

The Cult of Innovation and the Transformation of Chinese Military Power in the Era of Xi Jinping

Tai Ming Cheung(張大銘)

Professor; Director, UC Institute on Global Conflict and Cooperation.

At the 19th Chinese Communist Party Congress in October 2017 that solidified Chinese Communist Party General Secretary and Commander-in Chief Xi Jinping's hold on power for the foreseeable future, he offered a confident, even strident, vision of China's growing long-term influence and might in the international system. Xi talked about "socialism with Chinese characteristics entering a new era" in which he described China as "moving closer to the global center stage," that China's brand of socialism offered a new option for countries who want to speed up their development while preserving their independence, and a China that was becoming a great power.¹

¹ Xi Jinping, "Secure a Decisive Victory in Building a Moderately Prosperous Society in All Respects and Strive for the Great Success of Socialism with Chinese Characteristics for a New Era," *Report to the 19th Chinese Communist Party National Congress*, (Beijing; October 2017)

To realize these grand ambitions, Xi stressed that China needs to become a militarily powerful and technologically advanced country, and he offered a timeline. First, the country should reach the first tier of the world's most innovative countries by 2035, and at the same time, the military would realize its objectives of becoming a fully modern force. By 2050, China would challenge for global leadership with a world-class military a centerpiece of the country's "comprehensive national strength."

This briefing paper examines whether these goals are realistic and achievable within the timeline put forward by Xi? How will China undertake this grand transformation? What is Xi's vision for marrying military power with innovation? What are the geostrategic and geo-economic implications for the United States and Asia if China is successful?

The Roles of Innovation, Reform, and Modernization in the Transformation of Chinese Military Power

Xi Jinping's grand goal of transforming the Chinese defense establishment from being big to being strong rests on a three-pronged strategy of reform, innovation, and modernization. Reform refers to undertaking a concerted roots and branch restructuring of the existing defense establishment

http://www.xinhuanet.com/english/download/Xi_Jinping's_report_at_19th_CPC_National_Congress.pdf.

to improve its readiness and ability to fight and win future wars as well as to ensure its political reliability to the Communist Party. Innovation concerns the development of new, especially novel, ways and means of strengthening China's military power and influence through hard (such as material, technological, and industrial) and soft (such as normative, strategy and tactics, processes) factors. Modernization is the result of the implementation of the reforms and innovation on the development of defense capabilities.

While these three components of Xi's military strengthening strategy are being pursued on parallel but separate tracks, there is considerable overlapping and coordination of their activities. Moreover, although these endeavors are occurring concurrently, there are different timeframes set for them. Accomplishing the bulk of structural reforms is targeted for the beginning of the 2020s, while Xi declared at the 19th Party Congress that defense modernization would basically be completed by 2035 and China would become a world class defense innovation power on a par with the United States by 2050.

Reform and modernization have been at the top of the defense establishment's policy agenda going back to the 1970s, but innovation has only come to the fore since the beginning of the twenty-first century. Both Jiang Zemin and Hu Jintao emphasized the importance of innovation, especially related to research and development, during their tenures. Xi though has

elevated innovation to a core priority and broadened its application to far more military areas than his predecessors did.

Xi's push for the defense establishment to be more innovative has been far from easy though. Innovation in the defense domain, Xi has explained, "is more demanding and difficult than innovation in other arenas" because of the deeply conservative, insular, and change-resistant military culture and mindset. He pointed out that it is "incumbent upon us to liberate our minds and perceptions" and shift from: 1) thinking of fighting mechanized wars to preparing to fight informatized wars; 2) safeguarding traditional external security to focusing on comprehensive security; and 3) conducting campaigns by a single service to conducting joint campaigns involving multiple service arms.²

This transformation is being carried out through a wide-ranging overhaul of the organizational structure, workings, and institutional culture of the military and defense S&T systems. Xi calls this approach a systems engineering project that "requires overall planning and a coordinated advance" on many fronts.³ In viewing innovation from a

² "Xi Jinping Addresses Politburo 17th Collective Study Session, Emphasizes Need to Accurately Grasp New Trends in the World's Military Development, Advance with the Times to Vigorously Promote Military Innovation," *Xinhua News Agency*, 30 August 2014.

³ Ibid.

systems perspective, Xi subscribes to the concept of a bounded innovation system consisting of a complex arrangement of actors interacting with each other through defined norms and routines. He has in particular targeted five hard and soft areas for his comprehensive military innovation drive:⁴

- **Theory-Driven Innovation:** This covers the development of military theory for top-level strategic guidance and plans, which also includes theoretical and policy thinking at the strategy, campaign, and tactical levels.
- **Organization-Driven Innovation:** A top priority has been to revamp the high command system so that it is more capable and effective in overseeing a military force that is more technologically sophisticated, integrated, and battle-ready. This includes reorganization of the Central Military Commission, the PLA general headquarters apparatus, service arms, and regional commands, which began to take place in 2016. Another important priority is the restructuring of the defense S&T system, especially focusing on

⁴ Besides these five categories, Xi has also mentioned the management process as another area deserving to be shaken up with innovation. See “Xi Underlines Innovation, Reform in Defense, Military Upgrade,” *Xinhua News Agency*, 13 March 2016.

deep-seated structural obstacles to innovation such as corporate monopolies.

- **Creativity-Driven Innovation:** This focuses on encouraging more open, dynamic, and creative thinking at both the individual and organizational level to overcome deeply ingrained military conservative and bureaucratic risk-adverse attitudes, practices, and institutional culture. Paradoxically, the importance of orthodox political ideology, especially unquestioned loyalty to the Communist Party and Xi's leadership, is being emphasized at the same time.
- **Technology-Driven Innovation:** Improving military science and technology capabilities is of central importance, of which the nurturing of homegrown indigenous innovation rates as the top priority. Besides supporting research and development, there is also emphasis on building up the acquisition system.
- **Civil-Military Innovation:** This consists of two strands, of which the first is military-civil fusion that concerns efforts to integrate the civilian and defense sectors of the economy. The second part is about the political context of civil-military relations focusing on the Communist Party's control and monitoring of the PLA. Xi wants to integrate the military and the civilian innovation systems tightly so that the sum of the two

parts leads to a far more capable and competitive dual-use system.

Xi first made clear how important innovation was in his military priorities at a Politburo study session in August 2013 that was devoted to examining military innovation and international military developments. Xi said at the meeting that a new global military revolution was developing “at a speed so fast, in a scope so wide, at a level so deep, and with an impact so great that it has rarely been seen witnessed since the end of World War II.” Xi believed that, “faced with such grim challenges and rare opportunities because of this new military revolution, we can narrow the gap as soon as possible and realize the new leap forward only by advancing with the times and vigorously promoting military innovation.”⁵

Theory-Driven Innovation

At the Politburo session, Xi called for the development of a new innovation-driven military theory (军事理论) that would provide the comprehensive strategic guidance to steer the PLA’s long-term modernization and development, which he defined as “military strengthening.” Xi explained that, “to

⁵ “Xi Jinping Addresses Politburo 17th Collective Study Session, Emphasizes Need to Accurately Grasp New Trends in the World’s Military Development, Advance with the Times to Vigorously Promote Military Innovation,” *Xinhua News Agency*, 30 August 2014.

fulfill the goal of military strengthening is a great and arduous cause, which cannot be done without the guidance of advanced military theory. The innovation of military theory must be closely linked with this goal of military strengthening, must closely keep pace with trends in global military development, must be closely related to the changing needs of national security, must deeply study the characteristics and laws of taking the military strengthening path with Chinese characteristics, so that it effectively turns the goal of military strengthening into a concrete roadmap and schedule so as to provide reliable theoretical support for the building of a big and powerful military.”⁶

A central component of Chinese military theory is the country’s military strategy, which represents a set of policy decisions that define the military framework for operational planning and actions. China’s military strategy is known as the Military Strategic Guidelines (MSG -*junshi zhanlüè fangzhen*; 军事战略方针) that “prescribe concepts, assess threats, and set priorities for planning, force posture, and modernization”.⁷ The PLA conducted a major revision of its MSG in 2015 in

⁶ Ibid.

⁷ Office of the U.S. Secretary of Defense, *Annual Report to Congress: Military and Security Developments Involving the People’s Republic of China 2018* (Washington D.C.; May 2018), <https://www.hsdl.org/?view&did=814130>, p45.

which the new focus was on fighting and winning “informatized local wars” with a particular emphasis on “maritime military struggle”.⁸ There were other notable revisions that incorporate key elements of Xi’s thinking on military and national security innovation, according to one Chinese military scholar:⁹

- **Taking advantage of a window of historic opportunity to shift from being big to being strong:** China’s growing prosperity allows the PLA to emphasize quality over quantity, which means the top priority of modernization should be on a smaller force but with much greater firepower.
- **China’s more complex threat environment:** The MSG views China’s security environment as extremely complex with challenges coming from multiple

⁸ People’s Republic of China State Council Information Office, *China’s Military Strategy* (Beijing, May 2015), <https://news.usni.org/2015/05/26/document-chinas-military-strategy>.

⁹ Luo, Derong, “军队建设与军事斗争准备的行动纲领-对新形势下军事战略方针的几点认识” [“Action Guidelines for Armed Forces Building and Military Struggle Preparations: Several Points in Understanding the Military Strategic Guidelines in the New Era”]: *中国军事科学* [*China Military Science*], No.1, 2017. As the MSG is classified, its actual contents are unknown.

geographic and technological directions that require ‘across-the-board’ planning to ensure overall strategic stability.

- **A comprehensive national security perspective:** The revised MSG has broadened its traditional narrow military focus to include an “overall national security outlook,” which views the country’s security more expansively and includes political, economic, and social dimensions of national security.
- **A more flexible and offensively oriented ‘Active Defense’ strategy:** The revised MSG advocates a more pro-active forward-based military posture in a number of ways. First is to combine strategic defense with campaign and tactical-level offensives. Second is to switch from strategic defense to strategic counter-offensive in a “timely manner.” Strategic defense in the revised MSG means the “establishment a strategic posture of resisting aggression and safeguarding national security and development interests, and serving political, diplomatic, and legal initiatives.”

The updating of the MSG was incorporated in the crafting of Xi’s overarching military guidance issued by the Communist Party and entitled “Military Strengthening in the New Era.” (新时期的强军) This constitutes the military component of Xi’s guiding political ideology that was enshrined in the Communist

Party Constitution at the 19th Party Congress as “Xi Jinping Thought on Socialism with Chinese Characteristics in the New Era.” The military strengthening guidance provided the roadmap that allowed the PLA to forge “a new system, a new structure, a new pattern and a new look,” Xi proclaimed at a ceremony to celebrate the ninetieth anniversary of the PLA’s founding in August 2017.¹⁰

With the “Military Strengthening” guidance providing top-level direction, there has been extensive formulation and revision of new and existing development strategies and strategic guidance covering military doctrine, and defense S&T since the mid-2010s. They include the long-term Weapons and Equipment Development Strategy and a National Security Outline for the national security apparatus. A number of medium term defense implementation plans and programs have also been drafted, such as the Defense S&T Industry Strong Basic Engineering Project 2025 (国防科技工业强基工程 2025), which is the counterpart to the civilian Made in China 2025 Plan, and the 13th Five Year Defense Science and Technology Plan.

Organization-Driven Innovation

Turning next to organization-driven innovation, this

¹⁰ Xi Jinping, “Speech at Rally Celebrating 90th Anniversary of the Founding of the People’s Liberation Army,” *Xinhua News Agency*, 1 August 2017.

domain has also been a pressing priority for Xi, which has gone hand-in-hand with structural reform of the high command and other parts of the military and defense S&T systems. Of particular relevance to the Chinese techno-security state has been the revamping of the military's armament management system that is responsible for overseeing scientific research, development, and acquisition issues. At the beginning of 2016, the military armament system underwent a far-reaching reorganization, especially in two areas:¹¹

- The PLA General Armament Department (GAD) was reorganized into the Central Military Commission Equipment Development Department (EDD) and given responsibility for the centralized unified management [jizhong tongguan, 集中统管] of the military armament system.¹² One of the now-defunct GAD's chief roles was to oversee the armament development of the ground forces. The GAD units responsible for

¹¹ 中央军委印发《关于深化国防和军队改革的意见》[“Central Military Commission Issues ‘Opinions Concerning Deepening the Reform of National Defense and the Armed Forces’”], *Xinhua News Agency*, 1 January 2016, http://www.xinhuanet.com/mil/2016-01/01/c_1117646692.htm.

¹² “Ministry of National Defense Holds News Conference on CMC Administrative Reform and Reorganization,” *China Military Online*, 11 January 2016.

this have been transferred to a newly created PLA Army command.

- The GAD Science and Technology Committee was elevated to a commission-level rank reporting directly to the CMC and renamed as the CMC Science and Technology Commission (CSTC).

The promotion of the CSTC from the GAD to the CMC demonstrates that the Chinese military authorities, and especially Xi, are increasingly serious about engaging in higher-end innovation pursuits. The establishment of a high-level coordinating mechanism through the CSTC will provide operational leadership and guidance. Soldier-scientist Lt-Gen. Liu Guozhi, who was the GAD S&T Committee director, became the CSTC's first director. Liu had spent much of his career engaged in high technology R&D with a PhD in physics from Tsinghua University and as an academician of the Chinese Academy of Sciences. His technical expertise is in accelerator physics and high-power microwave technology.¹³

The ability of the EDD to carry out its mandate of providing centralized management of the armament system looks to have a greater chance of success than the GAD, which

¹³ "Former GAD S&T Committee Director Liu Guozhi Appointed Director of New CMC S&T Commission," 澎湃新闻 *[The Paper]*, 11 January 2016.

was hamstrung by its institutional bias towards the ground forces. The nature of the relationship between the EDD and the armament departments belonging to the service arms will be critical in determining how much jointness versus compartmentalization will be present in PLA armaments development. The authority and influence of the EDD initially benefited from the appointment of GAD Director Gen. Zhang Youxia (张又侠) as its head. Zhang reportedly has close ties with Xi through princeling-related links and was subsequently promoted to be a CMC vice-chairman in October 2017.¹⁴

In parallel, the state defense industrial bureaucracy formulated new strategies and plans for a less ambitious but still significant adjustment to the defense industry as well as to chart its medium and long-term transformation. One of these key plans is the 13th Defense Science and Technology Five Year Plan (13th Defense S&T FYP). This plan was issued at the beginning of 2016 and sets out six key tasks to 2020: 1) facilitating so-called ‘leapfrog’ development of weapons and military equipment; 2) enhancing innovation capabilities in turnkey areas; 3) improving overall quality and efficiency; 4) optimizing the structure of the defense industry and vigorously promoting civil-military integration; 5) accelerating the export

¹⁴ “Former GAD Director Zhang Youxia Becomes New Director of CMC Armament Development Department,” 澎湃新闻 [The Paper], 14 January 2016.

of armaments and military equipment; and 6) supporting national economic and social construction (State Council 2016).

Creativity-Driven Innovation

A third innovation domain that Xi has paid considerable attention to is creativity-driven innovation. Xi has spoken of the need for more creative thinking and more open-minded and highly qualified personnel to establish a more forward thinking and innovative military institutional culture. He has argued that human agency is the most critical factor in innovation.¹⁵ “There is a pressing need,” Xi said at a meeting with NPC military delegates in 2016, to develop a critical mass of “high-end talented people to push for our army’s reform and innovation.”

Nevertheless, Xi recognizes the enormous challenges that need to be tackled to train and educate adequate numbers of high quality talent. He has pointed out that China in general “lacks world-class S&T masters, and our leading human talent and cutting-edge human talent is lacking. The cultivation of engineering and technical personnel has become disconnected

¹⁵ “Nurture and Train a Large Number of Excellent Talents in Science and Technology: On Studying and Implementing the Important Speech of General Secretary Xi Jinping at the Two Meetings of the Academicians of the Chinese Academy of Sciences and of the Chinese Academy of Engineering,” *Renmin Ribao*, 2 June 2018.

from the practice of production and innovation.”

To address these issues, Xi said that, “we must reform the mechanisms for human talent cultivation, importation, and utilization,” explaining that this must be a long-term effort and should be prioritized over shorter-term demands. “We must avoid hastily seeking immediate success,” Xi warned. Another normative barrier that Xi highlighted was the risk-adverse nature of the S&T system that meant that innovation was not highly valued. “We must actively create a positive atmosphere that encourages daring and courageous innovation and that is also accepting of innovation. We must value success but must also be tolerant of failure.”

Subordinate military commands have put together their own talent development initiatives. The Army in 2018, for example, established a five-year “Army Science and Technology Innovation Talents Priority Support Program Implementation Plan” to build 100 innovation teams to work on military theory and technology innovation issues, cultivate 1,000 promising and high-caliber S&T personnel, and support another 10,000 troops working in technical professions such as equipment maintenance.¹⁶

Xi has added new initiatives in promoting creativity-driven innovation, especially aimed at the high-end

¹⁶ “Army Kicks Off Plan to Give Priority Support for Science, Technology Innovation Talents,” *Jiefangjun Bao*, 9 April 2018.

of the innovation spectrum in the pursuit of cutting-edge and breakthrough research and development. Perhaps the most consequential of these initiatives is a far-reaching overhaul of the military academic system in 2017 centered on the three institutions at its pinnacle, which are the Academy of Military Sciences, National Defense University, and National University of Defense Technology. At a ceremony unveiling the changes, Xi said, “our military academies, scientific research institutions, and training institutions are the backbone forces for pushing forward the rejuvenation of the armed forces through science and technology.”¹⁷

The CMC Political Work Department (PWD) and its extensive network of party organizations is primarily responsible for the management of the key components of the creativity-driven innovation portfolio, especially on matters related to human talent development. However, this task of nurturing a more permissive environment for intellectual inquiry and debate appears to run counter to the PWD’s overarching mission of ensuring strict political reliability of military personnel to the Communist Party.

Xi has rejected arguments that the PLA’s professional responsibilities and political obligations are at cross-purposes.

¹⁷ “Xi Jinping Addresses Ceremony, Symposium Marking Newly Reshuffled Military Academic Institutions,” *Xinhua News Agency*, 19 July 2017.

He insists that the corrosive influence of domestic and foreign trends means that “political work should only be strengthened, not weakened.”¹⁸ This has resulted in a significant tightening up of ideological discipline during Xi’s tenure. As part of this crackdown, Xi has directed that only politically reliable personnel should be recruited and promoted who “will not be swayed by negative ideological trends” and that there should be “innovative development of political work.” With political reliability as the defining requirement in Xi’s creativity-driven innovation framework, this does raise a fundamental question about whether the PLA will be able to forge a more innovation-friendly institutional culture under these severe constraints.

¹⁸ “All-Army Political Work Conference Held in Gutian; Xi Jinping Attends Meeting, Delivers Important Speech, Emphasizes Need to Develop Role of Political Work as Lifeline for Strengthening the Army and Invigorating the Military, and to Struggle for Realization of the Party’s Goal of Strengthening the Army Under the New Situation,” *Xinhua News Agency*, 1 November 2014; and “CPC Central Committee Retransmits the Decision on Several Issues Concerning Military Political Work under the New Situation and Stresses Giving Even Better Play to the Role of Political Work as the Lifeline in the Course of Building a Strong Army and Rejuvenating the Army,” *Xinhua News Agency*, 30 January 2015.

Civil-Military Innovation

The PLA's relationship with the Communist Party also figures prominently in civil-military innovation, which is the fourth key domain in Xi's efforts to turn the PLA into an innovation-minded institution. Xi has sought to reconfigure the nature of civil-military interactions in both the political and economic domains through a combination of reforms and innovation.

In the political realm, civil-military relations have undergone far-reaching realignment because of serious concerns that Xi had when he came to office about the PLA's obedience to the Communist Party as well as the trustworthiness and professional competence of the military leadership. There were several occasions during Hu Jintao's rule as CMC Chairman when the PLA appeared to be operating independently with little oversight from the civilian leadership, especially on matters related to foreign and security policy. Xi moved quickly to address this emerging gap in party-army relations under the guise of a sweeping and prolonged anti-corruption drive into the top military ranks. More than 100 generals and many lower-ranking officers were arrested and imprisoned, including some of the PLA's most senior commanders, such as former CMC Vice-Chairmen Gen. Guo Boxiong and Gen. Xu Caihou. The Liberation Army Daily admitted in 2016 that the arrests of these two officers was because of "their violation of the bottom line of the party's

political discipline, rather than the corruption they committed.”¹⁹

The political commissar system was identified as one of the hotbeds of corruption and an extensive purge of its ranks took place from the top down. This meant that the political monitoring and control system that has been the bedrock of the Communist Party’s grip on the PLA had been seriously compromised. In response, Xi overhauled the long-standing commander-commissar parallel rule system in 2016 by adding a robust disciplinary governance mechanism so that it could more effectively monitor the political work system. This disciplinary governance apparatus includes a more high-level and powerful CMC Discipline Inspection Commission, a political-legal committee to oversee the work of the military judicial system, and the elevation of the CMC Audit Office.

The economic component of civil-military innovation is military-civil fusion, which has been elevated under Xi to be a national priority. The Chinese authorities have been promoting the convergence of the civilian and defense components of the national economy since the beginning of the twenty-first century, but with little tangible success because of limited high-level leadership attention, unclear strategy, ineffective

¹⁹ “‘Political Mistakes,’ More than Graft, Led to Downfall of Chinese Military Chiefs Guo Boxiong and Xu Caihou,” *South China Morning Post*, 26 May 2016.

implementation, and poor coordination between civilian, defense regulatory, and military agencies. Chinese authorities see this integration as essential in the country's drive for original innovation and defense modernization.

The bulk of efforts to promote CMI have focused on reforms of defense corporations and on the implementation of policies, platforms, and other mechanisms by which private sector technology can flow into defense projects. This included opening up the closed and opaque defense acquisition system to allow civilian firms to take part and bid for projects and reducing red tape and excessive secrecy.

Xi has actively promoted CMI under his tenure, which he rephrased as military-civil fusion to distinguish a new approach that he was taking. To address the previous CMI strategy that was ad hoc, structurally misaligned, and of low policy importance, Xi designated MCF as a national priority in 2015 and defined it as a development strategy. A central goal of the MCF development strategy is, according to Xi, to build an "integrated national strategic system and strategic capabilities." The development of such a strategic system and capabilities will allow China to "implement key science and technology projects and race to occupy the strategic high ground for science and technology innovation," Xi added.²⁰

²⁰ "Xi Calls for Deepened Military-Civilian Integration," *Xinhua News Agency*, 12 March 2018.

Key elements of this national strategic system are detailed in some of the MCF implementation plans that have been formulated since the adoption of the MCF development strategy. This includes the 13th 5-Year Special Plan for Science and Technology MCF Development issued in 2017 by the CMC Science and Technology Commission and MOST that detailed the establishment of an integrated system to conduct basic cutting-edge R&D in AI, bio-tech, advanced electronics, quantum, advanced energy, advanced manufacturing, future networks, new materials “to capture commanding heights of international competition.”

The political significance of MCF gained even more prominence with the formation of the Commission for Integrated Civilian-Military Development (CICMD) in January 2017. The importance of this organization in leading MCF policy making and implementation was made clear with the appointment of Xi as its chair and Premier Li Keqiang as a vice-chair. At the CICMD’s first meeting in June 2017, Xi said that there was a “short period of strategic opportunity” to implement MCF, pointing out the most fruitful areas that included infrastructure, equipment procurement, training, military logistics, and defense mobilization.²¹

²¹ “Xi Jinping Addresses Meeting of Central Commission for Integrated Military-Civilian Development,” *Xinhua News Agency*, 20 June 2017.

Technology-Driven Innovation

The fifth and arguably most important and visible component of Xi's military-driven innovation campaign is technology-driven innovation. Xi has given a set of ambitious instructions aimed at turning China into a world-class defense technological leader within the next two decades. First, there should be an all-out effort to shift as quickly as possible from reliance on foreign sources to homegrown original innovation (*yuanshi chuangxin* -原始创新).

Second, Xi has stated the importance of accelerating the implementation of major projects (Xi, 2017).²² This term was included in his authoritative 19th Party Congress work report. While Xi does not offer any details of these major projects, priority domains that have been highlighted during his tenure have been maritime, cyber and space. Specific major defense projects that have been fast tracked through research, development, and acquisition include the J-20 fighter, the country's first stealth-like combat aircraft that entered operational service in 2018, and the navy's first indigenously built aircraft carrier. The development pipeline for major

²² The phrase that Xi used was “重大项目落实,” which means the implementation of major projects. English language translations of Xi's speech by official Chinese entities such as Xinhua News Agency and the Central Compilation and Translation Bureau offers a slightly different translation: “We will speed up implementation of major projects.”

weapons and dual-use projects is impressive, including a significantly larger and more advanced locally built aircraft carrier, a new generation of nuclear ballistic missile and attack submarines, ballistic missile defense, satellite navigation systems, and next-generation exascale high-performance computers.

Third, urgent priority will be directed to the development of a select number of core and emerging defense and strategic technologies that would allow China to advance to the global frontier ahead of other competitors. Many of the strategic technologies are dual-use in nature and are listed in key national plans such as the Science, Technology, and Innovation 2030 Major Project Plan, Made in China 2025 Plan, 13th Five Year S&T Plan, and the 2006-2020 MLP. They include aircraft engines, deep-sea technologies, quantum communications and computer technology, cybersecurity, semi-conductor chips, deep space exploration, and space-earth integrated information systems.

A fourth requirement by Xi was for the building of a more robust, systematic, forward-looking and integrated planning process combined with increased investment in early-stage research that would allow Chinese defense planners and scientists to, “see things before they happen, know things before they occur.”²³ At a CMC reform conference in

²³ “Xi Jinping Attends Plenary Meeting of PLA Delegation, Stresses

November 2015, Xi said that, “we must select the right points for breakthroughs, make planning ahead of time, and strengthen major technological research with forward-looking, pioneering, and exploratory features.”²⁴

Global Implications: Intensifying U.S.-China Technological Competition

The Chinese techno-security state is flourishing and looks set to grow faster, bigger, and better under Xi Jinping’s long-term leadership. While weaknesses such as bureaucratic fragmentation, corruption, political interference, and entrenched corporate interests will complicate progress, there are numerous strengths that will allow the techno-security state to mitigate or overcome these obstacles. They include ample funding and good access to foreign technology and know-how.

The rise of the Chinese techno-security state has triggered deepening concern in the United States that its military

Comprehensive Implementation of Innovation-Driven Development Strategy and Promote Realization of New Strides in Defense and Army Building,” *Xinhua News Agency*, 13 March 2016. See also “Xi Delivers Important Speech at Rally Marking PLA’s 90th Anniversary,” *Xinhua News Agency*, 1 August 2017.

²⁴ “Give Full Play to the Role of Innovation in Driving Development: Seriously Study and Implement Chairman Xi’s Important Speech at the Central Military Commission’s Work Conference on Military Structural Reforms,” *Jiefangjun Bao*, 5 December 2015.

technological superiority with China is under mounting threat. This has led to intensifying Sino-US defense technological competition that is likely to become more acute. The U.S. Defense Department has been pursuing a number of initiatives since the early 2010s in an effort to maintain its technological advantages, such as the Third Offset Strategy and the Defense Innovation Initiative that was pursued by the Obama Administration.²⁵

While the Trump Administration no longer uses the Third Offset label, it has made clear that it embraces the view that the United States and China are now great power rivals. This is spelled out in the US national defense strategy issued in January 2018 that points out, “as China continues its economic and military ascendance, asserting power through an all-of-nation long-term strategy, it will continue to pursue a military modernization program that seeks Indo-Pacific regional hegemony in the near-term and displacement of the United States to achieve global pre-eminence in the future.”²⁶

This competition in the defense domain has also spilled

²⁵ Tai Ming Cheung and Thomas G. Mahnken, (eds), *The Gathering Pacific Storm: Emerging US-China Strategic Competition in Defense Technological and Industrial Development* (Amherst, NY: Cambria Press, 2018).

²⁶ U.S. Defense Department, *Summary of 2018 U.S. National Defense Strategy* (Washington D.C., January 2018).

over into the broader U.S.-China technology relationship, especially in areas such as high and strategic technology, communications technology, U.S. and allied curbs on Chinese investment in sensitive technological areas, and restrictions on research and development exchanges. The two countries appear to be spiralling into a technological cold war that has far-reaching negative consequences for not only their techno-security establishments but also for the development of their national innovation capabilities and for the global technological order.

