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14. ABSTRACT
Since 2001, and arguably the Communist Chinese Party, outlined as core interests to the People's Liberation Army (PLA) in 2005, 2008 and 2015 in Defense White Papers of varying names, a mission to support its critical economic development and defense interests through developing a defense infrastructure that safeguards against new and emerging threats to its interests domestic and abroad. China has now given itself until the year 2025 to accomplish its "informatized" C4ISR goals and expects by the year 2050 to be the premier warfighting organization in the world. The peers and competitors of China must now look to the patterns of "informatized war" development to understand China's future C4ISR military capabilities.

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Chinese Communist Party (CCP), Peoples Liberation Army (PLA), Informatization, China.

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STUDIES

at the Tactical Level?

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MASTER OF MILITARY STUDIES

TITLE:

Did the Peoples Liberation Army “Informatize” at the Tactical Level?

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OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF MILITARY STUDIES

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Executive Summary

Title: Did the People's Liberation Army "Informatize" at the Tactical Level?

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Thesis: Since 2001, despite aggressive spending, enhancement of a wide array of C4ISR platforms, and aggressive attention by the CCP, the PLA is hampered by commanders conducting command, communication, and lack of ISR integration and capabilities at the tactical level. The PLA and is still not the "informatized" force needed to support outlined core interests in defense publications in 2018.

Discussion: Since 2001, and arguably the Communist Chinese Party, outlined as core interests to the People's Liberation Army (PLA) in 2005, 2008 and 2015 in Defense White Papers of varying names, a mission to support its critical economic development and defense interests through developing a defense infrastructure that safeguards against new and emerging threats to its interests domestic and abroad. China revitalized the dialogue on old tenets of Chinese warfare, from modernization, coined as "informatization" to the protection of interests in the Maoist style strategy of "active defense." These progressions of traditional ideas have led to a resurgence of military thought on the modernization and progression of the People's Liberation Army and its ability to protect these mainly modern economic core interests against contestants, employing modern Command, Control, Communication, Computers, and Information, Surveillance, and Reconnaissance (C4ISR) infrastructure among many other platform and operational structure advantages. China has now given itself until the year 2025 to accomplish its "informatized" C4ISR goals and expects by the year 2050 to be the premier warfighting organization in the world. The peers and competitors of China must now look to the patterns of "informatized war" to understand China's future C4ISR military capabilities.

Conclusion: China, and specifically the CCP, has accomplished a partial "informatization" of its capabilities, but not met the CCP goals of being able to conduct local wars successfully in 2018, and will struggle to meet goals in the year 2025. The PLA Navy and Air Force are outpacing the PLA in the race to field a modern fighting force, and stand the most capable of projecting Chinese military power, with the PLA still struggling to keep pace with the rapid changes in the defense goals of the CCP.

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Introduction

Since 2001, and arguably the Communist Chinese Party (CCP), outlined core interests to the People's Liberation Army (PLA) in 2005, 2008 and 2015 in Defense White Papers a mission to support its critical economic development and defense interests through developing a defense infrastructure that safeguards against new and emerging threats to its interests domestic and abroad.¹ For the first time in recent history China has identified that those core interests that the People's Liberation Army (PLA) will defend are no longer limited to domestic defense, but the protection of overseas interests that are in direct competition with interests of other nations and actors. China revitalized the dialogue on old tenets of Chinese warfare, from modernization, coined as "informatization" to the protection of interests in the Maoist style strategy of "active defense." These progressions of traditional ideas have led to a resurgence of military thought on the modernization and progression of the PLA and its ability to protect these mainly modern economic core interests against contestants, employing modern Command, Control, Communication, Computers, and Information, Surveillance, and Reconnaissance (C4ISR) infrastructure among many other platform and operational structure advantages.

Recent scholarly work places emphasis on the changes that the PLA and CCP have made as wholesale institutions and at the strategic level of warfare. This paper will look at the effects

¹ The State Council Information Office of the Peoples Republic of China, *China's Military Strategy* (Beijing, China, 2015), <https://www.airuniversity.af.edu/CASI/Display/Article/1353697/chinas-military-strategy-white-papers/>, 1.

The State Council Information Office of the Peoples Republic of China, *China's National Defense in 2008* (Beijing, China, 2009), <https://www.airuniversity.af.edu/CASI/Display/Article/1353697/chinas-military-strategy-white-papers/>.

The State Council Information Office of the Peoples Republic of China, *China's National Defense in 2006*, (Beijing, China, 2006), <https://fas.org/nuke/guide/china/doctrine/wp2006.html>.

of “informatization” and the ability to conduct “local wars” at the tactical level of warfare in which individual unit leaders, armed with the weapons of reform will perform in conflicts. This Literature review is executed by a thorough study of contemporary defense organizations and scholarly work, along with an analysis of disclosures through newspapers, periodicals and online publications to study how the PLA reforms have trickled down to combat leaders, their education and development of C4ISR in order to win in modern conflicts. This paper will not thoroughly asses all individual weapons advances, naval platform development of surface vessels not related to C4ISR, nor changes that perform primarily strategic level effects, but platforms enhance C4ISR capabilities of the PLA leader at the tactical level.

Since 2001, despite aggressive spending, enhancement of a wide array of C4ISR platforms, and aggressive attention by the CCP, the PLA is hampered by commanders conducting command, communication, and lack of ISR integration and capabilities at the tactical level. The PLA is still not the “informatized” force needed to support outlined core interests in defense publications in 2018.

The world revolution in military affairs (RMA) is proceeding to a new stage. Long-range, precise, smart, stealthy and unmanned weapons and equipment are becoming increasingly sophisticated. Outer space and cyber space have become new commanding heights in strategic competition among all parties. The form of war is accelerating its evolution to informationization. World major powers are actively adjusting their national security strategies and defense policies, and speeding up their military transformation and force restructuring. The aforementioned revolutionary changes in military technologies and the form of war have not only had a significant impact on the international political and military landscapes, but also posed new and severe challenges to China's military security.²

-China's Military Strategy, 2015

I. China in the World:

The Need to Reform

China's role in the world as the "Middle Kingdom" is no longer a metaphor for growth or a strategy for the inspiration of an emerging nation but a reality to the Chinese Communist Party (CCP) and its Peoples Liberation Army (PLA). China's CCP moved its defense and military strategies forward along a path to competition with the outside world much as its fiscal power and economy have done. The Chinese rise in global power has spawned renewed academic rigor within the party and the PLA in defense theory and use of forces. The driving spirit in both defense and foreign policy has been the realization of the "Chinese Dream," in which a prestigious and an economically successful China consumes the thoughts and minds of the other nations of the world.³ China's realization of this dream is not without the possibility of cost or conflict, as the CCP moved forward to shape the world for the "Chinese Dream" to come to fruition. China strived to do this by locking their competitors, such as the United States, out of

² The State Council Information Office of the Peoples Republic of China, *China's Military Strategy* (Beijing, China, 2015), <https://www.airuniversity.af.edu/CASI/Display/Article/1353697/chinas-military-strategy-white-papers/>.

³ Timothy R. Heath, Kristen Gunness, and Cortez A. Cooper, *The PLA and Chinas Rejuvenation: National Security and Military Strategies, Deterrence Concepts, and Combat Capabilities* (Santa Monica, CA: RAND Corporation, 2016), viii.

its new spheres of influence, which paved the way for revitalization of the economic power of China. In shaping this future, China realized in time that competitors and threats may not idly monitor the domestic and foreign policy of an emerging Chinese power.

The contemporary Chinese leadership realizes that Chinese programs of “One Belt, One Road,” and “Chinese Dream” are nothing without defense power and prestige backing the dogma and actions of the initiatives. Since 2010, the words of the PLA have become increasingly cognizant of the need to support economic and foreign security, rather than mainly domestic security policies.⁴ The view of conflict and crisis has shifted from a policy of reluctance in foreign defense entanglement, to acceptance and leverage for the prestige of the state and its goals.⁵

Defining C4ISR as a Goal

The current mission set of the PLA has evolved to meet the challenges bearing down on China’s domestic and foreign progress. China now looks for the PLA to protect the nations interest internally and externally in order to maintain sovereignty, participate in security cooperation, maintain regional and global peace, as well as safeguard the security of it’s interests overseas and new domains.⁶ The most controversial goal, in the eyes of westerners, are the tasks of maintaining regional and world peace, and safeguarding the security of their interests overseas and in new domains. This mission set evolved from nonexistence in the Chinese National

⁴ Timothy R. Heath, Kristen Gunness, and Cortez A. Cooper III, *The PLA and China's Rejuvenation: National Security and Military Strategies, Deterrence Concepts, and Combat Capabilities*. Santa Monica, CA: RAND Corporation, 2016, viii.

⁵ Timothy R. Heath, Kristen Gunness, and Cortez A. Cooper III, *The PLA and Chinas Rejuvenation*, viii.

⁶ The State Council Information Office of the Peoples Republic of China, *China's Military Strategy* (Beijing, China, 2015), <https://www.airuniversity.af.edu/CASI/Display/Article/1353697/chinas-military-strategy-white-papers/>, 6-7.

Defense Paper 2008 to a main topic and focus for the PLA in 2015.⁷ The CCP recognized that these new goals will be contested in a world that competes for information dominance utilizing technologies that are new and evolving to meet the demands of defending national interests. The 2015 PLA guiding theory for warfare demonstrates the need to master the information realm and has evolved to “information dominance, precision strikes on strategic points, joint operations to gain victory.”⁸ The guideline is reinforced by the drive in the PLA to “informatize” its warfighting capabilities in this modern age. Three PLA Navy (PLAN) officers defined “informatization” for the PLAN, which serves as a reasonable definition for the PLA as:

The informatization of naval equipment refers to using information technology as the impetus, information networks as the foundation, and command automation as the core, effectively developing information resources, carrying out information transformation of every aspect and every link of naval equipment, and continuously promoting the “information ability” and “informatization level” of naval weaponry and equipment.

- Ji Chengxin, Li Xiangyang, and Wan Yongfeng,⁹

This definition is broad in scope, and today is focused in what was to be “informed” and includes the employment of joint command and control systems (C2); information operations; computers, communications; and intelligence, surveillance, and reconnaissance (C4ISR).¹⁰ A premier C4ISR capability is in line with other modern foreign military capabilities and

⁷ The State Council Information Office of the Peoples Republic of China, *China's National Defense in 2008* (Beijing, China, 2009), <https://www.airuniversity.af.edu/CASI/Display/Article/1353697/chinas-military-strategy-white-papers/>, 6.

⁸ The State Council Information Office of the Peoples Republic of China, *China's Military Strategy* (Beijing, China, 2015), <https://www.airuniversity.af.edu/CASI/Display/Article/1353697/chinas-military-strategy-white-papers/>, 6-7.

⁹ Ji Chengxin, Li Xiangyang, and Wan Yongfeng, “Some Ideas of Naval Service Equipment Information Modification” [对海军现役装备信息化改装的几点思考], *Journal of the Academy of Equipment Command and Technology* [装备指挥技术学院学报] 17, no. 1 (February 2006), 10. The authors are affiliated with the Scientific Research Department at the PLAN Dalian Ship Academy (海军大连舰艇学院) in Dalian, China.

¹⁰ Timothy R. Heath, Kristen Gunness, and Cortez A. Cooper III, *The PLA and Chinas Rejuvenation*, X.

accordingly the Chinese goal of an “informatized” C4ISR capability is a reasonable expectation of the PLA by the CCP in the future.

Taken all together, China has shifted from an interpretation of defense to a moderate offense, realized that technology must be taken at a whole of government approach and realized; its interests must be protected by a strong and capable PLA. China has now given itself until the year 2025 to accomplish its “informatized” C4ISR goals and expects by the year 2050 to be the premier warfighting organization in the world. The peers and competitors of China must now look to the patterns of “informatized war” to understand China’s future C4ISR military capabilities. Understanding the needs of “winning informatized wars” and the goal to conduct it under “informatized” conditions requires a brief look at the origins.

II. “Winning Informatized Local Wars” and “Informatization”:

Concepts

The Chinese PLA recognizes that the form of war it will fight has fundamentally changed in the aftermath of the Gulf War in Kuwait and Iraq, forcing the CMC to publish innovation guidelines beginning in 1993.¹¹ The Gulf War proved to the CCP that warfare would be fought and won in multiple domains. In 1993, former Chinese leader Jiang Zemin told the PLA that emphasis must be placed on winning local wars under modern high-technology conditions.¹² Winning local wars would forever require a mastery of the information portion of military operations. In 2004 the guide to winning local wars morphed slightly to place an emphasis on the information battle and the goal became to win these local wars under the conditions of

¹¹ Jiang Zemin, *Jiang Zemin wenxuan: Jiang Zemin’s Selected Works, Vol. 1*, (Beijing: Renmin chubanshe, 2006), 285.

¹² Jiang Zemin, *Jiang Zemin’s Selected Works, Vol. 1*, 285.

“informatization,” which Jiang Zemin again believed would be the future of warfare.¹³ The phrase “informatization” represents all processes, training, equipment, and technology previously described as modern high-technology conditions such as C4ISR. In 2015, the goal shifted again slightly in relation to the deepening of the dependence and meaning of information technology in future conflict to a simpler, but concise, statement of “winning informatized local wars.”¹⁴

Since 2005 China has viewed the world's militaries through the lens of a modern Revolution in Military Affairs (RMA). Defense analyst Daniel Goure defines an RMA as a theory that warfare is evolving in ways not imagined in a prior period, and over a specified period due to new organizational and technological development and reform.¹⁵ China believes that the CCP and PLA are part of a global landscape of military change:

The world revolution in military affairs (RMA) is proceeding to a new stage. Long-range, precise, smart, stealthy and unmanned weapons and equipment are becoming increasingly sophisticated. Outer space and cyber space have become new commanding heights in strategic competition among all parties. The form of war is accelerating its evolution to informationization. World major powers are actively adjusting their national security strategies and defense policies, and speeding up their military transformation and force restructuring.

-China's National Defense in 2015

In this view China believes that “winning informatized local wars” mission, and “informatization” goal is on one hand necessary to compete in global defense and on the other hand part of its ambition to win “informatized” wars. China went a step further in 2015 and announced that the defense competition partner, the United States, was “rebalancing” priorities

¹³ M. Taylor Fravel, "China's New Military Strategy: "Winning Informationized Local Wars," The Jamestown Foundation, July 02, 2015, accessed March 20, 2019, <https://jamestown.org/program/chinas-new-military-strategy-winning-informationized-local-wars/>.

¹⁴ The State Council Information Office of the Peoples Republic of China, *China's Military Strategy* (Beijing, China, 2015), <https://www.airuniversity.af.edu/CASI/Display/Article/1353697/chinas-military-strategy-white-papers/>.

¹⁵ Daniel Goure, "The Next Revolution In Military Affairs: Multi-Domain Command and Control," Real Clear Defense, December 06, 2017, https://www.realcleardefense.com/articles/2017/12/06/the_next_revolution_in_military_affairs_multi-domain_command_and_control_112741.html.

to the Pacific region which was a significant move for Chinese defense strategies from formerly stating that the United States was simply a world power that dominated military affairs in 2008.¹⁶

C4ISR “Informatized”

Along with the other tenets of China’s defense theory “winning informatized local wars” is conducted under modern “informatized” conditions. “Informatized” conditions inside C4ISR mean China will compete in command and control, systems integration, information warfare, and win in conditions where information systems ensure victory against a modern opponent.¹⁷ China believes the security of their nation depends on the development of these systems, successful competition with peers in employment of reforms by leaders, and worldwide control of the “informatized” environment as keys to their long term success and strength.¹⁸

For China’s future opponents and competitors, tactical model is revealed. China can seek to gain a technological upper hand with superior C4ISR systems and use them in warfare in a manner that may be hard to describe or categorize as conflict in the traditional sense, leaving opponents to decide whether their future actions are worth the cost. This model allows China to decide the next offensive move with traditional military forces, ensuring the traditional Chinese method of out maneuvering an opponent who does not yet know the weight brought against them to be preserved and utilized. The main competitor to China, the United States, and other future opponents must look to understand and compete with these “informatized” elements within the PLA. Although China does not yet demonstrate “winning informatized local wars” they are moving against internal challenges discussed later in this paper to achieve the capability.

III. The C4ISR Conundrum

¹⁶ The State Council Information Office of the Peoples Republic of China, *China’s Military Strategy*, 3.

¹⁷ Timothy R. Heath, Kristen Gunness, and Cortez A. Cooper III, *The PLA and Chinas Rejuvenation*, ix-x.

¹⁸ Pan Zhaonian, “Strategic Thinking for Battlefield Construction in Joint Operations Under Informatized Conditions,” *China Military Science* [Zhongguo Junshi Kexue], October 5, 2013.

The stage set for the modern Chinese military is challenging. China has not fought a major conflict since the Chinese-Vietnam war of 1979. The Chinese-Vietnamese conflict was decidedly low technology and fought during a time in which the PLA was struggling with the concept of mechanization. The PLA now must develop and employ modern capabilities without the direct contact knowledge of modern conflicts. The following sections will cover the advances and consequences of this modernization of C2, systems integration, information warfare, and electronic systems developed to ensure victory by tactical type and the ability to employ them.

Communication and Control (C2) Struggles in A New Age

Command and control reform in China is refined into two interrelated but sometimes distinct components of coordinating and controlling forces and assets utilized for the defense of the nation and the concept of command. The Chinese nation underwent reforms to “informatize” the operational process for controlling the battlefield at both the strategical and tactical level in order to provide synergy in their warfighting process. On the modern battlefield, militaries need a command and control structure under which to operate. One portion is command, which is the authority and responsibility for effectively utilizing available resources and for planning the employment or, directing, coordinating, and controlling military forces for the accomplishment assigned military objectives.¹⁹ Command is a personal thing related to the commander himself to include his education, training, and developed professional capabilities. The other portion of this function is control which is utilized by commanders and staffs to regulate the employment of forces and warfighting functions through detailed systems and technology to analyze facts and data utilizing empirical methods to improve the commanders understanding of the environment,

¹⁹ ADRP 3-0, *The Army's Operational Concept*, Department of the Army (Washington, DC 2012), 2-11.

enemy threat and mission accomplishment.²⁰ Control is both art and science, with analysis mixed with a modern systems approach to building commanders awareness of actions on the battlefield or in conflict. This section will focus on the reforms at these levels of command and control and the overall effectiveness at the tactical level.

Although the strategic command and control revolutions in the PLA are better represented in print and media by the Chinese vision of a modern RMA based on information environments exploited in the strategic level of warfare, the Chinese tactical level of warfare is equally essential. Strike capabilities and individual troop actions are not governed or commanded from supreme headquarters of large command groups readily in any substantial conflict. On a modern battlefield, offensive and defensive operations will be conducted by individuals and units utilizing the best information available to make decisions promptly.²¹

Command as a Function

The ability to command effectively at the tactical level has eluded many militaries throughout the ages, often leading to a lack of synergy of purpose that leads to failures.²² The Chinese PLA is no different from other militaries in need to reduce fog of war for commanders. On the modern battlefield, militaries need an effective command structure under which to fight. A key component of the quality of military leaders is the educational system that educates them to execute their duties. Education was an important lesson the Germans learned during the interwar period between the World War's while restructuring training and education systems

²⁰ ADRP 3-0, *The Army's Operational Concept*, Department of the Army (Washington, DC 2012), 2-12.

²¹ ADRP 3-0, *The Army's Operational Concept*, Department of the Army (Washington, DC 2012), 2-12.

²² Henry S. Kenyon, "Marines Spread Command Responsibility To Cut Fog of War", *Signal Magazine*, accessed March 18, 2019, <https://www.afcea.org/content/marines-spread-command-responsibility-cut-fog-war>.

"Fighting through the fog of war", Clausewitz Describes the Fog of War, <http://www.strategybydesign.org/fighting-through-the-fog-of-wa>

while preparing Officers to execute and adapt in Blitzkrieg warfare in Europe.²³ Education is especially important during periods of significant reform to modern military systems and modern command structures, a notable lesson Germans gleaned from studying reforms in other European armies before World War II.²⁴ The Chinese have improved the quality of leaders in measurable ways in the last twenty years, but have not completely solved the issues of the lack of joint force capable officers, education levels, and realistic training required to develop effective commanders of tactical forces.²⁵

Some China defense scholars are calling the modern era of Chinese reform the “Goldwater-Nichols Act” period since late 2015, in reference to the act passed in the United States that reformed the American military in the 1980s.²⁶ Since 2001, China moved to reform an aging PLA command structure and provide training and education that centered on developing joint service officers required for winning on modern battlefields.²⁷ In 2015, China flattened the command structure, mainly at the strategic level, to improve the efficiency of decisions made by the PLA’s respective service heads and regional military commanders. Previously, at both the tactical and strategic level, commanders made decisions in a centralized model, with all critical decisions rising to more senior leadership levels.²⁸ Critical decisions include the movement of troops, enemy force engagement authorities, and large logistical support actions. Although the reforms are new, tactical level commanders still comment that

²³ Alan R. Millet and Williamson Murray, *Military Innovation in the Interwar Period* (Cambridge, UK: Cambridge University Press, 2007), 16

²⁴ Alan R. Millet and Williamson Murray, *Military Innovation in the Interwar Period*.

²⁵ Dennis J. Blasko, "The Chinese Military Speaks to Itself, Revealing Doubts," *War on the Rocks*, February 19, 2019, accessed April 05, 2019, <https://warontherocks.com/2019/02/the-chinese-military-speaks-to-itself-revealing-doubts/>.

²⁶ Phillip C. Saunders and Joel Wuthnow, *China’s Goldwater-Nichols*, 5.

²⁷ Mark R. Cozad, *PLA Joint Training and Implications for Future Expeditionary Capabilities*. Santa Monica, CA: RAND Corporation, 2016. <https://www.rand.org/pubs/testimonies/CT451.html>, 6.

²⁸ Michael Chase, *Chinas Incomplete Military Transformation: Assessing the Weaknesses of the Peoples Liberation Army (PLA)* (Santa Monica: Rand Corporation, 2015), 50.

traditional decision-making structures pervade, limiting the ability of lower-level tactical commanders to seize the initiative, innovate, and respond quickly to a crisis as they arise.²⁹

China began in earnest a reform of education to the training of military officers and staffs in 1995.³⁰ The focus of the reform to education that China and scholars published for the last nineteen years was a recognition of the need to create smart, professionally taught officer cadres for “informatization” to take hold in the PLA. Today, China struggles to educate their officers at all levels and services to effectively fight and employ the forces and equipment set already available, let alone conduct warfare under “informatized” conditions.³¹ Most available publications and researchers describe the professional military education of the PLA prior to 1979 as almost nonexistent in the traditional western sense, and now only recently has the PLA moved to the point of requiring professional degrees and training for all officers of all occupational specialties.³² Current PLA regulations for the recruitment and education of the officer cadre of all services dates from 2001. What exactly was changed from a technology and information environment for tactical level commanders to understand, train with, and inculcate in the force from a professional education standpoint is not clearly stated other than the PLA began reforms to produce advanced and modern education processes and training equipment in 2014.³³ The PLA began introducing distance learning as early as 1999, and has continued to promote that modern classrooms, improved texts, simulators, and augmented reality platforms will be part of

²⁹ Michael Chase, *Chinas Incomplete Military Transformation*, 50.

³⁰ David Lai, *The PLA at Home and Abroad: Assessing the Operational Capabilities of China's Military*, edited by Roy Kamphausen, David Lai, Andrew Scobell, (Strategic Studies Institute, Carlisle, PA), 18.

³¹ Michael Chase, *Chinas Incomplete Military Transformation*, 71.

³² John F. Corbett, Jr., Edward C. O'Dowd, and David D. Chen, *The "people" in the PLA: Recruitment, Training, and Education in Chinas Military*, edited by Roy Kamphausen, Andrew Scobell, and Travis Tanner Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 2008, 141.

Joel Wuthnow and Phillip C. Saunders, *Chinese Military Reform in the Age of Xi Jinping: Drivers, Challenges, and Implications* (Washington. D.C.: National Defense University Press, 2017, 51.

³³ Roy Kamphausen, Andrew Scobell, and Travis Tanner, *The "people" in the PLA: Recruitment, Training, and Education in Chinas Military*, 141.

all future officer and enlisted professional development.³⁴ All the services have technical and professional colleges, a system which began reforms also in 1999, that remain committed to increasing capabilities in scientific and technical areas that benefit the “informatization” of their respective services.³⁵ The break out of education and training committed to improving service members at the tactical level in the military regional commands and how much classroom time is, rather, political training is a question that is relevant to the discussion of the future capability of the PLA. What is widely accepted and known is that the quality of the average Chinese PLA Soldier, Airman, Marine, and Sailor remains a challenge, with many still recruited from rural areas of the country with little formal education before entering their respective PLA service.³⁶

In 2014, the CCP increased leverage on the PLA to recruit more officers with professional degrees and accredited education levels within the Chinese education system, addressing the lack of an educated joint tactical command structure incapable of employing capabilities and troops under “informatized” conditions at the tactical level.³⁷ The move to joint warfighting doctrine utilizing new technologies and troops will continue to be a challenge. The push for joint training and platforms may only exacerbate the educational gap in the leadership of the PLA until the reforms, and at the very least, the basic education level of leaders improves over time given the current overall poor levels currently in the force at the lowest levels of command. The entire PLA officer cadre does not fall under this burden and it must be noted China has long selected and promoted officers formally educated in technological and scientific

³⁴Jiefangjun Bao, “Intellectual Military Calls for Scholar-Generals,” 2 February 1999, translated in FBIS-CHI, 2 February 1999.

Thomas J. Bickford, *The "people" in the PLA: Recruitment, Training, and Education in Chinas Military*, edited by Roy Kamphausen, Andrew Scobell, and Travis Tanner Carlisle, PA: Strategic Studies Institute, U.S. Army War College, 2008, 36.

³⁵Xinhua, 27 January 1999, translated in FBIS-CHI, 27 January 1999.

³⁶Michael Chase, *Chinas Incomplete Military Transformation*, 58-59.

³⁷Michael Chase, *Chinas Incomplete Military Transformation*, 68.

fields as development and modernization programs have required. The change in educating all commanders is still in its early stages, but the publicly released CCP and PLA documents do not address these faults in the education of the current tactical level officer cadre in plain light. As a point of comparison, the United States formalized professional military education and joint officer education under released public law in the 1980s and continued to improve educational systems for all ranks.³⁸

Beyond military education reform, China has fervently worked to reform training at all levels, including the training of tactical level surface, sea and air forces. From an analysis of Chinese training events, the expectations of commanders are that they must now focus on training their respective services to work together in a joint capacity and integrate the capabilities of the entire Chinese PLA to destroy their enemies. Training based on this joint reform began in earnest in 2009, with the Sharp Sword joint exercise series.³⁹ The Chinese Tenth and Eleventh Five Year Plans continued the theme of all major exercises requiring joint integration and training realism utilizing a realistic opposing force for the first time in PLA history.⁴⁰ In 2013 China conducted its first out of region training exercise in the Philippine Sea utilizing joint integration command and control under “informatized” settings, under the title “Mission Action”.⁴¹ Since then China ramped up joint operations under “informatized” conditions and joint command by participating in a staggering amount of bi-lateral exercises with other nations to improve these more rigorous training exercises both as a member of the Shanghai Cooperation

³⁸ US Department of Defense, “DoD Reforms Goldwater-Nichols Act 1986.” Accessed August 20, 2018. <https://history.defense.gov/Historical-Sources/DoD-Reforms>.

³⁹ Mark R. Cozad, *PLA Joint Training and Implications for Future Expeditionary Capabilities*, 4.

⁴⁰ Mark R. Cozad, *PLA Joint Training and Implications for Future Expeditionary Capabilities*, 4.

⁴¹ Mark R. Cozad, *PLA Joint Training and Implications for Future Expeditionary Capabilities*, 10.

Organization (SCO) and outside SCO membership.⁴² A look back in Chinese bi-lateral exercises demonstrates the major training shift in China. Between 2003 and 2014 China conducted 130 bilateral exercises, while in 2016 China participated in 124 bi-lateral and Chinese joint exercises alone.⁴³

Without knowing the exact curriculum changes of Chinese training doctrine at the tactical level for exercises, the goals for joint and bi-lateral exercises were similar since the first massive exercise in 2009; command and control of units, personnel, weapons systems, information utilization, surveillance, precision fires, communication systems, and air-ground-sea integration.⁴⁴ The majority of these are the very core requirements of utilizing modern C4ISR systems.

Given the aggressive pace and goals of the exercises in and out of a region, what were the results of all these training reforms throughout the period, and how effective were the reforms? Common trends emerge in the reports and interviews of commanders after the exercises. In a review of bi-lateral exercise “Vostok 2018” between the PLA and the Russians, Chinese commanders noted many important improvements. The integration of air and land forces for combined arms was much quicker, control of precision fires was possible from a single command and control node, and an improvement in commanders and staff’s response to complex missions, according to the vice chairman of the PLA 78th Army Corps.⁴⁵ Compared to a previous exercise in 2009, when during a Chinese and Russian military exercise “Peace Mission

⁴² Anthony H. Cordesman and Aaron Lin, *Chinese Strategy and Military Power in 2014: Chinese, Japanese, Korean, Taiwanese and US Perspectives* (Washington, DC: CSIS, Center for Strategic & International Studies, 2014), 134-135.

⁴³ China Power Team. "How is China bolstering its military diplomatic relations?" China Power. October 27, 2017. Updated December 18, 2017. Accessed February 2, 2019. <https://chinapower.csis.org/china-military-diplomacy/>.

⁴⁴ Mark R. Cozad, *PLA Joint Training and Implications for Future Expeditionary Capabilities*, 9.

⁴⁵ Gei Yenfui, *Russia's Vostok-2018, A Test of China's New Joint Command System*, CGTN, accessed December 21, 2018, https://news.cgtn.com/news/3d3d514e3051544d7a457a6333566d54/share_p.html.

2009”, was conducted, the Chinese had great trouble in integrating aviation combined arms, strike platforms and wished to demonstrate their commanders and staff’s new ability to plan exercises in shorter duration.⁴⁶ According to Russian observers, the advance in command and control and performance in the intervening years was significant.⁴⁷ The theme in interviews that is the most telling over the nine years was the inability for tactical staff’s to plan complex operations under “informatization” and integrate complex combat platforms with traditional ground troops. All interviews noted improvements but stopped short of praise by both the Russian and Chinese observers. This outcome is not unlike other nations bi-lateral and multilateral exercises, as integrating with another nation is often complex, and most have the added friction of a language barrier. The critical point though, pulled from the exercises and interviews though was the type and quality of the training, especially given the goals from the CCP five-year plans. Most of the operations in the exercises with the Russians in 2009 and 2018 were only conducted allowing the Chinese commanders to make decisions on how to utilize strike platforms, troops, and precision weapons under the most administrative and scripted control possible.⁴⁸ This rigid and unrealistic training program pits PLA forces against no active aggressor and is, therefore, at odds with the PLA’s goals of enhancing training through opposed exercises the force says actually began in 1985.⁴⁹ Without making real, tough and challenging decisions on the employment of forces and capabilities, leaders in the PLA are significantly behind the professional benchmark of western military leaders.

⁴⁶ Dennis Blasko, *The PLA at Home and Abroad: Assessing the Operational Capabilities of China's Military*, edited by Roy Kamphausen, David Lai, Andrew Scobell, (Strategic Studies Institute, Carlisle, PA), 402.

⁴⁷ Dennis Blasko, *The PLA at Home and Abroad*, 402.

⁴⁸ Dennis Blasko, *The PLA at Home and Abroad*, 408.

⁴⁹ David C. Logan, "The Evolution of the PLA's Red-Blue Exercises," *The Jamestown Foundation*, March 14, 2017, accessed March 19, 2019, <https://jamestown.org/program/evolution-plas-red-blue-exercises/>.

The conditions and rigor of exercises, as observed by the Russians, is a significant issue in China. Chinese leaders, in joint and non-joint exercises, and both bi-lateral and internal to China are more likely to cheat, make exercises appear to be successful, and appease external pressures rather than provide tough, thoughtful and realistic feedback and criticism.⁵⁰ As addressed previously by the Russian onlookers, observers internal to China share a familiar picture. By and large, military forces at the tactical level looking to integrate complex platforms and information systems have substantial barriers to overcome. A study of Chinese press releases rarely mention the complex systems utilized by units, but rather that units will operate at night, under stress, and in partially signal degraded environments within the training centers in China.⁵¹ This rather low bar, compared to the lofty goals of modernization may, on one hand, be a propaganda plan by the PLA and CCP to undervalue their units, but more likely there exists a real gap in the drive to improve training of commanders and units and the current reality. To this point, PLA leaders created a term for differences in goals and accomplishments. The gap in what is said in national documents and what is observed in training and exercises is coined the “two incompatibilities,” or the failure at modernization and actual military capabilities compared to the political rhetoric since 2008.⁵² The key issues addressed by Chinese military leadership and onlookers is the fact that as “informatization” increased, training units under these conditions never fully developed, leaving a capability gap from platforms to users.⁵³ In 2013, the Chinese Central Military Commission (CMC) Vice -Chairman sourly addressed comments that China was simply a partially mechanized force, and not truly following the “informatized” PLA

⁵⁰ Michael Chase, *Chinas Incomplete Military Transformation: Assessing the Weaknesses of the Peoples Liberation Army (PLA)* (Santa Monica: Rand Corporation, 2015), 50.

⁵¹ Sun Zhao, Yao Chun, “PLA kicks off live-fire military training,” *China News*, accessed December 28, 2018, <http://en.people.cn/n/2014/0716/c90786-8755980.html>.

⁵² Michael Chase, *Chinas Incomplete Military Transformation*, 70.

⁵³ Michael Chase, *Chinas Incomplete Military Transformation*, 70.

working within the information RMA by stating that the Chinese forces face challenges in “informatization” because they were not actually even a fully integrated and mechanized modern force for operations under the previous five year plans.⁵⁴ The training executed at 22 major regional and trans-regional exercises focused mainly on new systems debuting and basic skills in a non-complex, un-opposed environment versus joint “informatized” “red force” opposed battles. (see Figure 1 for an illustration of the problem.)

Figure (1) **PLA Major Training Exercise Trends Since 2013-2018***

PLA Force/ Number of Exercises	C4ISR Highlighted	Major Combat System Debut	PLA Single Unit Non-Complex Training	PLA Joint or Combined Complex Training
PLA Army	2	1	6	2
PLA Navy	2	4	3	1
PLA Air Force	3	2	4	1

*Table represents study of 843 PLA Daily press releases and open source news stories from South China Morning Post, China Daily, and Associated Press on training exercises. Stories without specific timelines, debuted strategic capabilities only, and, or, where research and development focused were not accounted for. Twenty-two (22) training exercises met this criterion in the time period. Fidelity of news releases declines prior to 2012.

Further hampering training under “informatized” conditions is the lack of professionals and network professionals trained to integrate tactical units and commanders digitally to perform missions.⁵⁵ The lack total network professionals managing networks puts the training and education of commanders at jeopardy, as memories of armed conflicts fade from the current PLA

⁵⁴ Xu Qiliang [许其亮], “Firmly Push Forward Reform of National Defense and the Armed Forces [坚定不移推进国防和军队改革],” *People’s Daily* [人民日报], November 21, 2013, p. 6.

⁵⁵ Michael Chase, *Chinas Incomplete Military Transformation*, 70.

officer cadre. Furthermore, these challenges and over statements paint a picture of training that does not meet the standards of winning armed conflicts under “informatized” conditions. Rather the statements, justly, demonstrate tough “basic” joint training with realistic feedback in a building block approach to train leaders on the expectations and requirements of their forces in equipment and resource limited conditions.

When President Xi Jinping flattened the PLA command structure in late 2015, early 2016, the lack of education and training in utilizing assets by tactical commanders under “informatized” settings outside of small unit exercises and strategic uses of elements of national power in very structured and administrative training sessions was not addressed. By and large, Chinese commanders are better suited for the future because of key service reforms, but a standard of commanding and conducting wars under “informatized” conditions, where information dominance is the key to success with of the current set of senior military officers is a not evident in 2018. Many PLA officers originate from a previous generation of culture and reform between services and military commanders who stated, “I don’t listen to you, you don’t listen to me,” prior to the reforms CMC Chairman Xi Jinping set in motion in command and control in 2013.⁵⁶ By the end of 2018, the achieved goals were not in developing the commanders to win “informatized local wars,” but focused on addressing the joint relationships of its own services commanders and harnessing traditional combat systems through service level organizational improvement, logistics improvements, and administrative reform since that began in the 12th Five Year Plan a decade ago and reinforced by policy from current CMC Chairman Xi Jinping.⁵⁷

⁵⁶ Joel Wuthnow and Phillip C. Saunders, *Chinese Military Reform in the Age of Xi Jinping*, 24. This conversation took place during a meeting of the National Defense University staff and a delegation to NDU from the Peoples Liberation Army.

⁵⁷ Joel Wuthnow and Phillip C. Saunders, *Chinese Military Reform in the Age of Xi Jinping*, 7-14.

The Control Problem

The new Chinese PLA leadership at the tactical level may be better educated and trained in the art of employing modern forces and capabilities than its predecessors, but commanders cannot effectively lead a battlefield in which they cannot communicate, control, and observe. Military command and control systems and resources are at the center of the C4ISR reform of the PLA and its ability to conduct and win wars under “informatized” conditions. Militaries around the world to some degree or another struggle to develop efficient solutions to controlling their forces on the modern battlefield through modern broadcast means. The Chinese have now had over a decade of developing and training with command and control systems since the reforms to PLA structure began in earnest. During this time, the Chinese have developed a “system of systems” approach that appears close in appearance and function to most modern western capabilities but suffers from the “two incompatibilities” of Chinese military reform. According to former CCP Secretary-General Hu Jintao, the incompatibilities center around the standards and published PLA future use of forces under “informatized” conditions as opposed to their actual training, education, and employment in the operating forces.⁵⁸ The second incompatibility Hu Jintao described was the lack of defense systems currently available that hamper the ability to defend China’s growing interests abroad with these systems.⁵⁹ The two are related to more than C2 systems for the PLA but constitute a significant component of the future abilities and aspirations of the PLA while balancing the fact that currently fielded equipment and training do not meet the requirements of today.

⁵⁸ Cortez A. Cooper III, *The PLA Navy's "New Historic Missions": Expanding Capabilities for a Re-emergent Maritime Power*. Santa Monica, CA: RAND Corporation, 2009.

⁵⁹ Cortez A. Cooper III, *The PLA Navy's "New Historic Missions."*

Military control in a modern connected battlefield requires units, systems, weapons platforms, and troops to be connected via electronic means, utilizing digital systems and the electromagnetic spectrum. Some examples of these electronic means are radios, satellite positioning devices, and computer systems providing a digital operational picture for commanders and precision weapon systems. All these facets are integral to China's modernization of C4ISR systems to ensure success on modern battlefields. The ability to build awareness for commanders and staffs and communicate actions and responses from critical decision-making nodes or command and control centers account for the most significant challenge that the PLA faces in creating a more lethal tactical level force.

The PLA began a slow transition nineteen years ago to harness more of the electromagnetic spectrum to enhance control of its military forces by addressing antiquated communication systems and replacing them with modern equipment.⁶⁰ By 2008, the PLA established a nationwide joint network system utilizing high-speed data line and satellite communication methods, both encrypted and unencrypted to pass data from its military commands to the centralized military commanders in military regions around China.⁶¹ This leap was the first step to connecting all commanders, commands, and the Central Military Commission in a real-time network to pass data and information PLA wide, bringing commanders onto the "net."

Information Warfare

Information warfare in the PLA is a broad topic used to define the complete control and struggle with all data and information on the battlefield. Information warfare is both a struggle and a battlefield that the PLA competes in with the rise in organic information capabilities. With

⁶⁰ Kevin Pollpeter, *The PLA at Home and Abroad*, 195-197, 202-203

⁶¹ Kevin Pollpeter, *The PLA at Home and Abroad*, 201.

this rise in capabilities, China grows more dependent on positioning satellites and the electromagnetic spectrum for positioning data, precision strike platforms and munitions, and communication in conflict areas.⁶² This placement of the PLA on a “net” and developing modern communication systems did not come without associated risk. Similar to other modern militaries, the Chinese have found that by “informatizing” their forces, they become vulnerable to reliance on these systems and the potential exploitation of them, as most western militaries have discovered in the last twenty years.⁶³ This vulnerability is juxtaposed to the fact that China in recent years was a potent cyber attacker, shutting down electromagnetic spectrums of potential adversaries and conducting effective cyber offensive operations. Most Chinese military scholars acknowledge that at the tactical level their forces rely on these same systems and are just as vulnerable to attacks and denial of the electromagnetic spectrum as their adversaries were and are defensively just as weak.⁶⁴ Critical observers could yield a conclusion that although offensively spirited in the electromagnetic spectrum, Chinese units conducting operations abroad in “local wars” would face serious consequences at the tactical level in their “informatized” formations from simple offensive cyber-attacks and electronic warfare.⁶⁵ With every new development in control and communication, China will grow increasingly reliant on information systems for targeting and supporting its improving ISR platforms and will face challenges in integrating these systems to conduct strikes in future electro-denied environments, limiting the lethality, flexibility, and reach of tactical units. At all levels of warfare, China views the

⁶² Michael Chase, *Chinas Incomplete Military Transformation*, 116.

⁶³ Michael Chase, *Chinas Incomplete Military Transformation*, 116.

Weapon Systems Cybersecurity: DoD Just Beginning To Grapple With Scale Of Vulnerabilities, 2018, Government Accountability Office, Reports and Testimonies, Washington D.C., H.R. Rep. No. GAO-19-128, 20-21.

⁶⁴ Michael Chase, *Chinas Incomplete Military Transformation*, 116-117.

⁶⁵ Oriana Skylar Mastro, *The Chinese Peoples Liberation Army in 2025*, edited by Roy Kamphausen and David Lai, (Carlisle, PA: Strategic Studies Institute and U.S. Army War College Press, 2015), 213-215.

dominance of the electromagnetic spectrum combined with maneuver and precision weapons platforms as the key to success in potential future conflicts and has begun holistic training in the PLA to integrate these capabilities and exploit potential adversary weakness.⁶⁶ The very requirement of joint integration, improved command and control, and precision platforms will push future Chinese PLA leaders to the same crux of information management addressed in all other modern militaries.

Information Dominance

The integration of information warfare systems has made significant progress since “informatization” has begun as witnessed in the training and sightings of Chinese C4ISR equipment and platforms. Communication platforms are a key component in information warfare, and a review of the evolution of communication and control systems in the PLA Navy provides a view into the progress of the reforms. In a 2009 study of the PLA Navy by *Signal Magazine*, the recent modernization demonstrated many advances and shortcomings. Of the 33 ships that the PLA Navy had in active service in training exercises in 2008 as many as ninety percent did not have the essential communications equipment observable for conducting long-range, over the horizon, operations.⁶⁷ Since China built its first sizable naval vessel in the 1970’s, the PLA has successfully integrated a shore to ship tactical radio communication system that allows vessels to communicate back to command and control nodes on other ships at sea and extend the range of ocean-going vessels by allowing a chain of vessels to serve as an intermediate between the open ocean ships and the command centers.⁶⁸ In the 1990s, China

⁶⁶ Michael Chase, *Chinas Incomplete Military Transformation*, 115.

⁶⁷ Clarence A. Robinson, Jr, “China's Military Potency Relies on Arms Information Content,” *Signal Magazine*, November 2009, accessed December 15, 2018, <https://www.afcea.org/content/chinas-military-potency-relies-arms-information-content>.

⁶⁸ Clarence A. Robinson, Jr, “China's Military Potency Relies on Arms Information Content.”

installed a new command and control system to allow naval commanders to respond to crisis and utilize precision weapon systems more effectively, the Tavitac Communication Direction System, developed by the French, which includes information systems for ship to ship communication and integration of weapon systems, and radars like those used on United States warships. This older system, along with Russian and Chinese GPS systems, is still installed on newly constructed and older vessels as required by the PLAN.⁶⁹

Through the 2000's communication improved through a mixture of Chinese developed and foreign copied onboard data systems, meaning modern Chinese ships will have the ability, and some already do, to utilize precision weapons and communication systems for strikes with high-speed modern connection speeds at long range standoff. Although the number of vessels utilizing these upgrades is debatable, it is speculated to be less than sixty percent of the fleet, when combined with the fact that most worldwide Chinese GPS service and satellite communication is dependent on a mixture of Chinese and Russian services, the PLA Navy has moved forward at the tactical level in the number of vessels that utilize advanced C2 systems but not completed the task on independent PLA information warfare.⁷⁰

As a service, however, the PLA Navy has not employed equipment or support that would allow it to operate as an "open water" fleet worldwide, employ weapon systems, and communicate with China's centralized decision-making authorities in 2018.⁷¹ In 2015 the PLAN operated a flotilla with four destroyers separated in two groups with logistics support ships off of the coast of the Gulf of Aden simultaneously, positioning one group for operations while sending

⁶⁹ Clarence A. Robinson, Jr, "China's Military Potency Relies on Arms Information Content."

⁷⁰ Clarence A. Robinson, Jr, "China's Military Potency Relies on Arms Information Content."

⁷¹ Andrew Scobel, *The PLA at Home and Abroad*, 201

There is no definition of U.S. Navy "blue water" navy but is understood to mean to operate in two locations, distant from home port, at the same time while maintaining full operational capability as a separate naval force projecting power.

Heidi Holz and Kenneth Allen, *The PLA at Home and Abroad*, 452.

the other to liberty ports in the region over a period of five months.⁷² This move represented the first time the PLAN had two groups of ships conducting separate mission sets over vast distances utilizing the C4ISR advantages recently introduced. The PLAN actions in the Gulf of Aden represent the push to win “informatized” combat with superior information systems. Another potential limiting factor in information dominance is the fact that most of these newly acquired communication and data systems are not resistant to electronic attack by the nature that they are either older Russian or European equipment or copies of U.S. Navy equipment already in use.

In the push to prove “blue water” legitimacy, however, China will have to do more. The PLAN will need to employ a “blue water” naval group with an aircraft carrier, organic logistical ships, escort craft, amphibious capabilities, joint C4ISR, and fixed wing aircraft and helicopters capable of sustained ship to shore movement in addition to its achieved milestone of defensive capabilities outside of its near seas to prove naval integration and capabilities.⁷³ Doing so will place China on a level playing field with other recognized “blue water” naval forces.

The information warfare pictures are similar for the PLA Air Force and Army, with a mixture of the same radio and GPS equipment and reliance on the same systems. The PLA Air Force has developed a newer electronic control system for the integration of the J-10A and Su-30 aircraft that can communicate to ships and shore. This advancement is not fleet wide in the Navy, thereby limiting the employment ability of weapons through PLA Navy targeting efforts.⁷⁴ Additionally, some of the older data links on the original French command and control systems allow the employment of only one ship fired precision missile at a time, rather than the ability to

⁷² Ren Ran, “Ten-Year Escort Operations In Gulf of Aden Reflect Rise of Chinese Navy,” translated from Chinese Military Online and published June 22, 2018, <http://www.defense-aerospace.com/articles-view/feature/5/194220/decade-of-gulf-of-aden-operations-reflect-rise-of-chinese-navy.html>.

⁷³ Timothy R. Heath, Kristen Gunness, and Cortez A. Cooper, *The PLA and Chinas Rejuvenation: National Security and Military Strategies, Deterrence Concepts, and Combat Capabilities* (Santa Monica, CA: RAND Corporation, 2016), 39.

⁷⁴ Clarence A. Robinson, Jr, *China's Military Potency Relies on Arms Information Content*.

fire on multiple targets simultaneously.⁷⁵ Making this potential stovepipe of the targeting system worse is the fact the PLA Air Force and Navy attack helicopters and aircraft mentioned earlier can communicate targeting data directly only with the modernized ships firing surface to surface anti-ship missiles and the newly employed aircraft carriers. This mixture of old and new equipment and capabilities certainly make training and executing anti-ship and sea-to-shore targeting and precision weapons employment difficult.

Communication and control systems will undoubtedly continue to modernize, especially when one considers the fact that PLA Navy ships built in the 1970s either had no communication equipment for long-range communications or limited ship to ship analog capabilities. Still, potential challenges for employing precision weapon systems and weapons platforms at the tactical level and controlling them from a command perspective are a great challenge to a future globally deployed PLA.⁷⁶ A broad examination may determine that any Chinese naval vessel built before 1990, and possibly to 1999, would not be capable of long-range over the sea communication and employment of precision weapons from targeting capabilities in the air and on land via high speed encrypted means aside from satellite communication. A notable first was in the Gulf of Aden, when the PLAN utilized satellite communications (SATCOM) to communicate with PLA senior decision makers in China for the first time on a naval *Luyang* class destroyer in 2012, the accompanying escort destroyer to the *Luyang* class vessel that participated but did not communicate was built in 1994.⁷⁷ Currently, there are several PLA units, aircraft, ships and systems that cannot conduct high speed communications and rely on older

⁷⁵ Clarence A. Robinson, Jr, *China's Military Potency Relies on Arms Information Content*.

⁷⁶ Clarence A. Robinson, Jr, *China's Military Potency Relies on Arms Information Content*.

⁷⁷ Jerome Henry, *China's Military Deployments in the Gulf of Aden: Anti-Piracy and Beyond*, ifri, Center for Asian Studies, https://www.ifri.org/sites/default/files/atoms/files/chinas_military_deployments_in_the_gulf_of_aden_anti-piracy_and_beyond_0.pdf ,17

voice systems still on the front line of service.⁷⁸ This lack of modern communication systems will impact the way in which PLA planners can deploy and array forces on the battlefield, leaving communication as the long pole in the tent instead the capabilities of platforms. The story of information warfare is currently different at the strategic level. The recent 2016 introduction of the Joint Battle Command Center by the PLA and Central Military Commission, to ensure all operations are tied into the PLA central decision making of the authority at the strategic level demonstrates the goal of a joint “informatized” warfighting capability by 2025 or 2050 is still at the forefront of the minds of the PLA.⁷⁹

“Informatized” Integrated Platforms

The PLA Air Force and Navy are taking advantage of the increase in defense spending, strengthening of their leadership positions and increased research and development initiatives driven to procure and produce platforms that will allow the tactical level commanders a variety of C4ISR platforms to employ in future conflicts. These platforms can be divided into ISR and C2 assets that are truly modern and push the limits of “informatization” initiatives and striking under active defense.

PLA Air Force and PLA Navy have allowed several advanced air superiorities and ISR platforms to matriculate to the front lines for joint Chinese commanders to utilize in conflicts. China has currently fielded two aircraft carriers, with one being a former Russian design purchased from Ukraine, and the other a unique Chinese design that is still undergoing development while fielding. The aircraft to utilize these new jewels of the PLAN fleet, specifically the ones of the modern reform era, allow a level of unprecedented precision and joint

⁷⁸ Clarence A. Robinson, Jr, *China's Military Potency Relies on Arms Information Content*.

⁷⁹ China News, “President Xi Visits Joint Battle Command Center,” accessed December 28, 2018, published December 17, 2018, <http://english.cctv.com/2016/04/21/VIDEJ7sliQq7CxR28CncFBK6160421.shtml>.

C2 systems compared to the former systems and analog radio communication. The roll out in 2012 of the aircraft carrier air-to-air, air-to-surface capable FC-31 aircraft provided the first joint-integrated example of this new era, allowing the PLAN the capability for the first time to launch a stealth airframe from a carrier.⁸⁰ At the end of 2018, the PLA Air Force debuted the J-20, a long range, stealth, nuclear-capable bomber with the ability to provide real-time feedback to command and control and targeting centers. The PLA Air Force also debuted the J-20 strike fighter, the Y-20 transport, and the Z-20 a modern multi-role helicopter platform, all capable of the same level of high-speed information integration and all potentially capable of conducting long-range ISR.⁸¹ All of these aircraft replace the mixture of non-high speed information warfare capable and in some cases propeller powered aircraft currently in service by the PLA. All “20” series aircraft are named in respect to hopeful full-service use by the PLA by the year 2020. Probably, the most sizable increase in capability for the tactical commander is the current integration of the KJ-2000, KJ-200, and KJ-500 aviation early warning (AEW) craft that can detect and track targets and provide timely feedback for the use of the PLA integrated air defense network, securing Chinese core interests in 2018. This capability to integrate air defense with PLA units is one of the emerging victories of “informatization”. This emerging Chinese technology tied directly to decision makers is what the former CMC’s envisioned when they defined to future battlefields for China.

The PLA Air Force has not had an easy path to the “informatization” of their aircraft.

The PLA has a strife-ridden history with the FC-31, which has seen use in various forms since

⁸⁰ Liu Zhen, "China's next Generation of Weapons and Military Equipment Nears Readiness," *South China Morning Post*, December 23, 2018, , accessed December 30, 2018, <https://www.scmp.com/news/china/military/article/2179198/after-heavy-investment-chinas-next-generation-weapons-and>.

⁸¹ Liu Zhen, "China's next Generation of Weapons and Military Equipment Nears Readiness".

2012. The FC-31, also known as the F-31 and J-31 has not been fully backed by the PLA due to missed milestones and some performance areas that only put it on par in with other western modern aircraft, as it is essentially a thirty-five-year-old Russian Su-33 in new clothing.⁸² In 2018, that new clothing came about as a result of copying many systems from the American F-35 and adding another motor. Chinese defense experts state that the PLA struggles to fully integrate the systems copied from the F-35 into their C2 systems and maintain the new, larger jet engine aircraft to a satisfactory level.⁸³ Most aviation experts are in consensus that the aircraft does not have all the technologies of the F-35 that make it unique and, for the needs of the PLA, may just be the right aircraft for carrier integration right now, solving at least a portion of the “two incompatibilities” in platform capabilities to win in local wars. The “20” series aircraft are new and also appear to be similar to established western aircraft.⁸⁴

Very few of these new aircraft are integrated into the PLA Navy and Air Force as of 2018, and those that are in service are most likely demonstrators for research and development and not capable of fully integrated combat roles, and few have matriculated into the hands of pilots conducting joint training at a rigorous level.⁸⁵ At the tactical level, the recent high tech additions wont bear fruit until the year 2020, and commanders can expect to employ no C4ISR increase beyond the current capabilities of the 600 copies of older Russian platforms, or Russian imports such as the J-15 Su variant, Su-35, J-16 and J-10C currently upgraded with newer strike, ISR, and C2 packages. These issues makes the KJ series aircraft the only modern organic

⁸² Robert Farley, "Is China Rethinking the Shenyang J-31 Fighter?" *The Diplomat*, November 14, 2018, , accessed December 14, 2018, <https://thediplomat.com/2018/11/is-china-rethinking-the-shenyang-j-31-fighter/>.

⁸³ Robert Farley, "Is China Rethinking the Shenyang J-31 Fighter?"

⁸⁴ Liu Zhen, "China's next Generation of Weapons and Military Equipment Nears Readiness".

⁸⁵ Robert Farley, "Is China Rethinking the Shenyang J-31 Fighter?"

Chinese platforms widely fielded that have C4ISR capabilities that meet the “informatized” standard heading towards the year 2025.

Chinese unmanned Information, Surveillance, and Reconnaissance (ISR) specific platforms play a more significant role in the overall combat capabilities of the PLA than before the modern mission of “winning informatized local wars” began. The Chinese have invested large amounts of capacity into space programs, unmanned platforms and reconnaissance capabilities that will allow the future tactical commander to profoundly change the way he may have fought only ten years ago.

China launched sixteen successful space vehicles, to include satellites for positioning, targeting, ISR, and command and control in 2017, bringing the believed total to be thirty-one in service.⁸⁶ Some of these satellites are touted as being able to conduct counter communication, and early warning system integrated, enabling the PLA to shape the battlefield to the advantage of PLA forces in conflict by damaging the communication infrastructure and precision weapon strike effects of enemy combatants. With the increased demand to perform a mix of functions including weapon systems employment and C4ISR, these, potentially, strategically employed systems will still have a tremendous impact of the effectiveness of the operations of tactical commanders. Tactical PLA commanders can count on entering combat playing fields that have been leveled to some degree by PLA technological advances, as they face employing the remnants of their potentially inferior platforms of today against their foes.

Unmanned aerial vehicles for ISR have received increased attention and development by the PLA. The upper tier of these aircraft, stealth and near space capable, are nearing

⁸⁶ Jim Garamone, "DIA's China Military Power Report Details Leaders' Strategy," U.S. Department of Defense, accessed February 03, 2019, <https://dod.defense.gov/News/Article/Article/1732657/dias-china-military-power-report-details-leaders-strategy/>.

employment in 2018 with the PLA acquiring of the Xianglong and Yunying aircraft.⁸⁷ These aircraft are yet to see use in regular training and integration into the PLA decision-making structure but are both high altitude platforms capable of C4ISR and precision strike when they become more readily available. More toward the tactical level of warfare, the Chinese firm Chinese Aerospace and Technology Corp, have developed and fielded the CH 4 and CH 5 systems, precision strike and ISR platforms equivalent to the U.S. Predator and Reaper series for both widespread domestic consumption in the PLA and overseas sales.⁸⁸ The new introduction of the Wing Loong II, equivalent in ways to the MQ-9 Reaper in 2017, provides a wide array of ISR and strike platforms from which PLA tactical commanders can choose depending on mission necessity.⁸⁹ All of these systems are estimated not to be equivalent in capabilities and command and control options as counterparts, but half to three-quarter solution that is far cheaper and faster to produce.

A recent revelation in defense markets is the theory that China now leads the way in anti UAV and drone technology, providing defense against unmanned systems for the PLA. A widely read *China Daily* report on the 207th Institute of China Aerospace Science and the Chinese Industry Corps Second Academy in 2018 advances in low level and mid-level altitude anti-drone and UAV systems have led to a conclusion that China has mastered in many ways the ability to disrupt and redirect UAV and drone systems for the tactical commander.⁹⁰

⁸⁷ Jim Garamone, "DIA's China Military Power Report Details Leaders' Strategy".

⁸⁸ Jon Gambrell, Gerry Shih, and Associated Press, "Chinese Armed Drones Now Flying over Mideast Battlefields. Here's Why They're Gaining on US Drones," *Military Times*, October 03, 2018, accessed February 03, 2019, <https://www.militarytimes.com/news/your-military/2018/10/03/chinese-armed-drones-now-flying-over-mideast-battlefields-heres-why-theyre-gaining-on-us-drones/>.

⁸⁹ Jon Gambrell, Gerry Shih, and Associated Press, "Chinese Armed Drones Now Flying over Mideast Battlefields".

⁹⁰ 王建芬, "New System Can Combat Rogue Drones," *China Daily*, accessed February 03, 2019, <http://www.chinadaily.com.cn/a/201812/22/WS5c1d6d79a3107d4c3a0022fb.html>.

Between satellites, UAV's and defense systems, the PLA appears to stand ready to face modern opponents in unmanned ISR capabilities in 2018. The new platforms certainly provide the PLA an avenue to pursue asymmetry on the battlefield that they had not been able to explore before. The addition of these capabilities could well prove to be the offset necessary to match and win against opponents employing superior equipment and C4ISR systems. The reality, however, is 2018 presently paints a picture of newly developed systems without the required gestation and integration into the warfighting capabilities of the PLA. With the required training, employment requirements, and relatively few new UAV systems currently fielded to fight today the PLA is more likely to focus on the effort to integrate the systems at the tactical commander's decision level and build familiarity in employing these new ISR platforms. The PLA can then train with the systems to understand how they perform within the commanders C4SIR structure efficiently, and their focus on deploying large warfighting organizations overseas with these new platforms.

IV. Is the Tactical Level “Informatized?”

The 2018 Bar

The “informatization” advances in the fielding of technologically superior equipment and the initiative to have better educated and trained service members allow the PLA to support the CCP and China's core interests at the tactical level and dislodge some of the problems associated with the “two incompatibilities”. The PLA stands on much firmer ground to support the future aspirations of the CCP and China in 2018 than it did in 2001, 2005 or even 2015. The realization of the goals of “informatization” to win in warfare is far from complete. With large amounts of capital needed to be spent on PLA force development of both officers and enlisted in all services, and the fielding and assimilation of newer technologies into a force that never completed the

mechanized revolution in warfighting brought into existence in WWII. China lives with the “two incompatibilities” still today, but the road for the CCP into 2025 and 2050 bring it on par in C4ISR with modern competitors if those same competitors do not continue to maintain their edge.

Command and Control Matters

The C2 infrastructure, from equipment to developing commanders to fight modern joint wars is proving to be a major sticking point for the PLA. As the PLA moves to modernize education and training environments that provide more a competitive edge for units to train against, they run parallel to the ever-increasing technological dependence of their forces to perform what were once basic analog and manual tactical level tasks. The advances in education, downsizing of the overall PLA force and focus on providing officers in the PLA with a joint mentality in fighting conflicts worldwide provide an avenue to bring the basic tactical level abilities of all the PLA military branches to a standard to win in a potential conflict of short duration in Chinese territories and near offshore areas. Potential complications for China in the next twenty years are a byproduct of the very driving force of China’s emergence onto the world scene. The impacts of education, joint training, and recruiting versus competition with civilian economic infrastructure and occupations present a problem for future PLA leaders. Today, despite some mandatory service requirements, the PLA still finds itself competing for popularity, influence and the brightest Chinese minds in China as it attempts to defend the core interests of the Chinese Communist Party.

The control half of C2 is technologically driven and has integrated at least some tactical level leaders into the C4ISR infrastructure of the larger PLA and CCP strategic decision-making framework. The development of naval command and control centers, positioning and battlefield

awareness tools, as well as communication systems will allow the PLA to conduct high tech “informatized” conflict with efficiency and accuracy not before seen by Chinese decision makers.

The technological leap presents two questions that the PLA must resolve soon. The first question posed for the PLA is; does the emergence of connected C4ISR systems at the tactical level empower the tactical commander to make decisions, or does the CCP retain the historically centralized and committee-based decision cycles of the historical PLA? The second question for the PLA regards how the PLA trains future tactical commanders on the use of modern C4ISR systems, as tools for the CCP strategic decision makers to pass commanders intent and decisions, or for tactical decision makers to understand enemy capabilities and the battle presented to them at the tactical level and seize initiative on a diverse information rich battlefield?

Framed another way, who will benefit from the RMA, the commanders at the tactical level, or the strategic PLA leadership? The answer to the first question appears to be against the democratizing of decision and initiative. Except by items of small scale, tactical commanders within the PLA and CCP are still run by process of command and control decisions originating at the top of the organization. The top down process was potentially exaggerated with the building and connection of the joint command center of the CCP and PLA with the regional command centers since 2015, which is technically enabling party leaders and senior military officers the ability to monitor tactical level details and decisions from afar. The C2 information capabilities enabling top down oversight was done in the contemporary face of the lack of integration of C4ISR in the whole of the PLA. A potential outcome in the immediate future would be a deployed and able tactical level PLA force not having the same capabilities as the party and senior PLA leadership. The danger of the reform of 2015’s joint command center is that

execution in the system may provide senior leaders the ability to undermine subordinate commanders, a practice that has been called into question in the United States with the introduction and use of the Global Command and Control System (GCCS) allowing pentagon officials to make tactical decisions on weapons and troop employments in combat theatres from distant command posts.⁹¹ The answer to the second question remains to be seen, but without a reduction of the centralization a scene could be produced that unravels the tactical decision making system from the bottom up. In command and control then, a state of “informatization” has hit the very point that most other modern militaries have previously faced, to include the command and control debate of “tactical Generals” in the United States.⁹²

The “tactical Generals” debate centers around the theory that technology advances in C2 will allow centralized operational and strategic level decision makers to intervene and direct actions at the tactical level in real time while separated in distance and the situational awareness of the tactical decision-making chain of command. This process, taken to an extreme, could lead to the demoralization and authority of the tactical chain of command that is on the ground or in the situation and probably better suited through personal understanding situations to make the decisions. Another side effect of the “tactical General” is the demand placed on C2 infrastructure to make decisions that previously may have required very little reliance of advanced electronic systems for execution. The problem present to the PLA is harnessing the use of new capabilities to an advantage for force wide improved efficiency and lethality, rather than a mix of increased capability and strategic oversight and the potential for increased decision-making vulnerability, a situation the PLA Navy is likely to encounter on the oceans first.

⁹¹ Peter W. Singer, "Tactical Generals: Leaders, Technology, and the Perils," Brookings Institute, May 10, 2017, accessed March 20, 2019, <https://www.brookings.edu/articles/tactical-generals-leaders-technology-and-the-perils/>.

⁹² Peter W. Singer, "Tactical Generals: Leaders, Technology, and the Perils."

Platforms for the conduct of ISR since 2001, like C2 systems, have seen the benefits of attention with the shift to “informatized” warfare as demonstrated in this paper. The reliance of ISR systems to support the targeting, observation, intelligence and communication requirements of “informatized” warfare demonstrated primarily through “winning informatized local wars” place a very high demand on the development and employment of ISR to thoroughly support the PLA defending Chinese core interests. Much like command and control systems, this step forward comes with a potential step backward, as one runs the risk of leaning on technology while risking the balanced integration of modern warfighting capabilities in the whole system, making it prone to collapse. China thus far seems to have managed balance at the tactical level in PLA foreign training exercises, as in Vostok 2018 and domestically by openly addressing the fact with heavily criticized military training performances and continuing to build redundancy into platform capabilities supporting modern C4ISR.

The PLA’s ability to employ modern ISR platforms conducting wars under “informatized” conditions hinges on two problems for the PLA. First, the CCP, in order to support the vast needs of the PLA, while economically and politically advancing in the world, have adopted policies of mixed foreign acquisition and domestic development to support ISR requirements. This mixture has created a problem set not before realized in the race to “informatization” which is how to integrate platforms, all capable individually as “informatized” equipment sets, into an efficient modern hierarchy of tactical and strategic decision making? The answer to this was to refit equipment sets for needs to meet a demand to varying degrees of success. The second problem is that in the race to support these defense and economic development needs, the PLA has taken an approach, until very recently in the case of the new “20” series aircraft platforms, of accepting equipment at somewhat less cost than foreign

developed systems, that do not fully meet the requirements of the future PLA. The FC-31 in the position as the primary naval aircraft carrier fixed wing asset and the fielding of UAV platforms that do not provide all the available technological capabilities as foreign systems were the observable results. With the exception of UAV's developed and released in the last five years, such as the CH-4 and CH-5, the PLA Air Force and Navy satellites and aircraft do not provide offset via technology to combat future opponents at the tactical level, they simply provide a common, debatably reliable, and capable "generation three plus" to "generation four" solution compared to air and space equipment sets fielded by other modern nations. The "20" series aircraft provide a "fifth-generation" solution, but a review of the last five years of large training evolutions does not find them utilized, or openly integrated into the modern problem sets of the PLA.

Because of the platform specific nature of the PLA AF and the PLAN, and the need to compete technologically with fighting systems, have inculcated more of the tactical level need to modernize and "informatize." The PLA AF and PLAN, as services, need to maintain a competitive edge to meet the needs of the PLA, compete for funding, and fight for an asymmetrical edge, driving the requirement to embrace the PLA named RMA. As services, through their competitive professional education institutes, reform of training, embracing both new and old platforms for ISR, information, carriers, "fifth generation" fighters, long range communications, and "blue water" capabilities, they represent the closest shots to the target of "informatization" and "winning local wars" at the tactical level for the PLA at the present time.

V. In Conclusion:

The goal of winning "informatized local wars" is the goal of the PLA as it nears the year 2020, with complete dominance in defense in the world by the year 2050. These goals are lofty

for a force that still struggles with complete mechanization of its forces. In order to meet these goals, the PLA must enter the year 2020 with the capability to compete in C2, systems integration, information warfare, and information dominance. The issues, systems utilized, and employment theory of the information dominant future of conflict discussed present serious issues to the PLA that they are still tackling in the year 2018. The sheer size of the PLA, and the grandeur of the defense goals would be challenging for any nation to digest and create meaningful change in a mere twenty years. Despite the advances leadership challenges and information system integration alone present incredible hurdles to the PLA. The PLA is not only creating and purchasing new equipment but changing the way that it has equipped and trained to fight since its inception. Without the firsthand knowledge of modern combat to draw effective lessons from, when the capabilities and leadership challenges are sufficiently addressed the PLA will still have to face the uncertainty of modern combat for the first time. There is no easy way for the PLA to solve this problem and cannot purchase or train the fog of war out of what they future conflicts.

A Chinese military avionics scientist interviewed under conditions of anonymity, by the Associated Press in 2018, may have put the current progress of “informatization” best when he stated that Chinese equipment, developed domestically, provides half the capability of other modern western equipment, but is more readily produced, half as expensive and therefore more appealing to the military of today.⁹³ The PLA’s belief in the ability to out strategize their opponents through skill, whether through conditions shaped by historically large number of troops, or simply accepting risk in some areas, has answered the question of how the PLA will

⁹³ Jon Gambrell, Gerry Shih, and Associated Press, "Chinese Armed Drones Now Flying over Mideast Battlefields," *Military Times*, published October 3, 2018, accessed February 12, 2019, <https://www.militarytimes.com/news/your-military/2018/10/03/chinese-armed-drones-now-flying-over-mideast-battlefields-heres-why-theyre-gaining-on-us-drones/>.

support China's core interests and "winning informatized local wars." In doing so, PLA leaders accepted scenarios and equipment that will meet some interests partially, some wholly, but not all the political requirements stated by the CCP for future success in 2018.

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