PLA LOGISTICS REFORMS

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Historically, logistics has suffered from continued resource shortages since the inception of the People's Liberation Army (PLA). As a result, logistics and combat sustainability have been a weak link in the PLA's prosecution of operations primarily because the logistics system had short lines of supply and lacked rapid mobilisation and strategic transport capabilities. Based on its study of logistics requirements in modern conflicts, starting with the 1973 Arab-Israeli War, and its own performance in the Korean War (1951) and the 1979 "Defensive Counterattack" into Vietnam, the PLA had included logistics reform as a basic component of its comprehensive modernisation programme which began three decades ago. The need for greater integration of advanced weaponry and high technology equipment into PLA forces was highlighted after the 1991 Gulf War and an examination of subsequent foreign military campaigns in the 1990s. Reorganisations and policy directives in 1998 added greater bureaucratic weight to logistics functions within the PLA, encouraging further reform.

The General Logistics Department (GLD) is the logistics headquarters of the PLA and directs the logistics supplies including production, supply, transportation, housing, pay, and medical services on behalf of the Central Military Commission (CMC). It is one of the general departments along with the General Staff Headquarters, the General Political Department, and the General Armaments Department. The department manages and commands

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the logistics system within the PLA, and also directly provides certain logistics support functions. The GLD was first established in 1949 as the People's Revolution Military Commission General Logistics Department, and was renamed the PLA General Logistics Department in 1954.[1] The GLD ranks the third among the four general headquarters in the PLA's protocol order. Important departments include the Headquarters Department, Political Department, Finance Department, Material and Fuel Department, Infrastructure Construction and Barracks Department, Military Transportations Department, Health Department and Audit Agency.

Before the establishment of the GLD, much of the logistics support for the PLA came from the civilian populace, and it was organised most often by Commissars. Although the GLD controls a few depot-level maintenance facilities, primarily for heavy vehicles, maintenance is primarily the province of the owning formation, or PLA unit. Extensive repair operations, particularly for aircraft and naval vessels, apparently involve the manufacturers in the case of shipbuilding; the manufacturers control the primary shipbuilding and repair facilities. PLA logistical resources in the 1980s and 1990s were far fewer than those of Western or Soviet forces, making the PLA heavily dependent upon the militia and civilians. In 1985, the General Logistics Department was reorganised, its staff cut by 50 percent, and some of its facilities turned over to the civilian sector.

GUIDELINES FOR PLA LOGISTICS TRANSFORMATION

China's military recognises the importance of logistics on the battlefield, and it is taking steps to maximise its logistics capabilities and undergoing a complete logistics transformation. The PLA has been slowly improving its logistics concepts since the mid-1990s. In 1991, Jiang Zemin, included logistics support as one of the five major requirements to build up the PLA. He pointed out that there would be no high combat effectiveness without

1. Dennis J. Blasko, "Chinese Military Logistics: The GLD System", *China Brief,* vol 4, issue 19, April 11, 2004, p. 3.

a strong logistics supply. In 1999, he signed the "PLA Joint Logistics Regulations", considered a landmark in transformation of the PLA logistics system.[2]

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In 2002, Hu Jintao, issued an order to transform the PLA logistics, hastening logistics modernisation. His order to transform the PLA logistics was inspired by several military events. The first was the PLA's lack of success during the Sino-Vietnamese War in 1979. During this conflict, the PLA never established dominance over the ill-equipped and smaller Vietnamese military. Hu blamed the PLA's Korean War-era logistics support plan for the failure of this operation. In the 1990s, Hu and other top officials cited Operation Desert Storm as a logistics model to emulate.[3] They were impressed by how the US defeated the Iraqi military in a matter of days with higher levels of technology and weaponry.

GLD Director Gen Wang Ke announced the logistics reform programme at a "Forum on the Features and Rules of Logistics" in November 1998, and it was officially enacted at the expanded meeting of the CMC in December 1998 covering the undermentioned aspects:

- Integration of logistics for the three Services.
- Standardisation of supply work to include centralised procurement.
- Conversion of officer perquisites into cash allowances for housing, insurance, etc.
- Outsourcing of support functions.
- Inculcating more professionalism and scientific inputs in logistics management.
- Improving mobile logistics support for units away from their bases.

By 2000, the PLA formed Joint Logistics Departments (JLDs) in all

2. Lonnie Henley, "PLA Logistics and Doctrine Reform, 1999-2009," in Susan M. Puska, ed., *People's Liberation Army After Next* (Carlisle, PA: Strategic Studies Institute, US Army War College, 2000), p. 77.
3. David A. Payne, "Army Logistician: Chinese Logistics Modernisation", vol 140, issue 4, July-August 2008, p. 1.

seven Military Region (MR) Headquarters. In addition, joint logistics staff officers, who understand the needs of all the Services, are being trained and assigned to headquarters staffs. Accordingly, the PLA Air Force and Navy transferred responsibility for many depots, supply bases, hospitals, maintenance and repair units to the control of the MR in which they are located. The JLDs, and their subordinate logistics sub-departments, provide support functions common to all the Services, while supplies and support unique to a single Service are provided through that Service's own separate department. Also, PLA reserve units, too, have undergone reforms wherein, a reserve logistics support brigade has been established by each MR. Hence, it is evident that despite a relatively late initiation, the CMC has been able to achieve integration of the PLA's defence logistics system.

The PLA's logistics doctrine in the year 2000 still depended heavily on the "people's war" concept and not on military assets. A portion of this doctrine stipulated that an individual must carry his own support and sustainment packages while fighting the enemy on the front lines. Based on a series of steps taken by the GLD, the PLA gradually began to shift from supporting itself to purchasing subsistence from civilian markets. The GLD began implementing privatisation measures to reduce the size of the standing army. Functions like managing barracks and building maintenance shifted from PLA units to civilian companies. The GLD and PLA are linking civilian and military logistics to provide what Jiang Zemin had called "precision logistics."[4] This term is still used today in an effort to encourage PLA leaders to continue the transformation of Chinese logistics.

DRIVERS FOR LOGISTICS TRANSFORMATION

Few logistics improvements were implemented by the PLA from the end of World War II to the Sino-Vietnamese War. Historically, the PLA relied heavily on small loads that gave it an advantage in terms of mobility, as was evident during the Chinese Revolution and the Korean War. A review of PLA operations since the Vietnam War (1979) reveals that logistics and

4. *People's Daily* online, "Precision Logistics; Focus of PLA Logistics Changes", accessed on March 5, 2013.

combat sustainability have been a weak link in the PLA's prosecution of operations. The main driver for change in Chinese logistics was the need to keep pace with US military transformation.

To make up for the lack of progress, Hu Jintao and Jiang Zemin both focussed on information technology improvements. They made it clear to the PLA and its subordinate units that the Chinese military needed to focus on achieving parity with the US military. They knew that if this transformation was implemented correctly, it would permit a precise logistics flow to PLA units. Some of the issues which have impacted the reorganisation and modernisation of the PLA logistics system are as follows:

- Integrated logistics support to sustain future wars.
- Additional requirements to support mobile warfare, amphibious and airborne operations.
- Logistics system to support projection of power missions and protect land and sea lanes of communications for unhindered flow of energy and commerce.
- Technical knowhow to enhance strategic/tactical mobility and lethality of firepower.
- Need for a lighter and modularised logistics system which would be compatible with the operations conducted by the Rapid Reaction Forces (RRFs).

BUILDING MODERN LOGISTICS

PLA logistics has suffered from the axiom "do more with less" since the 1930s. After 1949, the GLD took charge of the logistics modernisation process. The PLA received new combat uniforms and protective equipment, and manoeuvre units were given field feeding assets. Contracted civilian companies have been employed and improvements to the PLA's procurement process have also been successful. During the summer of 2004, the PLA and civilians in northeast China held a successful training event that focussed on implementing the transformation of field feeding and the procurement of supplies through civilian sources. The overall success of that event has led to the employment of a supply chain management system and an increased

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reliance on civilian support.

Four Great Transformations: Six years after inaugurating the integrated logistics system in year 2000, and two years after the PLA's limited response to the Indian Ocean tsunami, the GLD issued what it referred to as "the Four Great Transformations" which were described as ushering in a new era of logistics transformation and strategic conceptualisation.[5] According to this concept, PLA logistics must possess the ability to ensure operational capabilities in multi-dimensional space, including on land, at sea, in the air, in space and electronically, and other military operational capabilities, including reacting to crises, maintaining peace, containing wars and winning wars.

Specifically, the four great transformations are described as:

- From autonomous to the three armed Services joint logistics.
- From self-guarantee to socialised (i.e., integrated with the civil) guarantee.
- Informatisation constructs new logistics platforms.
- Scientification transforms traditional logistics management. As military Operations Other Than War (MOOTW) capabilities have become increasingly important to the PLA, so too have logistical capabilities designed to support and enable MOOTW.

In November 2010, CMC member and GLD Director Liao Xilong asked the PLA to basically accomplish the task of building modern logistics in an all-round way. He called on the PLA to improve strategic projection capabilities by improving coordination of national traffic and transportation systems, establishing a military logistics information system based on the national logistics system, and improving civil support resources. In addition, Hu Jintao issued "Important Expositions on Development of PLA Logistics," as fundamental guidance for the development of PLA logistics.

5. "Modernising PLA Logistics", *China Brief*, vol. 5, issue 25, December 6, 2005, p. 9.

Hu brought out that China's national interests are gradually going beyond the traditional sphere of territorial land, sea, and air space, and keep expanding and extending to the ocean, space, and electromagnetic domains. The PLA, therefore, should develop modern logistics with strong comprehensive support capabilities that not only provide support for winning local wars under informatised conditions, but also can provide support for the units in safeguarding the security of maritime, space, and strategic routes, and in safeguarding national interests in other areas. At the beginning of 2011, the GLD issued the "Framework for the Overall Advancement of Comprehensively Building Modern Logistics Experimental Goals and Tasks," which was intended as a baseline for future improvement in the PLA's logistical system.[6]

Improving Procurement: The PLA in 2009 attempted to accelerate the pace of reform in military procurement, and set up a three-tier logistics procurement management system organised by major units, logistics departments, and troop units. The PLA also attempted to establish a standardised set of rules and regulations for procurement in order to improve efficiency. Procurement has been computerised in order to evaluate bids, improve transparency and efficiency, and prevent black-box operations, a likely reference to corruption. In response to the recent storm in the PLA over the sacking of Lt Gen Gu Junshan on charges of corruption, the four general departments have collectively issued a set of 17 policy instructions on February 26, 2013, approved by CMC Chairman Xi Jinping, stipulating strict guidelines to be followed, specifically in cases of procurement, infrastructure, conferences and delegation visits to check corruption.

From mid-2008 to mid-2009, the GLD organised a reform experiment in regional joint procurement for military goods and material in 13 cities, reportedly procuring goods valued at Yuan 1.4 billion and saving 18 percent. Separately, but in the same spirit, in 2010, the PLA experimented with allowing international bidding to provide medical and health equipment for 100-plus military hospitals, an endeavour the PLA claimed attracted 13 bids from Chinese and foreign business, saving roughly Yuan 10 million.

6. Available at www.cdsndu.org/en/zgjs/jfjgk/jfjgk3.html, accessed on March 5, 2013.

The PLA is increasing scientific research on logistics equipment and making greater investments in R&D.

Logistics Training: The PLA has a multi-dimensional system for logistics training with over 20 institutes. The Logistics Command Academy is conducting training at theatre and operational levels since 2000. The PLA is sending large numbers of logistics staff officers for training in various reputed institutes abroad to achieve indigenisation, technological innovations and modernisation of production facilities. Logistics training exercises are also being conducted at all levels for all-weather high-altitude support.

Logistics Research and Develoment (R&D): The PLA is increasing scientific research on logistics equipment and making greater investments in R&D. In April 2004, more than 340 manufacturers from 26 countries took part in the fourth Beijing International Exhibition on military logistical equipment and technology. Military delegations from 16 countries were invited to attend the exhibition as well as the international symposium on the development strategy of military logistical equipment and technology. These exhibitions and military exchange programmes contribute much in military diplomacy. China has realised that development of indigenous production capabilities of high technology equipment and technological innovations is an inescapable necessity to sustain the war effort in the future.

In addition, the PLA organises and provides logistical support for key national and international events with meticulous precision. Some of the examples include the National Day Parade, naval escort operations in the Gulf of Aden and the waters off Somalia, joint exercises with foreign military forces, security work for the Shanghai World Expo and 2008 Beijing Olympics. China provides strong and reliable logistical support for rescue and relief operations following disasters, such as the Yushu earthquake and the Zhouqu mudrock slide. These activities enhance the capabilities and confidence of the PLA logistics system.

Battlefield Logistics: In the new combined arms mechanised corps, the logistics brigade is held at the corps level and logistics support is supplied directly to the brigades and battle groups using a pull system. Besides military

operations, the new logistics brigade tasks involve providing logistics support for military operations other than war. To repair vehicles in the field, the PLA has developed two vehicles to provide repair facilities for armoured vehicles in the forward battle area. To cut costs while improving the provisioning of supplies in the field and in base areas, the PLA now uses computerised outsourcing and procurement to buy equipment. PLA battlefield medical services have also been modernised. The PLA is investing in its battlefield health services with the addition of armoured tracked ambulances. In the field, new mobile kitchen vehicles have been introduced. To enable sustained operations in the field without the need for resupply, the PLA in 2005 introduced pre-packaged field rations. Specific cold-weather ration packs are now available and come in self-heating, tinned, soft packaging.

PLAAF LOGISTICS AND MAINTENANCE

The PLAAF's Logistics Department's basic mission is to provide supplies for construction, operations, training, and daily life. The Logistics Department has 18 subordinate departments, bureaus, divisions, and offices that are responsible for individual aspects of the overall logistics system. The PLAAF's Equipment and Technical Department is responsible for determining how much and what types of equipment should be procured; for general management of equipment; for aircraft and engine maintenance, repair and procurement; for aviation maintenance/repair research; and for aircraft ground-support equipment. The PLA's GLD conducted extensive analysis of logistics operations during the 1991 Gulf War and has tried to implement those portions that meet Chinese capabilities and requirements.

As the PLA Air Force moves toward becoming a leaner force with rapid deployment capabilities, it is in the process of trying to diversify its logistics patterns in several areas, including emergency resupply, prepositioning of supplies at key airfields and cooperation among frontline and rear area airfields.[7] The overall concept of supply guarantees includes the following tenets.

7. Kenneth W. Allen, PLA "Air Force Logistics and Maintenance: What has Changed". Available at www.rand.org/pubs/conf_proceedings/CF145/CF145.chap6.pdf.

- **Emergency Guarantees:** In order to fulfil combat tasks, the PLAAF has established an emergency mobile supply system. As a result, airfields can receive emergency logistics support if their own logistics guarantee systems are knocked out. Moreover, emergency guarantees can be extended to such areas as setting up temporary airfields, repairing damaged key airfields as well as damaged aircraft take-off and landing facilities within a short time, and guaranteeing field oil supply and emergency air transport.
- **Partial Guarantees in Advance**: To fight a high-tech air battle, the air force has to supply key combat goods and materials to the frontline and backbone airfields in advance. Since transport lines are often vulnerable to enemy attack, all essential equipment needs prepositioning in advance, in order to gain the logistics initiative and save time.
- **Guarantee to Key Airfields:** All types of aircraft are involved in a modern air battle, and various types of aircraft are to be assigned to, or temporarily landed at, key airfields. The logistics department should the supply necessary personnel, technology, goods and materials, instruments, and equipment to key airfields that undertake to maintain various types of combat aircraft to ensure maintenance and combat effectiveness.
- **Independent Guarantees to Different Areas.** The air force should divide a combat zone into independent guarantee areas in the light of its jurisdictional and topographical characteristics and supply routes; clearly define responsibilities, tasks, and requirements for independent guarantee areas; properly strengthen the logistics force of independent guarantee areas; and organise guarantee operations on the basis of independent guarantee areas under normal circumstances.
- **Guarantees Among Departments.** To ensure effective guarantees to the frontline and second-line airfields, airfields located in the hinterland should cooperate with the front-line and second-line airfields. The front-line and second-line airfields and airfields located in the hinterland should help each other by establishing either permanent or temporary relations of mutual guarantee and support.
- **Overall Cooperation Guarantees.** To provide logistics guarantees to a high-tech air battle, the logistics departments of all arms and services

should closely cooperate with one another and with the localities concerned in providing combined logistics guarantees.

The Lanzhou Military Region Air Force (MRAF) logistics department and subordinate unit personnel tested some of these new concepts during two 1995 joint high-tech ground and air attack exercises. The exercises involved three categories and six types of combat aircraft, including attack planes, large transport planes, armed helicopters, and transport helicopters. During the exercises, Lanzhou MRAF aviation units made efforts to turn the airfield and support stations from those that provided logistics support for only one category of combat planes in the past into those that provide support for all categories and all types of combat planes.

In April 2011, the Lanzhou MR hosted a live military exercise, code-named 'Joint Logistics Mission' 2011.The purpose of the exercise was to comprehensively examine the emergency support capabilities of the logistics units in the context of informatisation, specifically focussing on command and planning, manoeuvre and deployment, and support. The exercise involved the establishment of a joint logistics sub-department under the MR, which centralised command and control for logistical elements. According to a published review of the exercise, the Lanzhou MR had benefitted from previous exercises by building an integrated command information system for logistics, a safety protection system, and a comprehensive logistics database, and achieved interconnectivity among different information resources.

Similarly, the Chengdu MRAF has increased investment to speed up the modernisation of the logistics support system of air force stations in Tibet. This includes Petroleum, Oil and Lubricants (POL) and ammunition reserve bases, their supportive warehouses and logistics support systems. Further, modern logistics command systems have been connected with the operational logistics command offices by system networks; and logistics support for airports has been improved. They have also succeeded in developing air transport, forming a three-dimensional air, land, and rail, multi-directional transport system equipped with various types of aircraft

The Theatre Joint Logistics Department (TJLD) of the Military Area Command (MAC) is responsible for joint logistical support for all 'in-theatre' units of the three Services.

that have increased the transport capacity more than seven-fold.

LOGISTICS REFORMS: FOCUS AREAS

Some of the main focus areas of PLA logistics system reforms are as follows;

Unified Joint Logistics: The PLA created its first-ever "Unified Theatre Logistics Command System" in Nanjing MR in 1995. The Theatre Joint Logistics Department (TJLD) of the Military Area Command (MAC) is responsible for joint logistical support for all 'in-theatre' units of the three Services. Jinan MR has set up a joint oil distribution network to overcome supply shortfalls. Nanjing MR has established a joint military-civilian vehicle spare parts and maintenance operations system. Efforts are on to create a corps of joint logisticians, who would be trained to think about joint logistics support, rather than Service specific operations.

Mobilisation: China has established a system of National Defence Mobilisation Committees (NDMCs) extending from Beijing to the county level. The NDMC system is the focal point for the integration of militia and civilian logistics assets to support active duty and reserve PLA operations and joins together the government, Communist Party and military leaders at all levels to oversee the functions of mobilisation. Along with local PLA Headquarters, the NDMCs organise civilian personnel, trucks, ships, and other material required to support PLA operations.

Strategic and Tactical Mobility: A modest fleet of transport aircraft and naval transport vessels has been acquired to boost strategic mobility. The PLA is purchasing heavy lift assets from Russia to move its Heavy Brigade Combat Teams (HBCTs) and supplies from the Mainland to outlying provinces/remote parts of the world. The Chinese defence industry is also building cargo planes and ships that will replace foreign-purchased ships and aircraft by 2015. The PLA would have the lift capability for supporting three corps level operations simultaneously.

Amphibious Operations: The PLA Navy's amphibious lift capacity is estimated to be about one infantry division i.e. 10,000-12,000 personnel and equipment. The airlift capability is limited to about 11,000 parachutists in a single lift, depending on the quantity of equipment required to be lifted at the same time. The PLA plans to incorporate civilian ships, aircraft and crews for its war-time transportation requirements.

Emergency Support Units: Quick reaction logistical support units are vital to support frontline Rapid Reaction Forces (RRF). Senior PLA leaders have outlined the requirement of emergency logistics teams for deployment in the field. A network of small-scale emergency support units and depots has been established in all MRs over the past few years. The PLA Navy (PLAN) and PLAAF have established emergency support units to support prolonged operations from detached forward bases. Reserve logistical support units have been set-up in recent years.

Joint Battle Zone Logistics Support: The PLA is anticipating that vast quantities of material in future wars would necessitate restructuring of its battlefield logistics system. The new structure would integrate fragmented logistics units of the PLA Army, Navy and Air Force to provide regional joint support, under the joint battle zone logistics support concept, wherein the MR logistics departments and branches will be responsible for the unified supply of materials and general services to units within the battle zones.[8] The reforms are focussed to provide unified leadership, planning, management of logistics resources and services to support joint operations.

Forward Stockpiling: The PLA's strategic war materials reserve system is concentrated inland and is being reorganised and relocated to coastal / forward regions.

Outsourcing: A major element of logistics reform is outsourcing or contracting with local civilian entities to provide services previously performed by members or units of the PLA. The GLD and PLA are linking civilian and military logistics to provide, what Jiang Zemin called precision logistics. The PLA is testing such outsourcing activities in various operational exercises.

8. Maj Gen S.B. Asthana, "Transformation of PLA Logistics System: An Analysis", *Journal of the United Service Institution of India*, vol. CXLI, no. 586, October-December 2011.

Centralisation and Automation: The market mechanism system is being introduced to improve efficiency and save on costs. The military supplies are being centralised, automated and reorganised to improve the warehousing, distribution and procurement system during peace and in war-time periods. The effort is to make logistics management more professional and scientific; and to improve mobile logistics support for units away from their bases.

Integrated Procurement: The PLA has been carrying out mock emergency procurement drills to test its new computerised procurement system with local suppliers in northeast China. The success of the exercise demonstrated that the system was viable and indicated the way for future integrated army-civilian emergency procurement systems. The PLA is also developing comprehensive capabilities of automatic identification that deal with logistics information e.g. bar code readers and Radio Frequency Identification (RFID) equipment.

Integrated Command Platform: The Integrated Command Platform of field logistics connects the three Services in one network. In early May 2012, a special support coordination exercise was organised by the JLD under the Nanjing MAC. In the exercise, commanders of the three Services were reporting and submitting demands, generating support plans, regulating and controlling material flows, and simultaneously commanding support actions in different areas through the command platform, showing the integration capacity of information systems.[9]

CONCEPT OF JOINT LOGISTICS

At both the national and local levels, the separate Services of the PLA have maintained separate logistical infrastructures since they were created in the 1950s. As an important step to reform the PLA's logistics system, the GLD introduced the joint logistics concept, which aims to overhaul the existing logistics system of the PLA by bringing together logistics resources in different Service branches to improve the overall efficiency. In 2000, the logistics departments of the seven MRs were reorganised into Joint Logistics

9. Available at http://www.china-defense-mashup.com/pla-joint-logistics-sub-department-builds-integrated-command-platform.html, accessed on March 5, 2013.

Department (JLDs) to manage the logistics resources across all service branches within the MR. Under the joint logistics scheme, Military Region Air Forces (MRAFs) and naval fleets transferred their general logistics support elements common to all services such as hospital, fuel, and motor and vehicle maintenance to the MR JLD, while only keeping specialised logistics support elements unique to their own Service branch.

The PLA has extended the Revolution in Military Affairs (RMA) to logistics as well and established a three-tier logistics system based on joint logistics at the GLD.

The PLA has extended the Revolution in Military Affairs (RMA) to logistics as well and established a three-tier logistics system based on joint logistics at the GLD, war zone and region level logistics departments. The key change is a shift from 'Service specific' to 'integrated' logistics. Integrated logistics implies the integration of military Services' logistics, civil-military compatibility, and the combination of war-time and peace-time functions to support mobilisation. The plan is to develop combat logistics capability to enable sustained operations well beyond China's borders.

In 2003, a further reform was initiated to bring in the 'great joint logistics', wherein the army-dominant military region JLD will be further reorganised into the Theatre Joint Logistic Department (TJLD), a joint logistics headquarters staffed by personnel from all three Service branches. Joint logistics staff officers, who understand the needs of all the Services, will be assigned to the TJLD. The difference between 'general' and 'specialised' logistics will no longer exist. The PLAAF and PLAN will transfer the remaining specialised logistic support elements to the control of the TJLD, thus, further simplifying the logistics support to the PLA in joint Service operations.

Integrated Support System: Based on the joint logistics systems of MACs the PLA explored the integration of support systems in 2003 and officially launched the overall joint logistics system in the Jinan Theatre in 2007. The PLA steadily promoted an integrated support system by integrating

support forces, support units and support elements as well as developing strategic, battle and tactical logistical support capabilities in a coordinated way, all of which facilitate the combination of support strength of the three PLA Services as a firm whole.

Information-based Support Means: Over the past decade, the construction of the logistics database centre of the PLA has moved forward in an all-round way with three information systems for the rear warehouse, combat reserve management and logistics equipment management established, and their sub-systems under construction. A large support system, which is based on a unified platform, covers logistics organs, support entities and support-receiving troop units, stretches over competent military and civilian logistics departments, and integrates all elements in material support, has gradually taken shape.

Privatisation: The PLA and GLD are making progress toward privatising procurement, transportation, and building construction and maintenance. Over the past decade, the outsourcing of the PLA logistics support has extended from non-combat troop units to combat ones stationed in large and medium cities, from organs at the group army level and above to small, remote and scattered military units.

PLA'S CURRENT LOGISTICS CAPABILITIES

China has significantly improved its domestic and external logistical capabilities. Logistical systems have been modernised, logistical processes have been rationalised, and decision-making has been streamlined. PLA logisticians have demonstrated an improved ability to improvise, and the Chinese logistics benefits tremendously from the utilisation of civilian resources. In addition, strategic and tactical mobility for operations beyond China's borders is consistently increasing with induction and integration of civil transportation resources. The PLA is purchasing heavy lift assets from Russia for moving formations and heavy assets to outlying provinces, including Fuzhou which can be used as a platform to invade Taiwan. By 2012, the Chinese defence industry will replace foreign purchased ships and aircraft.

Although, China does not have a blue water navy as yet and has limited amphibious capability, a large number of ocean going transport ships and airliners can be interfaced to enhance rapid sealift/airlift capability. High priority has been accorded for sustained logistics support for RRFs operations on China's periphery and beyond. Land-based transportation capability is increasing at a fast pace due to rapid development of road, rail and air transportation infrastructure. Socialised support network, civil infrastructure and resources have been integrated to make the military logistics system efficient, responsive and cost-effective.

High priority has been accorded for sustained logistics support for RRFs operations on China's periphery and beyond.

With China's main strategic focus towards the South and East China Seas, the PLA aims to achieve logistics capability to intervene militarily to protect its energy supplies and to have an effective deterrence capability to safeguard national interests. It would take some time for China to be able to support a decisive large-scale war well beyond its borders. However, the PLA has been quite successful in developing a modest modern conventional force projection capability in its periphery. China's ability to deploy a small force over great distances quickly and sustain that force for a long period of time, was demonstrated by its operations in the Gulf of Aden and the Libya evacuation. The following factors have strengthened the logistics system:

- Unified command and control of logistics resources.
- Focussed leadership, determined to push through the reforms.
- A sizeable budget for modernisation.
- A policy of combing around the world to acquire military knowhow and equipment.
- A well developed industry for production of military hardware, oriented towards export.
- The will and ability to mobilise civil resources during an emergency.
- Focus, determination and ability to fast track infrastructure development.
- Improvement in availability of resources in border areas in recent times.

By creating the GLD and well defined, fast paced reforms under a focussed leadership, the PLA has come a long way to improve the effectiveness of its logistics system. While the reforms may be sufficient to support local campaigns, within or just beyond China's borders, they have not been focussed on extending expeditionary capabilities across oceans. Inefficiencies and a lack of power projection capabilities hamper external logistics. PLA units still lack high-mobility transportation assets for power projection missions. Although the PLA's logistics system has improved, it still has a long way to go and new systems and procedures are yet to be war-tested. Insufficiently resilient infrastructure and a lack of prepositioned resources have in the past hampered logistics from supporting responses to domestic security challenges. The synergy between the joint systems is also suspect due to some resistance from the ground forces towards integration.

LOGISTICS SUPPORT FOR TIBET AUTONOMOUS REGION (TAR)

The People's Republic of China (PRC) has been carrying out extensive infrastructure development in the TAR and Xinjiang to enable it to support the logistics supply, transportation, stocking and distribution systems, POL pipeline, telecommunications and industrial base, besides giving a boost to the economy of the TAR. Such extensive development of logistics infrastructure in the TAR indicates the impetus being made available to the PLA's logistics capability which, in turn, will enhance its operational capability in the TAR.[10] The 1,142-km Qinghai-Tibet Railway (QTR) line from Golmud in Qinghai province to Lhasa in Tibet became fully operational on July 1, 2006. In addition, China has also unveiled plans to extend the Chinese National Rail Network to the border with India. China has developed a network of internal highways and subsidiary/feeder roads in the TAR to connect strategically significant border areas with India, Nepal, Bhutan and Pakistan by means of motorable roads. It has developed 58,000 km of road network in Tibet, including five major highways and a number of subsidiary roads.

10. N. C. Vij, "Strategic Posture of China in Tibet Autonomous Region and Its Implication: Is India Prepared", Occasional Paper (New Delhi: Vivekananda India Foundation, Imprint Services, October 2012), p. 6.

Recent extension of the QTR to Xigaze at a cost of $1.98 billion by 2014, and extension of the 435-km-long Lhasa-Nyingchi railway to the southeast will boost logistics supply to the areas opposite Arunachal Pradesh of India. This will be part of the $20.8 billion, 1,900-km-long Sichuan-Lhasa railway which will be completed by 2018. There are reports of construction of dual runways in the TAR which will enable simultaneous use by fighter and transport aircraft enabling transportation of supplies, armaments and equipment by air.

The logistics support for air operations in the inhospitable plateau area is a key subject for the PLA Air Force to expand and deepen military struggle preparations.

In addition, construction of new airfields and the upgradation of Advance Landing Grounds (ALGs) and helipads in and around the TAR coupled with acquisition of new transport aircraft is likely to enhance China's strategic airlift capability. The construction/upgradation of airfields/ALGs closer to the borders enhances the PLAAF aircraft's striking range and provides the PLAAF the ability to strike/engage targets in India on a broad front and in depth.

The logistics support for air operations in the inhospitable plateau area is a key subject for the PLA Air Force to expand and deepen military struggle preparations. In the past three years, the logistics department under the Chengdu MAC has paid great attention to building a logistics system for plateau flight operations, and made important breakthroughs in weather forecast, material collecting, POL supply and medical support.

In POL support, the problem of rapid decline in the quality of POL on the plateau has been solved, by using the Qinghai-Tibet Railway, the time for the transportation of explosive devices has been reduced by 90 percent compared with the past, and in medical support, the hypoxia special training method has enabled the attendance rate of aircrew on the plateau to rise significantly. The logistics department of the Chengdu MAC has also developed a logistics support information system for aviation stations, which integrates such functions as support information collection, transmission, processing, and distribution, and makes logistics organisation and command more rapid and efficient.

The PLA, as well as most defence forces in the world, have shifted emphasis from Service specific to joint logistics systems and have economised their logistics investments and efforts.

PLA'S LOGISTICS CAPABILITY AND INDIA

China faces no major constraints in inducting forces required for conventional operations. It can use the three highways, railways and air transportation for moving forces up to major townships near the Indian borders. No additional acclimatisation period is required because the induction of Chinese forces in TAR has been spread over a long time. Lack of deployment space and capacities for maintenance of tracks along likely places of deployment restricts the overall force levels needed for launching operations speedily. Application of forces along the Indo-Chinese borders will continue to be restrained by terrain, extreme climate and limited campaigning period. Application of RRFs along the Indian borders would require ground-based logistics support suited for mountain warfare. Air operations will continue to be affected by problems related to high altitude factors, although the PLA is trying to mitigate this by air-to-air refuelling capabilities and other measures.

The PLA, as well as most defence forces in the world, have shifted emphasis from Service specific to joint logistics systems and have economised their logistics investments and efforts. In the Indian armed forces, the bulk of the logistics continues to be Service specific. We need a "Defence Logistics Agency" for higher direction, control and coordination of logistics effort within the three Services Headquarters to provide an interface with other logistics agencies in the country. It should project the logistics perspective plan and forge close cooperation between defence R&D and defence production, and the public and private sectors. In effect, there can be no worthwhile RMA without a worthwhile Revolution in Military Logistics (RML). The RML intends to transform the logistics system to ensure that the right material reaches the right place at the right time, for the best value.

While, the Indian armed forces are also undergoing logistics reforms, some of the areas which need emphasis are as follows:

- **Mobilisation:** There is a need to establish National Defence Mobilisation Committees at the grassroots level for involving the civil sector, population and reservists for speedy mobilisation. Due to advances in Information Technology (IT) in India, cyber mobilisation platforms can also be adopted.
- **Theatre Logistics Command System:** We need to have have a 'theatre-based' logistics system for establishing a 'grid pattern' logistics infrastructure, which could support all elements of the defence forces, including the paramilitary forces.
- **Indigenisation and Defence Production:** To ensure that national interests are not compromised, we need to be self-reliant in defence production. Defence production should be export oriented to enhance our surge capabilities to cater for fast-paced, short duration wars.
- **Defence-Industry Partnership:** The Confederation of Indian Industries (CII) could be a forum for closer interaction and synergy between the industry and defence logistics. It would ensure close cooperation between development and production in the defence, public and private sectors. We need to adopt the 'partnership' approach with the industry.
- **Absorption of Technology:** We should increase the pace of absorption of state-of-the-art technology, IT and scientific management techniques for better cost-effectiveness. There is a need to improve the R&D capabilities for defence technology, especially by involving the private sector also.
- **Logistics Training:** We need more formalised institutes for logistics training to nurture logisticians as specialists.

Infrastructure Development in Border Areas: India should formulate a broad framework for infrastructure development, especially in border areas and pursue it vigorously in conjunction with the civil agencies. The pace of infrastructure development in border areas has been very slow due to various reasons. We need to ensure that the current asymmetry between India and China, in terms of infrastructure development in the border areas, is reduced.

CONCLUSION

The PLA seems to know where it wants to go with its logistics system. Generally, strategic and doctrinal revisions in recent years all point to a

rather straightforward path ahead for PLA logistics. There is a clear interest in improving civil-military and inter-Service logistical integration, including logistical command and control as well as shared resources. The PLA is also committed to expanding the use of information system-of-systems in order to improve logistical efficiency and speed. There is also a great deal of emphasis on improving multi-dimensional capabilities in the land, sea, air, space, and electronic domains. Most important is the general realisation that a military being assigned an increasingly diverse set of tasks and missions requires a logistical system that is flexible, distributed, and nimble, both domestically and internationally. Ultimately, logistics is at the heart of any military's power. The PLA has finally acknowledged that logistics is the key force multiplier and should never again be the "poor cousin."

The GLD has embarked on a major modernisation campaign to bring logistics in the PLA up to the expected level of a modern military force. Considering logistics as an important tool, the PLA has fast tracked its logistics reforms. The measures undertaken by it will enable China to sustain independent operations beyond its borders and enhance its power projection capabilities. Infrastructure development along the India-China borders, coupled with other strategic and operational parameters, will improve the PLA soldier's quality of life, morale and capability to wage war. Realistic analyses of China's logistic capabilities along our borders should compel the Indian armed forces to pursue their logistics and infrastructure development plans vigorously to ensure that we do not lag behind them. The Indian Railways' plan to bring Arunachal Pradesh on the rail map is a welcome step in this direction.

In the near future, the PLA will be able to conduct sustained independent operations outside China's borders, something it has never been able to do before now, finally acknowledging that logistics is the force multiplier. However, despite these accomplishments, the PLA's logistical capabilities continue to be limited in size and sophistication. Foremost among them is the PLA's total reliance on a stable and accessible external environment.