¹⁶⁰

Some U.S. military operations may be a direct response to Chinese military activities. DOD is maintaining and in some cases drawing public attention to its naval and air operations in the Western Pacific, including presence operations and Freedom of Navigation (FON) operations that are intended to reinforce longstanding international legal norms relating to freedom of the seas. The U.S. military's periodic surveillance and reconnaissance activities in international waters and airspace near China's territorial waters are a source of information for DOD about PLA activities.

As described in the previous section, the U.S. military has sought to reinforce diplomatic objectives in its military-to-military exchanges with the PLA, foster cooperation on shared security challenges, and prevent accidents and unintended escalation. DOD and other U.S. officials regularly call for China to be more transparent on military matters, so as to reduce U.S. and international uncertainty about the direction and ends of China's military modernization effort.

Issues for Congress

China's changing military capability raises several policy and oversight issues for Congress, including those discussed below.

Assessing China's Military Capability

One key issue is whether the U.S. government has appropriately assessed China's changing military capability. DOD's assessment is reflected in various documents, including its annual report to Congress on military and security developments involving China.¹⁶¹ Challenges in assessing China's changing military capability and comparing it to U.S. military capabilities include the following:

- **Multiple factors contribute to military capability.** Ships, aircraft, vehicles, and ballistic missiles can be relatively easy to count, but quantity is only one aspect of a country's military capability. Other factors include the technological sophistication of those platforms and weapons; capabilities for knitting those

¹⁵⁸ See, for example, Bob Work, "The Third U.S. Offset Strategy and its Implications for Partners and Allies," Remarks as delivered by Deputy Secretary of Defense Bob Work, Washington, DC, January 28, 2015, <http://www.defense.gov/speeches/speech.aspx?speechid=1909>. The effort is referred to as the "third offset" strategy because it would succeed a 1950s-1960s U.S. strategy of relying on nuclear weapons to offset the Soviet Union's numerical superiority in conventional military forces (the first offset strategy) and a subsequent U.S. offset strategy, first developed and fielded in the 1970s-1980s, that centered on information technology and precision-guided weapons (the second offset strategy).

¹⁵⁹ U.S. Congress, Senate Committee on Armed Services, *Hearing on U.S. Pacific Command and U.S. Forces Korea*, 114th Cong., 2nd sess., February 23, 2016.

¹⁶⁰ Air-Sea Battle Office, U.S. Department of Defense, *Air-Sea Battle: Service Collaboration to Address Anti-Access & Area Denial Challenges*, May 2013.

¹⁶¹ 2015 DOD CMSD and previous editions.

platforms and weapons into networks; supporting maintenance and logistics capabilities; doctrine and tactics; the quality, education, and training of personnel; and the realism and complexity of exercises. Some of these factors are harder to observe and evaluate than others.

- **Limited Chinese transparency.** China's limited transparency on matters relating to its military makes it more difficult to observe and evaluate factors that contribute to or detract from China's military capability. U.S. officials regularly urge China to be more transparent about its military activities.¹⁶² In recent years, China has taken small steps in that direction by providing increased information about its military in periodic defense white papers. Information on China's military is also available in a wide array of defense-focused magazines published in China. Even so, China in general makes available much less information about its military than the United States does about its military.
- **Differing geographic scope of responsibilities.** The U.S. military has substantial worldwide responsibilities, including NATO-related responsibilities in Europe and a security role in the Middle East. Consequently, only a portion of the U.S. military might be available for a crisis or conflict scenario involving China. The PLA, in contrast, has limited responsibilities outside China's home region. Consequently, a more substantial fraction of China's military would likely be available for a conflict in China's home region.
- **Differing missions.** The missions to be performed by one country's military can differ greatly from the missions to be performed by another country's military. Consequently, more meaning comes from measuring a military's capability against its assigned missions than measuring against other metrics. This consideration is significant in assessing U.S. and Chinese military capabilities, because the missions of the two militaries are quite different.¹⁶³

Potential oversight questions for Congress include the following:

- Is the executive branch accurately assessing China's changing military capabilities, particularly in relation to the kinds of missions that Chinese leaders want the PLA to be able to perform?
- Is the executive branch doing enough to encourage greater transparency from China concerning its military capabilities?
- How well are U.S. surveillance and intelligence-gathering activities able to compensate for China's limited transparency on military matters? Are DOD and the U.S. intelligence community devoting the right amount of resources toward surveillance and intelligence-gathering activities directed at the PLA? What are the limits of what can be learned through these activities?
- How does U.S.-China military-to-military engagement inform the U.S. government about Chinese military capabilities?
- Does DOD's annual report to Congress on military and security developments involving China provide sufficient information to permit Congress to make a

¹⁶² 2015 DOD CMSD, pp. ii, 63.

¹⁶³ For additional discussion of considerations such as these as they relate to naval forces, see "Comparing U.S. and Chinese Naval Capabilities" in CRS Report RL33153, *China Naval Modernization: Implications for U.S. Navy Capabilities—Background and Issues for Congress*, by Ronald O'Rourke.

well-considered (if generalized) independent assessment of China's military capabilities? What changes, if any, might be needed in this report (10 U.S.C. 113 note)?

Assessing China's Intentions for Its Military

A second key issue for Congress is whether the U.S. government has appropriately assessed PRC leaders' intentions regarding the PLA. DOD's assessment of this issue is reflected in various documents, including its annual report to Congress on military and security developments involving China. Challenges in assessing the intentions of China's leaders include the following:

- **Statements from Chinese (or other national) leaders about their intentions may not always be reliable.** China's leaders make regular (if often generalized) statements about their intentions for their military through white papers and other public statements. These statements, however, might be attempts to influence foreign audiences or for domestic consumption, and might not be an accurate guide to understanding the actual intentions that China's leaders have for the PLA. On the other hand, not all statements should be dismissed as posturing. For example, Chinese leaders have made statements about China's "core interests" and their willingness to defend them by force if necessary; such statements might reflect, to some degree at least, genuinely held views. The challenge is to discern posturing from genuine expressions. Observing what kinds of military capabilities China is pursuing, and how these capabilities appear to align or not align with stated intentions, can help inform judgments on this question.
- **Limited Chinese transparency.** As with the matter of assessing China's military capabilities, assessing China's leaders' intentions regarding the military is made more complicated by China's limited transparency regarding intentions. DOD states that "China's lack of transparency surrounding its growing military capabilities and strategic decision-making has also increased concerns in the region about China's intentions. Absent greater transparency, these concerns will likely intensify as the PLA modernization progresses."¹⁶⁴ U.S. officials regularly urge China to be more transparent regarding their intentions.
- **Mirror imaging.** Assessing China's leaders' intentions regarding the military can benefit from having an accurate understanding of the values and belief sets of those leaders. Those values and belief sets can differ, perhaps substantially, from the values and belief sets common to Americans. Mirror imaging—tacitly and perhaps unconsciously assuming that one's values and belief sets are shared by the other party—can lead to less accurate assessments of the other party's intentions.
- **Intentions can change.** Military analysts often remark that intentions can change, perhaps quite quickly, underscoring the importance of having an accurate assessment of capabilities, which change less quickly over time.

Potential oversight questions for Congress include the following:

- Is the U.S. government accurately assessing PRC leaders' intentions regarding the PLA?

¹⁶⁴ 2015 DOD CMSD, p. 22.

- How do Chinese investments in military capabilities align or not align with statements from Chinese leaders about their intentions for their military?
- Is the U.S. government doing enough to encourage greater transparency from China's leaders concerning the intentions they have regarding the military?
- How, if at all, does U.S.-China military-to-military engagement affect the intentions that China's leaders have for their military?
- How stable are the intentions that Chinese leaders have for their military? How likely is it that those intentions might change due to changes in political leadership, in domestic Chinese factors (such as the rate of economic growth), or in China's external security environment?
- To what degree can U.S. actions influence China's leaders' intentions regarding the PLA? If U.S. actions can influence those intentions to some degree, is the U.S. government influencing those intentions in a direction favorable to U.S. interests?

Responding to China's Changing Military Capability

A third key issue for Congress is whether the U.S. government and DOD in particular are responding appropriately to China's changing military capabilities and the intentions that China's leaders have for their military. See the earlier section "U.S. Responses to China's Changing Military Capability" for a summary of the main responses. Potential oversight questions for Congress include the following:

- Is the U.S. government responding appropriately to China's changing military capabilities and the intentions of China's leaders regarding the PLA?
- In light of constraints on U.S. defense spending under the Budget Control Act of 2011 (S. 365/P.L. 112-25 of August 2, 2011) as amended, and the security concerns generated by Russian assertiveness in Europe and the rise of the so-called Islamic State organization in the Middle East, is DOD adequately funding initiatives that respond to China's changing military capabilities? Has DOD struck the right balance in terms of allocating resources among policymakers' concerns, including China?
- Are DOD programs for developing and fielding new weapons and supporting systems appropriately oriented and paced for responding to China's changing military capabilities? What areas of U.S. military capability are currently in most need of improvement, and what is being done to address them?
- What role can U.S. allies and partner countries play in assisting the United States in responding to China's changing military capabilities? Is the U.S. government doing enough to encourage U.S. allies and partner countries to respond to China's changing military capabilities in ways that the United States would prefer?
- What priority should China-related concerns receive in shaping U.S. choices, relative to other concerns of U.S. policymakers?

Looking ahead, and drawing from the issues for Congress discussed above, some general factors that congressional observers of China's military modernization might track are:

- How might changes in China's economic growth rate affect, if at all, the rate of growth in China's military budget in coming years?

- How might structural changes in China's military, such as the reduction of PLA forces by 300,000 personnel announced in September 2015 and the reorganization of the command structure, affect resources available to the PLA for investing in other defense priorities, such as maritime and air platforms and better compensation to recruit more qualified personnel?
- How are developments in China's military, the U.S. military, and the militaries of other countries in the Asia-Pacific region affecting the overall military balance in the region, and what implications does this evolving situation have for U.S. interests and policy options?

Appendix A. Past Legislative Activity

Congress has played a role in guiding U.S. foreign and defense policies regarding the PRC and the PLA. This section discusses laws that have had significant, continuing impacts on U.S. policies as well as some recent bills that address the present situation. In addition to legislation, Congress influences U.S. policies toward the PRC and the PLA through budget allocations, hearings, and public statements. Members of Congress have attributed some decisions on budget increases or policy positions to China's changing military capabilities, but these cases are the exception, not the rule. It is usually not possible to make a definitive attribution of the sole or main rationale for legislative activity. This section discusses bills and other congressional actions that explicitly address security issues related to China, especially the PLA.

Legislation Prior to the 112th Congress

Numerous laws and resolutions on foreign and defense policy have had impacts on U.S. policies toward the PRC and the PLA, but four laws stand out for their specific focus and their significant, continuing impact: the Taiwan Relations Act (P.L. 96-8), the Foreign Relations Authorization Act for FY1990 and FY1991 (P.L. 101-246, Section 902), the National Defense Authorization Act (NDAA) for FY2000 (P.L. 106-65, Section 1201), and the NDAA for FY2001 (P.L. 106-398, Section 1238). These laws outline U.S. policy toward the security of Taiwan, prohibit the export of arms to China, govern U.S.-China military-to-military interactions, and establish the U.S.-China Commission, respectively.

The **Taiwan Relations Act**, enacted in 1979, sets out U.S. policy toward Taiwan (ROC) in the wake of President Jimmy Carter's decision to establish diplomatic relations with the PRC and end formal diplomatic relations with Taiwan. Section 2(b) of the act states,

It is the policy of the United States.... (3) to make clear that the United States decision to establish diplomatic relations with the People's Republic of China rests upon the expectation that the future of Taiwan will be determined by peaceful means; (4) to consider any effort to determine the future of Taiwan by other than peaceful means, including by boycotts or embargoes, a threat to the peace and security of the Western Pacific area and of grave concern to the United States; (5) to provide Taiwan with arms of a defensive character; and (6) to maintain the capacity of the United States to resist any resort to force or other forms of coercion that would jeopardize the security, or the social or economic system, of the people on Taiwan.

Section 3(c) directs the President to inform Congress promptly of threats to Taiwan and to U.S. interests and states, "The President and the Congress shall determine, in accordance with constitutional processes, appropriate action by the United States in response to any such danger."

Following China's deadly crackdown on pro-democracy demonstrators in Tiananmen Square in June 1989, Congress passed legislation that prohibits the export of defense articles (and crime control and detection equipment) to China. Specifically, Section 902(a) of the **Foreign Relations Authorization Act for FY1990 and FY1991** suspends the issuance of licenses under section 38 of the Arms Export Control Act for the export to the PRC of any defense article on the U.S. Munitions List, including helicopters and helicopter parts. Many European countries followed the United States with their own arms embargoes. There have been occasional appeals to lift the U.S. ban on exporting arms to China, but few policymakers in Washington appear interested in repealing or waiving this provision.

Congress restricted military-to-military exchanges with the PLA in Section 1201(a) of the **NDAA for FY2000**. This law prohibits the Secretary of Defense from authorizing contact with the PLA

if that contact would “create a national security risk due to an inappropriate exposure” of the PLA to 12 operational areas. See the section “U.S.-China Military-to-Military Relations” for more discussion of this law and the broader context. The FY2000 NDAA in Section 1202 also created the requirement for DOD to produce a report on China’s military strategy and military-technological developments.

The Floyd D. Spence **NDAA for FY2001** established the U.S.-China Security Review Commission, which then became the U.S.-China Security and Economic Review Commission, in Section 1238. The law requires the Commission to produce an annual report discussing Chinese military matters and empowers the Commission to hold hearings.

Legislative Activity in the 112th, 113th, and 114th Congresses

This section summarizes a selection of enacted legislation and hearings from the 112th, 113th, and 114th Congresses that would directly affect U.S. policy toward the PLA and the security of the Asia-Pacific region.

- **Restricting space cooperation.** In 2011, Congress passed the Department of Defense and Full-Year Continuing Appropriations Act, 2011 (P.L. 112-10), which in Section 1340(a) barred the National Aeronautics and Space Administration (NASA) and the Office of Science and Technology Policy (OSTP) from using appropriated funds for any participation, collaboration, or bilateral coordination with China or any Chinese-owned company. The PLA plays a large role in China’s space programs, including ostensibly civilian, non-defense programs. Successive appropriations bills have maintained language restricting cooperation between NASA and Chinese entities. Section 7044(f) of the Consolidated Appropriations Act, 2012 (P.L. 112-74), prohibits the export of satellites and satellite components to China without prior notification of Congress and prohibits the U.S. State Department from using appropriated funds for grants, contracts, or cooperative agreements with the PLA and its entities. The FY2013 NDAA (P.L. 112-239) in Section 1261 also prohibits the export or transfer to China of satellites or related items subject to export administration regulations.
- **Assessing Chinese military capabilities.** The FY2012 NDAA (P.L. 112-81) in Section 1232 directed the Comptroller General of the United States to submit to the congressional defense committees an independent review of “any gaps between China’s anti-access capabilities and United States’ capabilities to overcome them.” The FY2013 NDAA (P.L. 112-239) in Section 1045 required a DOD report on U.S. military conventional and nuclear capabilities to neutralize China’s “underground tunnel network and what is stored within such tunnels” as well as an independent report on China’s nuclear weapons program and posture. Section 1231 required a report on U.S. capabilities in relation to China, Iran, and North Korea, and any intelligence gaps in assessing those foreign militaries. The FY2015 NDAA (P.L. 113-291) in Section 1256 requested that DOD report to Congress on Taiwan’s self-defense capabilities, including sections on the PLA’s capabilities in ballistic missiles, undersea and surface warfare, amphibious and heavy sealift, and ability to establish air dominance over Taiwan.
- **Prohibiting missile defense integration with Chinese systems.** In December 2013, Congress passed the FY2014 NDAA (P.L. 113-66), which prohibits the use of funds to integrate U.S. missile defense systems with PRC missile defense

systems in Section 233, following reports that NATO member Turkey was considering a purchase of Chinese missile defense systems.

- **Reporting on U.S. defense policy responses.** Section 1259 of the FY2015 NDAA (P.L. 113-291) requested a DOD report on its strategy for maritime security in the Asia-Pacific region, which DOD published in August 2015.¹⁶⁵ Section 1601 requests that DOD report to Congress on the ability of the U.S. military to deter and defeat acts of space aggression by adversaries and alternative defense and deterrence strategies, in response to the counter-space capabilities of China and Russia.

Senate Resolutions 217 and 524 in the 112th Congress expressed the Sense of the Senate supporting U.S. freedom of navigation operations in the South China Sea and “deploring” the use or threat of force by China. In the 113th Congress, Senate Resolutions 167 and 412 expressed the Sense of the Senate on maritime issues in the Asia-Pacific region. S.Res. 167 both welcomed China’s “peaceful development” and identified “dangerous and destabilizing incidents” caused by Chinese naval and maritime law enforcement vessels. H.Res. 714 in the 113th Congress encouraged the peaceful resolution of maritime territorial disputes and called on China to refrain from provocative actions in the Asia-Pacific region.

In recent years, several congressional committees have held numerous hearings to draw attention to developments in the Chinese military and to hear from acknowledged experts on the topic. A survey by CRS counted 10 hearings on topics directly related to the Chinese military (not including nomination hearings) in the 113th Congress and 8 in the 114th Congress, up to August 2015.¹⁶⁶ Including hearings of the U.S.-China Economic and Security Review Commission related to military issues, the totals rise to 14 hearings in the 113th Congress and 10 so far in the 114th Congress.

Recent Adjustments to the DOD China Military Power Report

In the FY2000 NDAA, Congress instructed DOD to publish a report on China’s military strategy and military-technological developments, a document that is now titled *Annual Report to Congress [on] Military and Security Developments Involving the People’s Republic of China*. Subsequent NDAAs have adjusted the focus and required topics of the DOD report.

- FY2012 NDAA: Section 1238 requests the addition of an assessment of the nature of China’s cyber activities directed against DOD and any resultant damage to DOD.
- FY2013 NDAA: Section 1271 requests coverage of numerous additional topics: China’s electronic warfare capabilities and details on the number of malicious cyber incidents originating from China against DOD infrastructure; China’s

¹⁶⁵ The report, titled *The Asia-Pacific Maritime Security Strategy: Achieving U.S. National Security Objectives in a Changing Environment*, is available online at http://www.defense.gov/Portals/1/Documents/pubs/NDAA%20A-P_Maritime_Security_Strategy-08142015-1300-FINALFORMAT.PDF.

¹⁶⁶ A selection of hearings in 2015 includes: “China’s Rise: The Strategic Impact of Its Economic and Military Growth,” House Committee on Foreign Affairs, Subcommittee on Asia and the Pacific, June 17, 2015; “Safeguarding American Interests in the East and South China Seas,” Senate Foreign Relations Committee, May 13, 2015; “The Risk of Losing Military Technology Superiority and its Implications for U.S. Policy, Strategy, and Posture in the Asia-Pacific,” House Armed Services Committee, April 15, 2015; “U.S. Defense Policy Issues Pertaining to the Asia-Pacific Theater,” Senate Armed Services Committee, April 14, 2015; “China’s Offensive Missile Forces,” U.S.-China Economic and Security Review Commission, April 1, 2015.

space and counter-space programs; nuclear program; anti-access and area denial capabilities; command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) modernization program; navy and paramilitary and maritime law enforcement vessels, including their response to U.S. naval activities; military-to-military relationships with other countries; any significant sale or transfer of military hardware, expertise, and technology from China, and any significant assistance to and from “any selling state with military-related research and development programs in China.” Section 1271 drops the requirement for an assessment of the damage inflicted on DOD by China’s cyber activities.

- FY2014 NDAA: Section 1248 requests the addition of coverage of the status of China’s fifth-generation fighter program, including an assessment of each individual aircraft type, estimated initial and full operational capability dates, and the ability of those aircraft to provide air superiority.
- FY2015 NDAA: Section 1252 requests additional detail regarding China’s paramilitary and law enforcement vessels.

Appendix B. China's Strategic Culture

Mao Zedong's Principles

Chinese strategists continue to cite Mao Zedong as a master of warfare, and describe his military theory as the baseline that subsequent leaders have built upon and improved.¹⁶⁷ However, in many other ways, the PLA has cast aside outdated ideas in favor of modern concepts derived from other militaries' strategies. Mao's dictums that war is a continuation of politics and that the Communist Party must have political control over the military remain guiding principles today.¹⁶⁸ Mao's concept of "People's War," which traditionally relies on overwhelming numbers, guerrilla tactics, cooperation between the military and the broader population, and protracted conflict, is being updated to apply to modern warfare. The People's War concept is being integrated with information warfare through the use of modern fighting platforms and domains, thereby in theory allowing "the masses" and PLA to work hand-in-hand even in cyber operations.¹⁶⁹ Likewise, some western analysts have assessed that China is applying the concept of People's War to its maritime disputes by organizing some of its fishing fleet into a maritime militia.¹⁷⁰ The People's War concept continues to be taken seriously by China's leaders and does not appear merely to be a relic from the days of Mao.

Evolution of Chinese "Military Thought"

Successive CCP leaders have built upon the principles of ancient strategists and Mao Zedong in promulgating their own dictums on the military and the strategic environment. This evolutionary process reflects each leader's understanding of China's strategic environment and the PLA's changing abilities to protect the state's interests. Deng Xiaoping, who served as China's supreme leader from 1978 until his death in 1997, judged that the main root of warfare had changed from class struggle to hegemony, reflecting the perceived military threat from the Soviet Union.¹⁷¹ In contrast with the CCP's previous long-held view that war was imminent, Deng posited that overall war was avoidable and that, if war did come, it would be a "local war," meaning a war that is short of world war or nuclear war.¹⁷² Deng also applied his principle of "seeking truth from facts" to military development, admitting that the quality of the force was low and therefore incapable of fighting a modern war.¹⁷³ Deng advocated large-scale personnel cuts as a means to

¹⁶⁷ Chi Haotian, "博大精深的毛泽东军事思想" [Mao Zedong's Rich and Profound Military Thought], *People's Daily Online*, <http://cpc.people.com.cn/GB/69112/70190/70194/5233638.html>.

¹⁶⁸ Jiang Siyi. "(毛泽东军事思想论纲)" [Mao Zedong Military Thought's Guiding Principles], CCCPC Party Literature Research Office. Last modified 2012. http://www.wxyjs.org.cn/mzdsxyj_568/201207/t20120702_6057.htm.

¹⁶⁹ Yan Xiaofeng and Yang Yongli, "People's War has Unequaled Strength [人民战争就是那无敌的力量]," *CPC News*, September 4, 2014.

¹⁷⁰ Andrew S. Erickson and Conor M. Kennedy, "Meet the Chinese Maritime Militia Waging a 'People's War at Sea'," *Wall Street Journal*, China Realtime blog, March 31, 2015.

¹⁷¹ Li Chengjun and Sun Sijing, "论邓小平新时期军队建设思想的重大理论和实践价值" [Significant Theoretical and Practical Value of Deng Xiaoping's Thought on Armed Forces Building in the New Period], *China Military Science*, vol. 2014, no. 4 (2014), pp. 5-10.

¹⁷² Michael Pillsbury, "PLA Capabilities in the 21st Century: How Does China Assess Its Future Security Needs?," in *The Chinese Armed Forces in the 21st Century*, ed. Larry M. Wortzel (Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 1999), pp. 89-158.

¹⁷³ Li Chengjun and Sun Sijing, "论邓小平新时期军队建设思想的重大理论和实践价值" [Significant Theoretical and Practical Value of Deng Xiaoping's Thought on Armed Forces Building in the New Period], *China Military* (continued...)

increase fighting strength and emphasized that army building was secondary to China's other modernization priorities.¹⁷⁴

Jiang Zemin was elevated to the top CCP post in 1989, immediately following the 1989 Tiananmen Square crackdown. In response to the harsh crackdown, Western countries imposed sanctions to prohibit the sale of advanced weapons to China, which was diplomatically isolated at the time. Nevertheless, the 1991 Persian Gulf War demonstrated to Beijing the importance of the use of high-tech weaponry to defeat a less-advanced opponent. Since that time, "winning local wars under high-tech conditions" has been a mainstay in China's understanding of modern warfare.¹⁷⁵ Jiang supported military budget increases that were commensurate with overall national economic growth, overseeing consistent double-digit annual military budget increases.¹⁷⁶ Like Deng, Jiang emphasized the need for quality over quantity to improve combat effectiveness, calling for the application of science and technology to enhance military training, education, and logistics. Jiang also took the crucial step of largely divesting the military from its commercial endeavors, which had become a serious source of corruption.¹⁷⁷

A Chinese Way of War?

Chinese thinking about military strategy and operations has idiosyncratic aspects that are amplified by Chinese axioms such as, "You fight in your way and we fight in ours, and strive for full initiative."¹⁷⁸ The PLA is not as transparent as most Western militaries regarding military doctrine, but there are several features to highlight here. Mobilization of the civilian population, a corollary of the People's War concept, figures large in Chinese military planning, for example. PRC administrative units (e.g., provinces and cities) regularly conduct exercises for defense mobilization of civilian transportation and infrastructure assets. Analysts assess that alongside kinetic operations, Chinese leaders likely would employ the concept of the "Three Warfares"—legal, media/propaganda, and psychological warfare—during (and possibly before) a conflict to achieve their political aims.¹⁷⁹

Following the strategic concept of Active Defense, PLA strategists place a high priority on seizing the initiative in a conflict. Some observers believe that the PLA would pair this predilection with its assessment that the cyber and space domains are the "high ground" of contemporary warfare and thus choose to strike its adversary's information networks. According to one American scholar, China believes that a "preemptive first strike is preferable, as it sets the stage for the remainder of the conflict and puts the aggressor in a distinct position of advantage.... The PLA advocates a cyber-posture that makes no differentiation between peace-time and war-

(...continued)

Science, vol. 2014, no. 4 (2014), pp. 5-10.

¹⁷⁴ David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2002), p. 2.

¹⁷⁵ Alexander Chieh-cheng Huang, *Seeking Truth from Facts: A Retrospective on Chinese Military Studies in the Post-Mao Era*, Rand Corp., Santa Monica, 2001, pp. 131-140.

¹⁷⁶ David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2002), p. 189.

¹⁷⁷ James Mulvenon, "To Get Rich Is Unprofessional: Chinese Military Corruption in the Jiang Era," *China Leadership Monitor*, no. 6 (Spring 2003), pp. 21-35.

¹⁷⁸ Peng and Yao, *The Science of Military Strategy* (Beijing: Military Science Publishing House, 2003), p. 452.

¹⁷⁹ Timothy Walton, "China's Three Warfares," Delex Systems, Special Report 3, January 18, 2012.

time, and, in fact, advocates for a state of perpetual mobilization.”¹⁸⁰ The PLA may use a variety of operations, including kinetic and electronic warfare methods, to disrupt an adversary’s military satellite networks.¹⁸¹

Since the Sino-Soviet split in 1960, China has pursued a course of strategic non-alignment and has eschewed treaty alliances. China often criticizes U.S. bilateral alliances, calling them outdated relics of the Cold War. China also has made rejection of overseas bases a central part of its foreign policy, but there are indications that the ongoing expansion of PLA operations may force China to rethink this policy.¹⁸² The new logistics facility that the PLA plans to establish in Djibouti may be a sign that China has already changed its approach.

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¹⁸⁰ John Costello, “Chinese Views on the Information ‘Center of Gravity’: Space, Cyber and Electronic Warfare,” *China Brief*, vol. 15, no. 8, April 16, 2015.

¹⁸¹ Joe McReynolds, “China’s Evolving Perspectives on Network Warfare: Lessons from the Science of Military Strategy,” *China Brief*, vol. 15, no. 8, April 16, 2015.

¹⁸² Christopher D. Yung and Ross Rustici, “‘Not an Idea We Have to Shun’: Chinese Overseas Basing Requirements in the 21st Century,” *China Strategic Perspectives*, Center for the Study of Chinese Military Affairs, Institute for National Strategic Studies, U.S. National Defense University, October 2014.