

15 February 2018
Kevin McCauley
Independent Analyst

Testimony before the U.S.-China Economic and Security Review Commission

“China’s Military Reforms and Modernization: Implications for the United States.”

Modernization of PLA Logistics: Joint Logistic Support Force



Joint Logistic Support Force Emblem

Key Judgments

- The People’s Liberation Army (PLA) considers joint logistics an important foundation for its emerging integrated joint operations capability.
- An integrated C4ISR (command, control, communications, computers, intelligence, surveillance and reconnaissance) system provides the foundation for a joint logistics support network.
- In 2004, the PLA began a series of joint operations experimental exercises, including joint logistics, in the former Jinan Military Region (MR). This led to the establishment of a joint logistics system in the Jinan Theater in 2007, and finally to the implementation of

force-wide joint logistics reforms under President Xi Jinping. The current reforms are scheduled for completion by the end of 2020.

- In late 2015 and early 2016, President Xi consolidated all military elements under the Central Military Commission (CMC), including the establishment of a Logistic Support Department with macro-management responsibilities.
- A Joint Logistic Support Force (JLSF)¹ was established in September 2016 to unify joint logistics forces at the strategic level and support the five new joint theater commands.
- The JLSF is key to building a modern logistics support system, and critical for implementing integrated joint operations, supporting joint training, and providing strategic and campaign joint logistics.
- Joint logistics modernization emphasizes incorporation of information technologies, the use of logistics networks and databases, and systems to monitor supply levels and unit requirements. The PLA's ultimate objective is to achieve a precision logistics support capability to meet the requirements of a dynamic, fluid battlespace.
- Civil-military integration² is a key component of logistics support leveraging the civilian economy and industry. The JLSF is responsible for civil-military integration related to logistics requirements. This includes outsourcing of logistics and promoting research and development of dual-use technologies. The intent is to maximize the efficient use of military and civilian resources.
- The PLA's association with civilian businesses is bringing modern business practices, such as modern inventory control and delivery methods, into the joint logistics system as a precision logistics capability emerges.
- The widespread use of civilian infrastructure, resources and transportation by the PLA during a conflict could make identification of military forces and targeting during a conflict difficult for an opponent.
- Wartime logistics mobilization includes manpower, financial, material, facility and equipment mobilization. Mobilization includes military resources and reserve forces as well as requisitioning from the civilian sector. China also maintains strategic reserves of critical raw materials.
- Corruption has been a major problem affecting PLA logistics. If corruption is not at least curbed, it could adversely impact logistics modernization and combat operations.

¹ The PLA uses "logistic" in the titles of the CMC Logistic Support Department and the Joint Logistic Support Force, but the more conventional "logistics" elsewhere.

² The PLA uses the term civil-military integration rather than civil-military fusion.

- China's growing economic strength, and overseas strategic interests and commitments, such as the Belt and Road Initiative and peacekeeping operations, are providing impetus for the PLA's development of strategic delivery capabilities and overseas bases.
- The PLA considers a strategic delivery capability as a strategic deterrent; an important factor in determining the outcome of a war; an important requirement enabling overseas joint logistics and joint operations; and an important means for gaining global influence.
- While the PLA's force projection capabilities are currently limited, they will continue to grow in the future as the force acquires larger and more capable transport aircraft, helicopters, amphibious warfare and comprehensive support ships. The PLA can also mobilize civilian transportation.
- A joint logistics system is likely to be largely functional by the end of 2020 or soon thereafter, with refinements, adjustments and modernization continuing.
- Currently China is engaged in supporting non-war missions overseas including peacekeeping and anti-piracy missions, and evacuation of citizens from danger. This can provide positive areas of engagement with the PLA.
- The threat to US and allied interests globally could increase in the future, as the PLA's joint logistics, strategic delivery and integrated joint operations capabilities and experience increase quantitatively and qualitatively, combined with Beijing's more aggressive strategy.

Background on Joint Logistics

Joint Operations Evolution

The PLA intensively focused military science research into joint operations and the Revolution in Military Affairs based on information technologies (informationization – 信息化) following Operation DESERT STORM in 1991. The PLA actively analyzes foreign military operations for lessons learned. After the turn of the century, PLA academics began to transition their analysis to integrated joint operations (一体化联合作战) considered a more advanced form of joint operations. By 2005 the PLA was directed to focus research on developing an information system-based system of systems operational capability (基于信息系统的体系作战能力) as the foundation for implementing integrated joint operations. System of systems operations is the integration of C4ISR, modular task organized force groupings, weapons and equipment into a seamless entity where the sum is greater than the parts; expressed by the PLA as $1 + 1 > 2$. Modularity provides a “plug and play” capability to optimize force groupings based on operational requirements.³

³ Kevin McCauley, [PLA System of Systems Operations: Enabling Joint Operations](#), (Washington, DC: The Jamestown Foundation, 2017), pp. 5 -12

Joint Logistics

Joint logistics is an important operational element for implementing joint operations. The PLA considers logistics support difficult in future wars featuring a multi-dimensional and expansive battlespace with fast paced, dynamic operations, as well as high consumption and destruction rates. Precision logistics support (后勤精确保障) is the objective of logistics modernization. It is considered the basic method of support responding to these complex requirements, improving overall efficiency, and reducing duplication and waste of resources. Precision logistics uses the minimum resources to meet requirements at the precise time and place – a military version of the business concept of “just-in-time” logistics. The intent is to integrate joint logistics assets at the strategic, campaign and tactical levels, as well as leveraging civilian logistics. System of systems operational capability with an integrated C4ISR system (for the PLA, the command information system 指挥信息系统) is required to build an integrated support network. This support network provides unified command and control, and analysis and forecasting of logistics requirements for timely and accurate distribution of resources. The fielding of Beidou Satellite Navigation System terminals throughout the PLA is particularly important for logistics units providing critical supplies to dispersed units on the battlefield.⁴

Joint Logistics Experimentation

The former Jinan MR began a theater joint logistics experiment in 2004. This coincided with joint operations experimentation in the areas of command, coordination, and task organized joint force groupings by the Jinan MR. In 2007 a joint logistics structure was established in the Jinan Theater. This experimentation and establishment of a joint logistics system provided experience leading to the reorganization of joint logistics under President Xi Jinping.⁵

Organization Reforms

PLA academics identified the need for a streamlined organization with fewer command levels over a decade ago. The current military reform efforts finally implemented a flatter command structure, consolidating all military forces under the CMC in a three-level command structure: CMC – Theaters – Forces. The new CMC departments are intended to provide strategic planning, macro management of subordinate forces, standardization, research and formulation of major policies to support ongoing reform and restructuring efforts. The CMC Logistic Support Department (后勤保障部 - LSD) formed from the former General Logistics Department, coordinates military-civilian development strategy related to strategic reserves; the economy and industry; scientific and technological research; rail, road, air and maritime transportation integration of military requirements; as well as improving logistics reserve forces. Research projects conducted in 2017 included cloud and software design supporting logistics, military energy, medicine, and strategic delivery to improve combat effectiveness. Additional responsibilities include ensuring high professional, specialized and technical skill levels for logistics personnel.⁶

⁴ Kevin McCauley, [PLA System of Systems Operations: Enabling Joint Operations](#), (Washington, DC: The Jamestown Foundation, 2017)

⁵ [CCTV](#), July 31, 2017

⁶ [Chinamil.com.cn](#), September 13, 2016; [PLA Daily](#), June 12, 2017; [PLA Daily](#), April 27, 2016; [MOD](#), January 12, 2016

Corruption has been a major problem effecting PLA logistics in the past. Many of the officers accused of corruption have been logistics officers. The effectiveness of President Xi's anti-corruption campaign is unclear, although it has likely curbed corruption. The embezzlement of funds intended for purchasing supplies, logistics equipment and maintaining stocks in depots could adversely impact PLA operations in a conflict if it were to continue.⁷

This consolidation of centralized control over all military forces by President Xi Jinping and the CMC is in part an attempt to correct past modernization implementation problems. In the past high-level general guidance would be issued, with implementation left to lower echelons. This led to a great variance in implementation within the force obstructing standardization and integration. The PLA is now emphasizing high-level direction to enforce standardization and uniformity during the military modernization process. If successful, this will lead to improvements throughout the force, including logistics.⁸

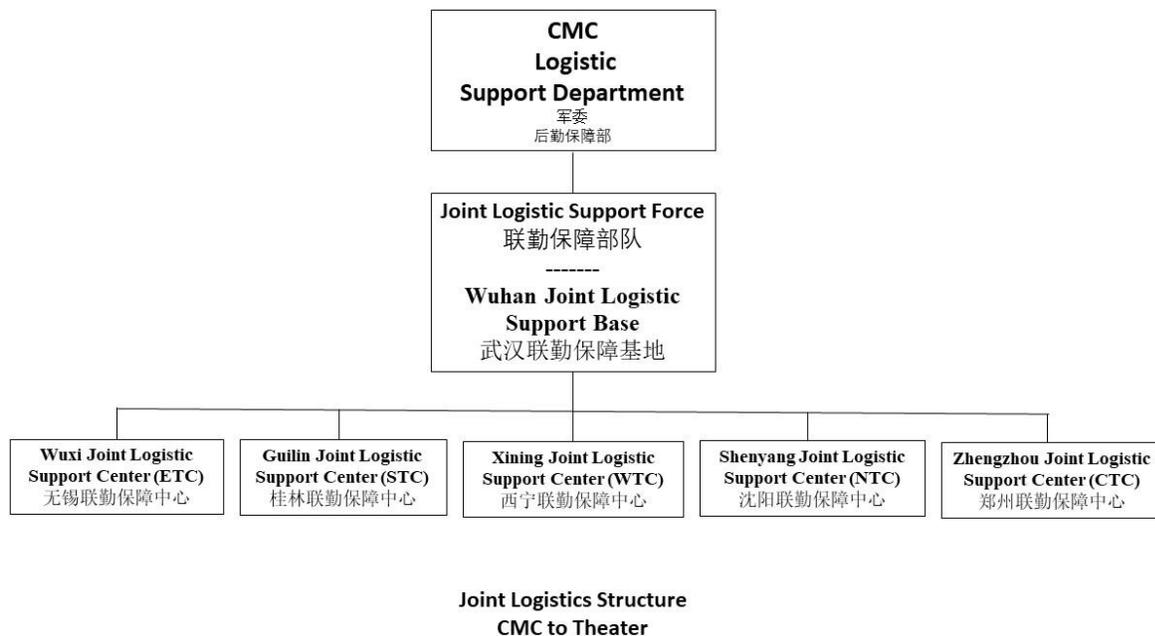
The Joint Logistic Support Force (联勤保障部队) was established September 13, 2016 as part of the CMC. The JLSF is responsible for accelerating the construction of the joint logistics system and forces. The Wuhan Joint Logistic Support Base (武汉联勤保障基地) is essentially the JLSF headquarters with five Joint Logistic Support Centers (联勤保障中心), one supporting each theater command (TC) as shown in the figure below. The five centers are staffed by personnel from the services⁹ (Army, Navy, Air Force and Rocket Force), and provide joint logistics support within their respective theaters and to forces transiting their region during multi-regional exercises or operations. The Wuhan base and five centers are composed of multiple units, ammunition depots, warehouses, fuel depots, hospitals and underground facilities spread over a wide geographic area.¹⁰

⁷ Kevin McCauley, President Xi Clears the Way for Military Reform, [China Brief](#), February 4, 2015

⁸ Kevin McCauley, [PLA System of Systems Operations: Enabling Joint Operations](#), (Washington, DC: The Jamestown Foundation, 2017)

⁹ Although currently the leadership appears to be Army officers.

¹⁰ [Chinamil.com.cn](#), September 13, 2016, [Xinhua](#), December 16, 2016; [China Youth Daily](#), January 19, 2017



The PLA considers the establishment of a joint logistics system as critical for success in achieving an integrated joint operations capability, supporting joint training, and providing joint support. President Xi Jinping stated that the JLSF is a strategic measure to deepen military reform and build a modern logistics support structure providing strategic and campaign support. The logistic base and centers form a modern joint logistics system integrating logistics units and capabilities,

providing centralized and decentralized support as required, as well as developing joint logistics tactics, research and experimentation. Joint logistics provides the main support, supplemented by the services in a unified structure with a division of responsibilities for general and specialized support capabilities.¹¹

PLA modernization identified the need to develop and strengthen large logistics support centers embedded with information technologies to improve efficiency and timeliness. These centers are intended to rapidly respond to emergency situations requiring large-scale logistics support. Reliance on military or civilian ground, air and sea delivery capabilities are important for effective logistics support within China or abroad. Logistics personnel from the five centers are sent to the theater commands to better understand operational missions and requirements to develop logistics support plans and support theater joint exercises. The Wuhan Joint Logistic Support Base incorporates the former strategic Wuhan Rear Base.¹² This base provides centralized strategic logistics support, while the five theater logistics centers provide campaign logistics support to the theater commands. The centers comprise units, facilities and functions to provide various types of logistics support to include the following: contingency logistics support brigades(后勤应急保障旅); medical support including hospitals and mobile medical units; motor transport and heavy equipment transport units; petroleum, oil and lubricant (POL) depots, oil pipeline groups(输油管线大队), and field fuel station detachments(野战加油站分队); ammunition depots; quartermaster depots; maintenance and repair; finance; and construction of military facilities. The centers can mobilize civilian transport services such as rail, motor, air and maritime transport, as well as mobilizing other civilian assets such as maintenance or construction.¹³

The joint logistics system is responsible for supplying general items that are used by all the services. The equipment support function that had been responsible for maintenance and repair appears to be included in the joint logistics system. Service (Army, Navy, Air Force, and Rocket Force) logistics are responsible for service specific logistics requirements.

Contingency logistics support brigades are modular adhoc units to provide rapid comprehensive logistics support in a main operational direction. There are also reserve logistics support brigades available for mobilization. A PLA publication on joint operations recommended strengthening and expanding the contingency support capabilities in general and the brigades specifically by increasing their mobility and modern equipment. The publication also identified the need to enhance support personnel quality and specialized training. Subunits include motor transport, medical, POL, materiel, and repair. The brigades have specialized equipment such as palletized supply vehicles and can monitor unit consumption through information systems to anticipate requirements and provide precision logistics support.¹⁴

¹¹ [PLA Daily](#), August 9, 2017; [PLA Daily](#), December 23, 2017; [CCTV](#), September 14, 2016

¹² The GLD also contained three Qinghai-Xizang Base. The Nenjiang Rear Base and the Chenhu Base were reportedly sold to private companies in 2001. Regional networks were based on large cities, such as Beijing, Shenyang, Jinan, Nanjing, Chongqing, Guangzhou, Chengdu and Xi'an.

¹³ [People's Daily](#), June 20, 2011; [PLA Daily](#), November 11, 2016; [PLA Daily](#), December 1, 2016; [PLA Daily](#), December 5, 2016; [China Youth Daily](#), January 19, 2017; [PLA Daily](#), December 17, 2017; [Chinamil.com](#), February 24, 2017

¹⁴ [PLA Daily](#), November 12, 2012; [Chinamil.com](#), August 15, 2013; [PLA Daily](#), October 9, 2013; [Chinamil.com](#), July 26, 2014; *Joint Operations Research*, (Beijing: National Defense University Press, 2013), pp. 289-290

The exercise North-2016B (北部-2016B) provides a good example of JLSF joint support during training. A joint support network (联合保障网络) and a modular campaign support group (战役支援保障群) were established. The JLSF employed fixed-point support, accompanying support in the main direction, skip-echelon support during the exercise. The campaign support group was a modular unit providing medical, ammunition, fuel, transportation, equipment repair and other support functions.¹⁵

Logistics Modernization

Background

Former President Jiang Zemin identified logistics as an important component of military modernization. The goal is establishing a precision logistics system executing full-dimensional, rapid, accurate and timely logistics support. The PLA has extensively studied U.S. logistics support to global operations, providing impetus to its logistics modernization. Former President Hu Jintao likewise stressed the importance of joint logistics to winning wars. A result was the CMC issuance in 2007 of the “Outline for Comprehensive Building of Modern Logistics.” This proposed an integrated advanced logistics supply structure, integration of a civilian logistics supply model, application of information technologies, and an accelerated logistics construction. The current military reform effort continues through the end of 2020, with adjustments and refinements of the restructuring taking place. The PLA has accelerated the three-stage long-term modernization plan, with completion by 2035 instead of 2049. The PLA is already identifying emerging and disruptive technologies that could lead to another Revolution in Military Affairs based on the integration of intelligent technologies (智能化) into weapons and equipment.¹⁶

Logistics Modernization Requirements

Requirements for future combat include a combination of fixed and mobile echelon-by-echelon and skip echelon support, with strengthening of the skip echelon method for flexible and rapid support. Joint logistics for informationized warfare requires the following:¹⁷

- Integration of information technologies into logistics equipment to support precision logistics and mobilization.
 - Transformation of military logistics support by actively employing the internet of things, big data, cloud computing and other new concepts for campaign support and building a smart battlefield environment.
- Accelerate innovation and systems of systems integration of strategic, campaign and tactical support forces.
- Eliminate traditional problems of compartmentation and multi-level bureaucracy.

¹⁵ [CCTV](#), July 31, 2017

¹⁶ [People's Daily](#), June 20, 2011; Kevin McCauley, “The PLA Accelerates Modernization Plans,” Jamestown Foundation [China Brief](#), January 12, 2018; [China News](#), December 25, 2007; [Xinhua](#), October 1, 2009

¹⁷ *Information System-Based System of Systems Operations Study*, (Beijing: National Defense University Press, 2012), pp. 63-67; [PLA Daily](#), December 12, 2016

- Civil-military integration of strategic assets and projection forces, including civil air transport and large transport ships.
- Accelerate overseas support means and facilities construction to safeguard overseas national interests, as well as fulfill international and peacekeeping obligations.
- Establish an integrated theater with a base system focused on general purpose and special integrated logistics support bases to meet theater requirements.
- Groupings of flexible, mobile strategic logistics contingency support forces, mobile maritime support forces including large supply ships, and PLAAF emergency mobile support groups and air refueling forces.
- Small, light, mobile, modular tactical logistics groups.

Precision Logistics Support

The PLA's concept of precision logistics support was derived from the new requirements identified to support modern informationized warfare. Logistics needs to make full use of information technologies and modern equipment to organize and implement precision logistics support. Precision logistics can optimally leverage logistics resources, reduce redundancy and waste to increase efficiency. Cost effectiveness of logistics support is an important factor in PLA calculations.¹⁸

The use of information technologies is at the core of precision logistics. The command information system (the PLA operational C4ISR system) consisting of integrated and automated command platforms provides networking, a common operating picture, databases and monitoring systems to forecast and track consumption rates and stocks of supplies. Satellite navigation positioning system provides accurate locations for units dispersed on the battlefield and a rapid messaging system important for the implementation of precision logistics. Advanced field equipment and modular logistics units will provide greater delivery speed and flexibility for mobile and accompanying logistics support.¹⁹

Informationization

The PLA is improving the command information system to provide greater connectivity between units and provide a common operating picture to all command posts down to the brigade level and likely to battalion command vehicles. Logistics forces are incorporating information and intelligent technologies combined with logistics practices adapted from civilian businesses to provide inventory control and rapid delivery. Command automation systems assist planning and monitor unit logistics requirements to provide optimized and timely delivery of supplies on the battlefield.²⁰

The JLSF has established a Joint Support Big Data Center (联保大数据中心) to support information integration and sharing to support rapid decision making and response. Theater joint

¹⁸ *Precision Logistics Support Research*, (Beijing: National Defense University Press, 2010), pp. 1-2

¹⁹ *Precision Logistics Support Research*, (Beijing: National Defense University Press, 2010), p. 5

²⁰ [PLA Daily](#), December 12, 2016

logistics support networks (战区联勤保障网), and military traffic information networks (军事交通信息网) support efficient dispatch of logistics units. A joint logistics support resource distribution map (联勤保障资源分布图) displayed on an integrated joint logistics support platform (一体化联勤保障平台) provides a common logistics operating picture.²¹

Through the integrated command platform, databases and monitoring provide status reports on supply requirements, unit locations (Beidou), battlefield situation maps, medical needs, and damage reports. This enables rapid response to support combat units. The communications system also enables consultation with military and civilian medical experts at distant locations providing battlefield medical advice.²²

The logistics base and centers have battlefield situation maps reportedly updated in real time displaying planning support decisions, geographic, meteorological, hydrographic environments, ground, air and maritime friendly and enemy situation, satellite transits, electronic spectrum data and other information to support command and coordination.²³

BeiDou Satellite Navigation Positioning System

The indigenously developed BeiDou Satellite Navigation System was designed to replace reliance on the U.S. GPS or other country's positioning systems. An additional feature of the BeiDou system is the communication messaging capability. Logistics units employ BeiDou to locate and provide critical supplies to combat units maneuvering on the battlefield.²⁴

Civil-Military Integration

Background

The Chinese concept of civil-military integration dates to the revolutionary era, with continual revision and refinement. The current form of civil-military integration began under former President Jiang Zemin, and continues to the present. The underlying objective is for the civil and military sectors to reinforce each other, using the other for leverage to promote modernization and scientific development of dual use technologies and industries, thus reducing redundancy and wasted resources, while maximizing efficiency, cost effectiveness, and use of resources.²⁵

In March 2008 the State Administration for Science, Technology and Industry for National Defense (SASTIND)²⁶ was established under the Ministry of Industry and Information

²¹ [PLA Daily](#), April 24, 2017

²² [CCTV](#), July 31, 2017

²³ Wuxi Joint Logistics Support Center [PLA Daily](#), September 16, 2016; Xining Joint Logistics Support Center [PLA Daily](#), September 16, 2016; Joint Logistics Support Centers [PLA Daily](#), September 16, 2016; [CCTV](#), July 31, 2017; [China Youth Daily](#), January 17, 2017

²⁴ [PLA Daily](#), March 30, 2010; [PLA Daily](#), November 19, 2013

²⁵ *Introduction to Civil Military Integration*, (Beijing: National Defense University Press, 2015), pp. 29-31

²⁶ SASTIND replaced the Commission for Science, Technology and Industry for National Defense (COSTIND), which included the China Atomic Energy Authority, the China National Space Administration, key technological universities, and key industries supporting weapons and equipment production.

Technology. SASTIND is a civilian agency promoting civil and military integration. The agency has responsibility for coordination, guidance, policies and regulations governing science, technology and industry. These actions support research and development for national defense as well as production of high tech weapons and equipment. Key civilian sectors include nuclear power, aircraft and aerospace, and the shipping industry. At the same time the CMC promulgated a plan for construction of a modern logistics system leveraging and combining the civilian sector for mobilization, and peacetime and wartime support.²⁷

Joint Logistics and Civil-Military Integration

The JLSF is responsible for civil-military integration related to logistics support. This is important for leveraging civilian expertise and capabilities to reinforce joint logistics. Outsourcing to the private sector of certain logistics requirements is intended to create greater efficiency, flexibility, and timeliness to support activities. The logistics force has arrangements with private companies to provide supplies directly to units. Logistics mobilization in wartime relies greatly on civilian resources. The concept of “supporting the front” (支前) has local governments and the population supporting military forces with manpower, material and financial resources, medical, transportation, maintenance, and engineering support, as well as intelligence.²⁸

The PLA’s association with civilian businesses is bringing modern business practices, such as modern inventory control and delivery methods, into the joint logistics system. Leveraging civilian research is also introducing emerging technologies into the PLA’s modernization plans. This civil-military integration is improving logistics flexibility and capabilities. An example is a recent Air Force experiment with a private company to use unmanned aerial vehicles (UAV) to transport supplies and spare parts to far flung units.²⁹

Key components of the integration are improving the military logistics research and production system supported by SASTIND, as well as improving military specialized talent and education. The current form of civil-military integration promotes the following objectives:³⁰

- Accelerating logistics mobilization capability through the integration of the civilian economy, industry, and infrastructure to support military requirements, and the leveraging of civilian capabilities in the areas of medical, materials, maintenance and transport.
 - Civilian construction projects are designed to meet military requirements. This includes civilian aircraft and shipping, construction of highways to include aircraft landing strips, and civilian airports and ports. In particular, the development of civilian transportation and communications infrastructure is designed to improve the national defense mobilization system.
 - Military logistics incorporates the civilian support system for military reserves, transportation and distribution.
 - Reform of the reserves and militia emphasizes high-tech capabilities.

²⁷ *Introduction to Civil Military Integration*, (Beijing: National Defense University Press, 2015), p. 34

²⁸ [Beijing Zhongguo Guofang Bao Online](#), April 18, 2017; [PLA Daily](#), May 3, 2017; [PLA Daily](#), September 13, 2016; *Military Terms*, (Beijing: Military Science Press, 2011), pp. 481-482

²⁹ [MOD](#), January 29, 2018

³⁰ *Introduction to Civil Military Integration*, (Beijing: National Defense University Press, 2015), pp. 32-39

- Integration of civil and military education is intended to provide the military with the highly qualified personnel needed to maintain and operate advanced information systems and equipment.
 - China is improving the training of national defense students and developing highly capable scientific research personnel to support the military.
 - The PLA is recruiting more college students and graduates with promises of greater benefits and advance placement in college programs upon demobilization The PLA is employing civilian and military colleges to train new recruits – Air Force pilot recruitment is an example of this program.
 - The modernized PLA requires officers, noncommissioned officers (NCO), and enlisted personnel with broad scientific and information technology knowledge and capabilities.
- Leveraging civilian scientific research for military use. This can include a two-way technology transfer to support both the civilian and military sectors. Currently, the PLA is displaying interest in quantum computing and communications, as well as artificial intelligence and other emerging technologies believed capable of the next revolution in military affairs.

Mobilization and Strategic Reserves

Logistics Mobilization

Logistics mobilization provides a rapid transition from a peacetime posture to wartime preparations. It can include partial or full mobilization. The wartime logistics mobilization system reaches from the President to the local level (see figure below). At each level from theater to county are subordinate offices responsible for different aspects of mobilization, for example the People's Armed Forces Office, Economic Mobilization Office, Civil Air Defense Office, and National Defense Education Office.³¹

³¹ *Modern War Logistics Mobilization*, (Beijing: PLA Press, 2015), p. 60; *Military Terms*, (Beijing: Military Science Press, 2011), p. 482



Logistics war preparation provides timely support in the event of war or emergency disaster relief. Wartime logistics mobilization includes the following:³²

- **Manpower Mobilization** – Call up of reserves to active duty and recruitment of civilians for active or reserve service. This includes the People’s Armed Police Force, which is now subordinate to the CMC.
- **Financial Mobilization** – Mobilization of the financial sector to support wartime requirements, including financial institutions support to pay for the conflict, use of loans, use and control of bank deposits, foreign exchange control, and limiting securities trading.
- **Materials Mobilization** – Modern war requires high consumption rates of materials to support the war effort. Relying only on stocks in depots might be difficult. Material mobilization includes almost any commodity, and includes requisitioning, emergency production, management and distribution activities. Main categories include military supplies for the troops such as food and clothing; fuel; medicine and medical equipment; construction materials; and logistics equipment.
- **Facility Mobilization** – Facility mobilization is the requisition of any facility required by the military, including the following: accommodation and office buildings including factories, schools, hotels, public housing, hospitals and civilian houses; material storage warehouses; civilian medical facilities and supply, including clinics, nursing homes, and medical manufacturing facilities; transportation facilities required for the movement of troops and materiel, including infrastructure, pipelines, and ferries. The widespread use of

³² *Military Terms*, (Beijing: Military Science Press, 2011), pp. 38-39, 481-482 and 558; *Modern War Logistics Mobilization*, (Beijing: PLA Press, 2015), pp. 18-19, 238, 253-262, 275-

civilian infrastructure and transportation can also make identification of military forces and targeting during a conflict difficult for an opponent.

- **Equipment Mobilization** – Mobilization of national and civilian equipment support, including equipment research and production, technical personnel and general supplies, maintenance resources, and acquisition of civilian equipment and resources to meet the increased wartime requirement for weapons and equipment. Equipment mobilization can also include food and food processing related equipment; fuel equipment; warehouse storage and handling equipment; health, sanitation and medical equipment; requisitioning of transport equipment, including ground, air and maritime transportation; specialized equipment for different climatic and terrain conditions; and engineering repair and construction equipment

Strategic Reserves

Unfortunately, few details are known on capacities and locations of PLA strategic reserves of supplies and equipment. The JLSF base and centers maintain depots of supplies and equipment for wartime support. China began storing strategic reserves of crude oil in 2007. China maintains secrecy of the size of its strategic petroleum reserve; foreign estimates placed it at approximately 400 million barrels in the middle of 2016. China's National Development and Reform Commission's (NDRC) State Bureau of Material Reserves is responsible for formulating national strategic material reserve strategy and plans, as well as day-to-day management of the strategic material reserve. The Bureau stockpiles critical raw materials, including rare earth metals. In the past China has employed traders to indirectly purchase materials for the reserves. The PLA also maintains strategic reserves of older weapons and equipment in conservation storage, primarily in underground facilities.³³

Logistics Support to Expeditionary Operations

The PLA is increasingly focused on long-range delivery of forces and the required logistics support. PLA academics analyze U.S. military global force projection capabilities for lessons learned. Increasing PLA capabilities to operate further from China's borders, combined with increasing global engagement and economic interests are driving the PLA to develop the capabilities needed to project larger force groupings further from its borders. The PLA has identified joint logistics, along with intelligence support, as an important requirement to support overseas operations.³⁴

Strategic Delivery

The PLA views a strategic delivery capability as a core element in China's strategic capabilities providing greater military flexibility. This is especially true as China enters a new historical stage with global interests. The expansion of China's national strategic interests includes the Belt and Road Initiative and other overseas economic projects, safeguarding Chinese nationals abroad, supporting peacekeeping missions, and anti-piracy escort missions.³⁵

³³ [OilPrice.com](#), March 29, 2017; NDRC [website](#); [Metal Bulletin](#), July 31, 2015; [Reuters](#), July 24, 2014

³⁴ [PLA Daily](#), December 12, 2016

³⁵ *Research on Problems of Strategic Delivery*, (Beijing: National Defense University Press, 2014), Forward

The PLA considers strategic delivery as a core element of military capabilities blending strategic mobility, logistics support, and national mobilization. Construction of a strategic delivery capability is required to respond to crises, safeguard the peace, deter war, protect national interests abroad, and win wars. Strategic delivery includes both military and civilian maritime, ground and air transport means. The PLA considers a strategic delivery capability as a strategic deterrent; an important factor in determining the outcome of a war; an important requirement enabling overseas joint logistics and joint operations; and an important means for gaining global influence.³⁶

The PLA has conducted trans-regional exercises since 2009 to improve the strategic delivery within China to respond to contingencies. These exercises are important for responding to internal or peripheral contingencies as China is a large country with complex terrain in many areas. While China is continuing to expand rail and road transportation lines, access to many areas in the west and the Qinghai-Tibet Plateau is limited. This increases the importance of military and civilian fixed and rotary-wing transport capabilities in these remote areas.

The PLA is fielding and developing larger transport aircraft and large amphibious warfare and comprehensive supply ships to support strategic delivery of forces. The Army Aviation force is expanding, new transport helicopters are being fielded, with a heavy lift helicopter planned. Current inventories and capabilities of fixed-wing transports, amphibious warfare and supply ships limit long-range strategic delivery, although capabilities will increase with the fielding of larger air and sea transport means. The Y-20 medium transport entered military service in 2016 and can reportedly carry the 58-ton Type 99A2 main battle tank. Press reports speculate that the Air Force will eventually receive 100 to 400 or more Y-20s. The PLA has developed and begun deploying the Y-9 medium transport. A Y-30 transport aircraft, reportedly capable of a larger payload than the Y-9, is in development. The PLA can also mobilize civilian aircraft.³⁷

Aircraft	Maximum Payload	Maximum Range	Estimated Inventory
Il-76 Transport	Medium 44 tons	4500 km/2795 miles	10
Y-20 Transport	Medium 66 tons	4400 km/ 2734 miles	6-13
Y-9 Transport	Medium 20 tons	5200 km/3231 miles	21

The Air Force and Naval Air Force have refueling tankers that can extend the range of fighter aircraft. The Air Force has 12 H6-U tankers and the Naval Air Force has four H6-DU tankers. The PLA also acquired three Il-78 refueling tankers from Ukraine. China has plans for new tankers in the future.³⁸

Refueling Tanker	Refueling Capacity	Combat Range	Estimated Inventory
H6-U / H6-DU	18.5 tons	5600 km/3480 miles	12 / 4
Il-78	65 tons	7600 km/4722 miles	3

³⁶ *Research on Problems of Strategic Delivery*, (Beijing: National Defense University Press, 2014), pp. 1-10

³⁷ [China Daily](#), January 28, 2013; [Xinhua](#), July 7, 2016; [WantChinaTimes](#), March 5, 2014; [MOD](#), November 13, 2014; [China Daily](#), December 20, 2017; [Global Times](#), September 14, 2017

³⁸ [Chinamil.com](#), September 8, 2015

The Navy has several comprehensive supply ships and large amphibious warfare ships to support strategic delivery. Supply and oiler ships are currently a weak link in Navy long-range operations. The Navy currently has approximately 11 tanker vessels (Type 908, Type 905 and Type 903), which is a low ratio to first-line ships.³⁹ The PLA Navy reportedly has more construction planned to improve support capabilities. The Type 901 comprehensive supply ship has a sophisticated logistics support system that allows real time monitoring via data link of consumption and remaining stocks of all ships under its assignment. The Type 071 amphibious dock ship (LPD) is the Navy's newest and most capable amphibious warfare ship. China has a number of older, less capable landing ships more suitable for local operations. The Type 075 landing helicopter dock under construction can provide command and control for amphibious landings.

Ship Class	Type/Tonnage	Maximum Speed	Capability	Estimated Inventory
Type 901	Supply/45,000	25 knots	Fuel, water, dry cargo; medical support; 2 x Z-8 helicopters	1; second ship launched in 2017 and being fitted out
Type 071	LPD/25,000	25 knots	500-800 troops & 15-20 amphibious IFVs; 4 x Z-8 transport helicopters; 4 x Yuyi LCAC	5; plans for total of 6
Type 075	LHD/40,000	23 knots	30 helicopters; can provide command and control	One under construction

The joint logistics force has identified civilian ships built to military specification for mobilization during exercises or wartime; the strategic delivery support fleet (战略投送支援船队). This force includes the capability to configure offshore platforms to provide maritime mobile ports for offloading materiel in cross-sea operations. The Navy reportedly has two mobile landing platforms to support amphibious operations.⁴⁰

Foreign Bases

The PLA has responsibility to protect its growing overseas national interests. Overseas operations in the past were primarily peacekeeping operations, anti-piracy escort missions, and evacuation of

³⁹ The US Navy has a ratio of 1 supply ship to 5 supported ships, whereas the PLA Navy has a ratio of approximately 1 to 15.

⁴⁰ [PLA Daily](#), April 16, 2017; [WantChinaTimes](#), May 26, 2015

citizens from trouble spots. These non-war missions have included long-range logistics support on a small scale. The development of China's first overseas base in Djibouti, described by Beijing as a logistics base, represented a first step in the country's global reach. China's Belt and Road Initiative is providing a requirement for a greater overseas military presence and maritime security. Senior Captain Fang Jian, vice president of the Dalian Naval Academy, speaking at a symposium "21st Century Maritime Silk Road and Navigation Support" in 2015, stated that in the future the PLAN may establish overseas military bases and strategic strong points for support and ship repair.⁴¹

Gwadar port⁴² in Pakistan and Hambantota in Sri Lanka have received press speculation as being the next Chinese foreign bases. Beijing has invested heavily in both ports' construction. A recent press report states that Jiwani, a port west of Gwadar, will be the next PLA joint naval and air base. China is investing in many foreign ports, some of which could eventually provide sites for additional PLA bases. Reports state that the state-owned China Merchants Group has invested in ports in nineteen countries and regions, including Asia, Africa, Latin America and the Middle East.⁴³

Command and Planning

The CMC Joint Staff Department (JSD) and the Joint Operations Command Center (JOCC) are responsible for operational planning and command and control. The JSD's Overseas Operations Division, subordinate to the Operations Bureau, is responsible for planning, preparation, and execution of overseas non-war military operations. This includes international peacekeeping, overseas naval escort missions, international relief, as well as protection and evacuation of Chinese citizens. The Operations Bureau would conduct planning and the JOCC would exercise command and control for combat missions abroad.⁴⁴

Implications for the United States

The implementation of a joint logistics system is fundamental for achieving an integrated joint operations capability, greatly enhancing the PLA's combat capability. The PLA appears to be more advanced in developing the joint logistics system than implementing joint operations. However, the PLA considers its joint logistics capability as weak.⁴⁵

The PLA's improvements in the joint logistics system, civil-military integration, and the wartime mobilization system will increase the PLA's capability to sustain combat. Expanding air and sea transport and sustainment capabilities, combined with the establishment of overseas bases will support overseas strategic delivery and sustainment of larger forces in the future.

⁴¹ [China Daily](#), February 5, 2016; [Ta Kung Pao](#), 12 July 2015; [Qianzhan](#), November 22, 2017

⁴² If the PLA creates a base in Pakistan, it would likely be at Jiwani west of Gwadar.

⁴³ [Eurasia Review](#), December 7, 2016; [South China Morning Post](#), January 5, 2018; [Washington Times](#), January 3, 2018

⁴⁴ Kevin McCauley, [PLA System of Systems Operations: Enabling Joint Operations](#), (Washington, DC: The Jamestown Foundation, 2017)

⁴⁵ [PLA Daily](#), December 12, 2016

Currently China is engaged in supporting non-war missions overseas: peacekeeping and anti-piracy missions abroad, and evacuating citizens from danger. This can provide positive areas of engagement with the PLA in the area of joint logistics.

The PLA considers a strategic delivery capability as a strategic deterrent; an important factor in determining the outcome of a war; and an important means for gaining global influence. China could well pose a future threat to US interests and those of its allies as the PLA's force projection capabilities continue to expand quantitatively and qualitatively, combined with Beijing's more aggressive strategy.

Civil-military collaboration in the logistics field is providing the PLA with modern business practices to enhance joint logistics capabilities. Additionally, the PLA is attentive to research in emerging technologies that can impact logistics and future warfare. The widespread use of civilian infrastructure, resources and transportation by the PLA during a conflict can make identification of military forces and targeting during a conflict difficult for an opponent.

Recommendations

Military-to-military contacts in the logistics area could provide greater insight on the Joint Logistic Support Force, its activities, and capabilities. This is a sensitive issue and would have to be accomplished on a completely reciprocal basis. Subjects such as logistics support for humanitarian assistance and disaster relief would provide initial areas of common interest, and still provide some conclusions on capabilities in other areas.

China has employed deceptive practices in the past in attempts to buy US companies and steal American intellectual property. Given the PLA logistical focus on civil-military integration the Committee on Foreign Investment in the United States (CFIUS) process should strongly examine logistics dual-use technologies to include the following areas of Chinese investment:

- Robotics and automation for production, warehousing and transportation;
- POL/oil pipelines technologies and software that improve distribution, management of large stocks, and efficiency during peacetime; and provide resiliency during wartime;
- Rapid prototyping/additive and subtractive automated manufacturing techniques to produce end-use materials in both small and high-volume production runs, including computer numerical control (CNC) automation of machine tools by means of computers executing pre-programmed sequences of machine control commands;
- Supervisory control and data acquisition (SCADA) control system architecture to provide high-level process supervisory management.

Closer monitoring of China's strategic reserves of critical raw materials, purchases of raw materials, and assessments of stocks should be conducted. Included should be analysis of key resources needed for wartime production.

There are several PLA joint logistics research areas requiring additional detailed analysis. Potential areas include the following:

- Overseas base, and strategic delivery (air, sea and ground) requirements to sustain a PLA expeditionary force; Navy at sea replenishment capabilities.
- Industrial mobilization capabilities for production of precision munitions to support a joint fire strike campaign on a sustained basis.
- Ability of Chinese industrial mobilization for surge production of materiel.
- Capability of Russia to provide key resources during a conflict.
- Logistics support to air and maritime blockade operations against Taiwan, including joint logistics requirements, and ability of the JLSF to sustain blockade forces for a lengthy blockade campaign.