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Chinese Military Modernization and Force Development

Main Report

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I. ASSESSING CHINA'S ARMED FORCES

It is far from clear what China's motives for expanding its strategic capabilities and modernizing its military forces are. According to China's own stated policy, it favors international peace and an equitable international order. However, China's actions, most notably its military buildup, have caused observers to question the validity of such statements.

Outsiders can – and do – speculate on current and future Chinese intentions and capabilities. China, however, has many reasons to modernize its security forces and expand their mission capabilities. If the world is view from a Chinese perspective, it faces at least as many strategic uncertainties in terms of other nations as other nations face in interpreting China.

China has every reason to see the U.S. as both a major trading partner and as a potential strategic rival. China has borders with 15 other countries in Asia, several of which pose serious security issues in Chinese eyes. Taiwan, North Korea, Pakistan and India all present challenges to regional stability.

Becoming a major world power also creates strategic and military imperatives than create a momentum of their own. In recent years, the development of China's domestic and foreign policies has increased the country's involvement in international affairs. The rapid expansion of international trade, along with its increased reliance on imported commodities and participation in multilateral policy-making institutions have exposed China to risks that may increasingly jeopardize its interests abroad and at home. In addition, domestic problems in China may generate problems in internal stability.

Even if outsiders could read the minds of current Chinese leaders, it would not be clear how China's foreign and security policies and force development efforts will respond to these international and domestic challenges. Like other modern military powers, China must now take procurement and force transformation decisions that will shape its forces for years to come. At the same time, a host of internal and external events could suddenly change the nature or these efforts or their strategic focus.

Capabilities as an Indicator of Intentions

There is, however, one indication of China's future capabilities and actions that is more fact than opinion: This is the current state of its armed forces. Unlike many aspects of China's policies, it is possible to measure many aspects of what China is doing by examining factors like China's holdings and deployment of major weapon systems, battle of order, arms trade, and internal security matters.

While many uncertainties exist in the data available, there are many official sources like government reports, yearbooks, White papers and other official reports. The IISS *Military Balance* provides the data for China's force structure and services like Jane's Defense provide additional overviews of China's military forces as well as data. China's policy of information on military matters makes such assessments difficult in some areas and leaves a considerable extent of uncertainty in others, but there are still a wide range of data that few experts question.

The attached draft report represents a carefully limited effort to deliberately focus only on such data, and limit any attempt to guess at China's possible strategies and less tangible measures of its intentions and capabilities. It does not make assumptions about whether China's military buildup constitutes a threat to the United States or other Asian states.

These limits do mean that the importance following descriptions and trend analyses must be kept in perspective. A quantitative description of military capabilities cannot be the sole foundation for strategic decisions. Force numbers and orders of battle cannot portray the ingenuity (or lack thereof) and morale of the people who command them.

Successful tactics, the ability to make best use of resources, combat-experience, and a functioning support base are some of the factors that may alter the meaning that comparisons of numbers can suggest. Finally, security forces are a means political decision-making. Their success will ultimately depend on the extent to which political leadership utilizes them.

At the same time, many data in this analysis do portray the qualitative trends in Chinese forces, and provide a better basis for understanding possible strategies and intentions. Modernization data, in particular, provide such insights where quantitative force data may not. These data are provided throughout the text of this report.

In addition, it is possible to portray key aspects of the military balance without making value judgments or guessing at who given scenarios might develop. These data are shown in the Appendices to this report. They deliberately are presented as bare data in order to avoid guessing at possible intentions and war fighting options.

II. UNDERLYING RESOURCES FOR CHINA'S SECURITY CAPABILITIES

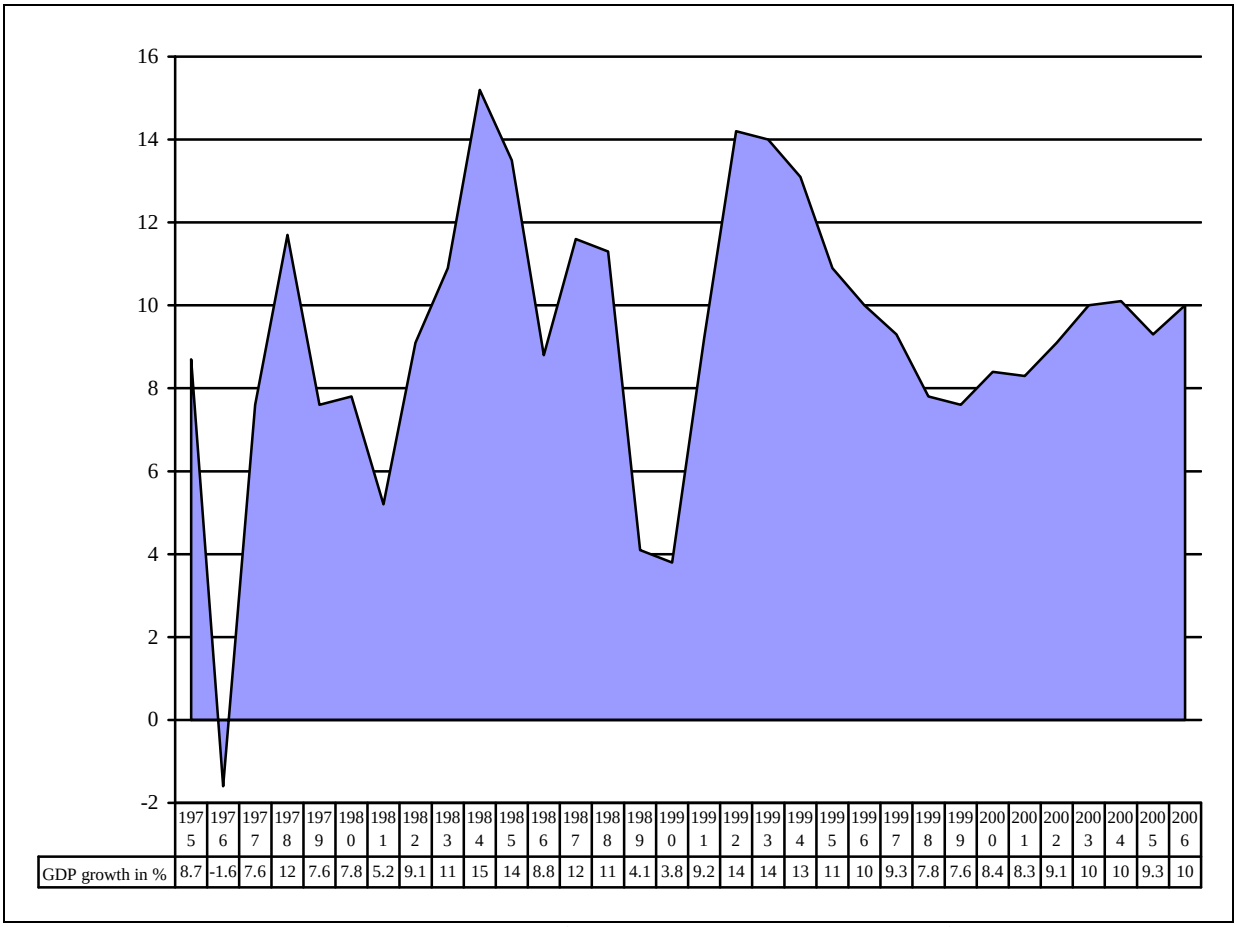
China's high rate of economic growth and large population are making it a major force in the world economy. They also give China the resources to become a major military power with steadily more advanced equipment and technology. A strong economic base and a well-trained workforce will bolster China's prestige in the international system and may lay the foundation for an increase in Chinese soft power.

Economic trends

China has recorded comparatively high GDP growth rates in the past two decades and there is currently no indication that economic growth will significantly slow down in the near future (see **Figure 1**). In 2005 China's GDP stood at 2.226 billion US-Dollars (nominal, based on exchange rate), the fourth-largest in the world.[1] The 11th national 5-year plan currently in effect calls for a GDP of $4 trillion by the year 2020.[2] In July 2006, the National Bureau of Statistics of China reported GDP growth of 10.9% for the second quarter of 2006, which will likely lead to an annual GDP growth rate of over 10%.[3]

Figure 2 shows an almost inevitable correlation between the rate of increase in GDP and a rise in government spending. These figures need to be kept careful in mind in interpreting the level of Chinese military spending. Many governments increase military spending in rough proportion to economic wealth and total government spending. They may find strategic rationales to do so, but wealth seems to generate force development and particularly in developing nations and emerging powers.

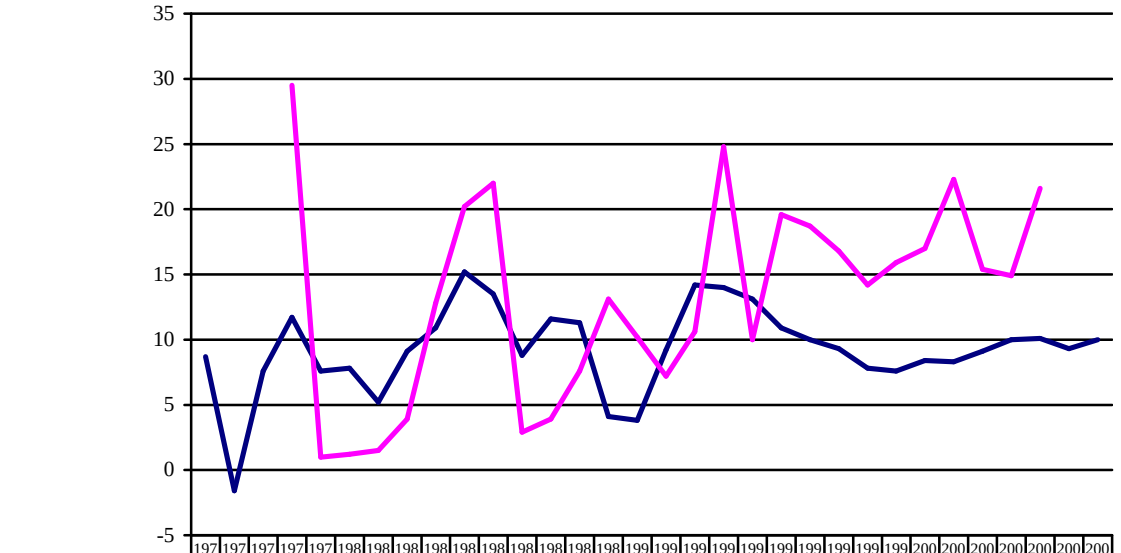
Figure 1: China's annual GDP growth rates in % (1975-2006)



	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
GDP growth in %	8.7	-1.6	7.6	12	7.6	7.8	5.2	9.1	11	15	14	8.8	12	11	4.1	3.8	9.2	14	14	13	11	10	9.3	7.8	7.6	8.4	8.3	9.1	10	10	9.3	10

Source: World Bank, *World Development Indicators* database, for 2005: World Bank, *East Asia and Pacific Key Country Macro-Indicators*, 2006 value estimate.

Figure 2: GDP growth vs. national government revenue growth



	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
GDP groth in %	8.7	-2	7.6	12	7.6	7.8	5.2	9.1	11	15	14	8.8	12	11	4.1	3.8	9.2	14	14	13	11	10	9.3	7.8	7.6	8.4	8.3	9.1	10	10	9.3	10
Gov. rev. gr. in %	?	?	?	30	1	1.2	1.5	3.9	13	20	22	2.9	3.9	7.6	13	10	7.2	11	25	10	20	19	17	14	16	17	22	15	15	22	?	?

Source: World Bank**,** *World Development Indicators* database, for 2005: World Bank, *East Asia and Pacific Key Country Macro-Indicators*; 2006 value estimate. Government revenue data from: National Bureau of Statistics of China (data for 1979; 1981-1984 from Chinese Ministry of Finance, *Key Fiscal and Economic lndicators in China*, available at http://www.mof.gov.cn/english/table/3.jpg, 01 August, 2006. Government revenue growth rates based on current yuan; data exclude revenue from debt.

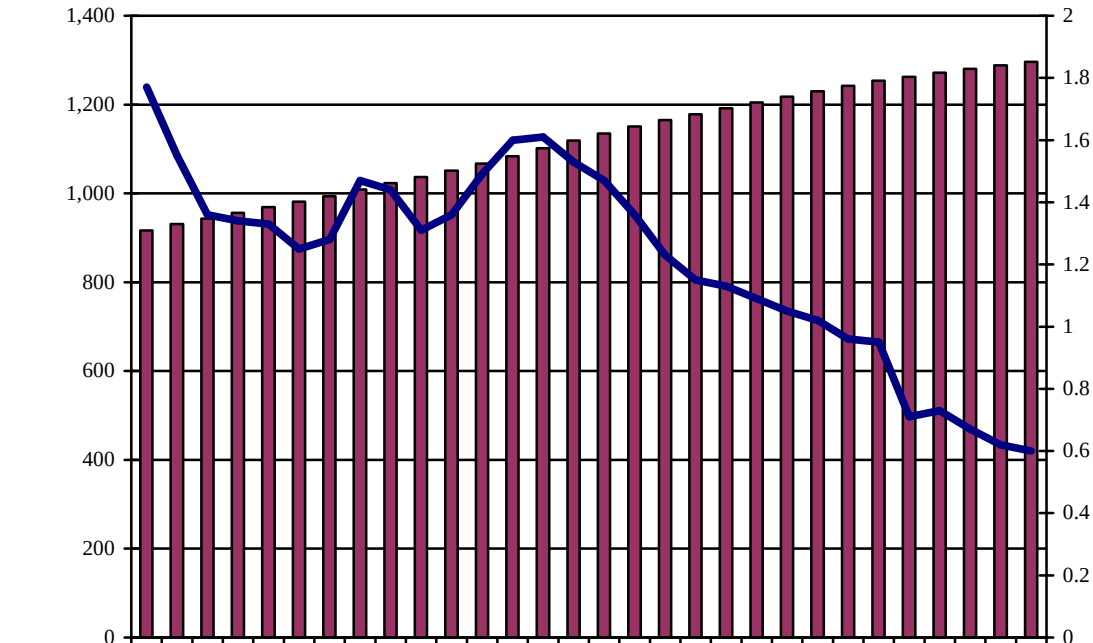
Demographic trends

It is clear that China will remain the most or close second-most populated nation in the world until the end of the 21st century. Sheer population size will certainly be one foundation for China's power and prestige in international affairs, although much will be determined by how the country will develop its pool of human resources.

China relies less and less on sheer manpower for its military strength, but demographics and a steadily better educated population give it immense resources to draw upon. With about 1.3 billion inhabitants, China is the most populous nation on earth. India, too, probably has more than 1 billion citizens, yet the U.S. as the third most populous country has a mere quarter of China's population.

Chinese population growth rates, however, have been slowing for most of the past thirty years. The official rate in 2004 was 0.6% (see **Figure 3**), although such reports may undercount growth in rural areas. In the absence of reliable migration data, it is difficult to make estimations as to whether China's net population growth will be positive or negative in the years to come despite the fact that there is no indication that the current trend will reverse.

Figure 3: Demographic Trends – total population and population growth (1975 – 2004)



	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Total pop. (mil.)	916	931	944	956	969	981	994	1,00	1,02	1,03	1,05	1,06	1,08	1,10	1,11	1,13	1,15	1,16	1,17	1,19	1,20	1,21	1,23	1,24	1,25	1,26	1,27	1,28	1,28	1,29
Pop. growth in %	1.8	1.6	1.4	1.3	1.3	1.3	1.3	1.5	1.4	1.3	1.4	1.5	1.6	1.6	1.5	1.5	1.4	1.2	1.2	1.1	1.1	1.1	1	1	1	0.7	0.7	0.7	0.6	0.6

Source: World Bank, *World Development Indicators* database.

Birthrates in China are steadily decreasing, standing at 1.8 children in 2002 and at the same time, life expectancy is rising, reaching an estimated 71 years for men and 75 years for women.[4] This will affect China's military manpower pool, and its economy because the country will experience a significant shift in its population pyramid, shifting to an age distribution with comparatively fewer young people and more elderly. In addition, some reports indicate the skewed ratio of around 120 males born for every 100 females in recent years that will certainly contribute to slower population growth and have other social ramifications.[5]

Nevertheless, the most likely population extrapolations indicate that the number of young women and men available for conscription will be more than sufficient to meet recruiting demands. This will be especially true if the cuts in personnel strength of the armed forces persist or even if the number of the security forces remains steady.

The future nature of the Chinese armed forces will also be affected by the societal trends that the population change will cause. Chinese armed forces will have to attract well-trained specialists and maintain a corps of enlisted and commissioned officers. This should be easier if Chinese overall economic development continues. There will be more and more skilled men and women to draw upon.

If demographic and economic trends should cause a shortage of skilled labor in the future, however, this could mean future problems for the security forces in terms of

recruiting and retaining qualified personnel, especially under tight budgets. On the other hand, selective conscription in the light of social inequalities could cause political pressure to introduce a volunteer army.

Current social issues

It has become commonplace among China-scholars to point out the immense consequences that China's quick and strong economic growth has had and will have in the future. In the near and intermediate term, social transformations appear to be a potential problem for domestic security. In the long run, the trajectory of China's social reforms and governance will undoubtedly influence the regional state system in Asia.

One major consequence of China's stellar economic growth in recent years has been the erosion of the traditional Chinese social service net. Rising socio-economic inequality has led to, among other things, aggravated problems concerning unemployment, corruption, lack of affordable health care, rising crime rates, and environmental degradation. In the light of the overall performance of China's economy, these trends may be offset by overall net welfare gains, but they undoubtedly persist. In terms of domestic security policy, the Chinese leadership has been alert to contain and quell potential social uprisings as this may weaken the legitimacy of the Chinese Communist party.[6]

Reports indicate that social unrest, measured in public order disturbance incidents, has grown by 50% in the years after the beginning of 2004.[7] This figure is based on official Chinese sources and it is not clear how close this figure comes to real incidents. It also fails to account for a qualitative change in social protests.

Tanner suggests that the nature of social protests has changed to more numerous incidents of violent attacks against law enforcement forces, an increased propensity to sustain protests, and a more sophisticated organization among protesters.[8] The Chinese government will have to find a way to address these problems; at this time it is simply speculation what the consequences for Chinese security will be. However, a surge in separatist movements, the reduction of foreign investment, and possible sanctions due to human rights violations are not inconceivable should social unrest in China escalate.

III. CHINA'S SECURITY FORCES

According to China's White Paper on National Defense of December 2004, the highest priority goal for China's defense policy is to defend national sovereignty and integrity, including maritime rights and interests, and prevent separation of parts of the state.[9]

Chinese Doctrine

An analysis of the measurable trends in Chinese force development cannot touch upon all of the issues affecting Chinese military doctrine. It is, however, necessary to have some picture of what China says as background to any portrayal of its force strength and modernization. What China says may not be a full reflection of what it actually thinks and intends. Certainly, no Western strategy document or force plan has ever met this test, or generally come close to meeting it. It does, however, at least set the stage.

At the same time, it is important to keep in mind the difficulties that arise from transcription and transliteration and the different cultural context, and remember that all countries sometimes deliberately conceal the facts or use misleading terms in official documents and statements. This holds especially true when trying to make inferences about what objectives the PLA will be used for.

China does not make publicly available a unified, single doctrine for guiding military operations. Chinese doctrine must be understood as the combination of several documents and guidelines at different command levels of the armed forces. The 2006 Department of Defense annual report to Congress "Military Power of the People's Republic of China" (hereafter: 2006 DOD report) calls the "National Military Strategic Guidelines for the New Period" a "national military strategy"[10], an approximation of a Western-style comprehensive national security doctrine at the highest level of executive policy-making.

The broadest guideline for war fighting within China's military doctrine is the concept of "active defense". Attempts to discern a systematic hierarchy among Chinese war-fighting principles usually identify two concepts – "active defense" and "local wars under conditions of informationalization" at the top level of a military doctrine.

"Active defense" is an operational guideline for military strategy that applies to all branches of the armed forces. It means that China does not start wars to achieve strategic means and thus remains committed to only use its armed forces to defend against attacks at its national sovereignty. According to the 2006 DOD report, any attack by the People's Republic against Taiwan would be legitimized by "active defense" as a preemptive, defensive act.[11]

China's own White Paper on National Defense of 2004 states that the People's Republic must be able to win "local wars under the conditions of informationalization"[12]. This stands in contrast to the term "local wars under high-tech conditions" (or War Zone Campaigning), which was a previous guideline from 1993 until about 2004/2005. A report published by the Council on Foreign Relations "Chinese Military Power" from 2003 (hereafter: 2003 CFR report) defines the older concept of "limited wars under high-tech-conditions" as[13]

> conflicts with limited political objectives and geographical scope and short in duration but with decisive strategic outcomes. They are usually fought over territorial claims, economic disputes, or ethnic rivalries. These wars are not region-wide, much less global conflicts, but they can be very large in scale and intensity.

War Zone Campaigning stresses modernization of the armed forces in order to create "pockets of excellence". These are selectively assembled, advanced capabilities that are supposed to offset an enemy's technological advantages in a military conflict.[14] Under War Zone Campaigning, the military command chain would change into a designated war zone representative who would be directly responsible to the CMC/GD headquarters, command all PLA units and exert orders to civilian authorities within a particular war zone.[15]

The implications of the change of language from "limited wars under high-tech-conditions" to "local wars under the conditions of informationalization" remain unclear. The 2006 DOD report claims that the concept represents a summary of the expected impact of information technology and knowledge-based warfare on a potential military conflict.[16]

Further, the extent to which the new concept will gradually replace the old one or if it will mainly augment it also remains to be seen. It is undoubtedly clear, however, that China has made great efforts to introduce high-tech equipment into its armed forces in order to enable armed forces to lead extensive joint services campaigns with information technology capabilities.

The increased use of the concept "local wars" in the War Zone Campaigning doctrine and the latest Chinese White Paper on National Defense indicate a continued use of the concept of "people's war", traditionally meaning the mobilization of large numbers of the population with very limited military skills and equipment, in order to resist an occupation enjoys decreasing importance in China's strategic contingency planning.[17]

Some reports see the focus on information warfare as a chance to revamp the idea of a "people's war". According to reports, Chinese military planners envision the mobilization of millions of citizens skilled in IT applications as the heroes in a new "people's war".[18] Some military districts have already established reserve and militia units specializing in information warfare, thereby drawing on the vast untapped potential of civilian software experts. As many as 20 city departments are believed to have information warfare regiments among its military reserve forces.[19]

There are some examples of such activity. *Defense News* reported an attack into the computer networks of the Taiwanese Ministry of National Defense and the American Institute in Taiwan on June 5, 2006. Hackers operating from the territory of the People's Republic were believed to have staged the attack. Similar previous attacks have been reported in 2003, when hackers, believed to operate from southern China attacked several military command networks located in the U.S. According to Taiwanese media estimates, Chinese hackers launched 250,000 attacks on Taiwanese computer networks between 1996-2000.[20]

The 2006 DOD report points out that under China's increasing use of information technology, computer hackers may support the PLA in protecting Chinese networks and

at the same time attempting to disrupt those of the enemy. The report also mentions that the PLA undertook a military cyber warfare exercise in 2005, practicing first-strike cyber attack operations.[21] According to the 2006 DOD report, PLA leaders have a somewhat coherent concept named "Integrated Network Electronic Warfare" to coordinate efforts in this regard.[22]

Christensen states that a PLA field manual calls for developing the following capabilities: increasing the number of computer hackers, developing viruses, special forces operations against enemy command and control facilities as well as developing more sophisticated missile equipment.[23]

The Korean Research Institute for Strategy (KRIS) reports that according to a Chinese source, the PLA has developed a high-power microwave weapon and a high-frequency electro-magnetic weapon capable of killing humans.[24] Status, readiness and specifics of such a weapon remain unknown.

Constant mention of increased joint training efforts indicates that the PLA has deficits in this field. The PLA lacks the capabilities to respond to a contingency by employing a large-scale joint operation. Its command structure appears to not yet provide for effective joint operational command nor does it seem to have a comprehensive C^4ISR network.

Chinese Overall Command Structure

At the top of China's military chain-of-command stands the Central Military Commission (CMC). The CMC plays the decisive role in planning and decision-making for military-security policy and in all issues related to the armed forces. Since 1982, the CMC has been the most senior decision-making body for military affairs and armed forces in China. The CMC is a body directly derived from the Central Committee of the Chinese Communist Party thereby subjecting the Chinese armed forces to party control.

The chairman of the state CMC – currently China's president Hu Jintao – is the commander-in-chief of all Chinese forces. The responsibility of the CMC encompasses operational command over all of China's armed forces and services, military doctrine development, logistics, and civil-military relations.

Strictly speaking, two CMCs – one party, one state – exist next to each other, but are largely identical. The National People's Congress elects the state commission's 11 members, the Central Committee of the Chinese Communist Party de jure elects the party commission.[25] The existence of two parallel CMCs shows that the PLA and the armed forces play a difficult role in the Chinese body politic – the CMC, and therefore the PLA, on the one hand is an integral part of the Chinese Communist Party and on the other hand serves as the highest administrative body for all matters military. Both CMCs have the same membership structure, the most important difference between the two is the existence of the General Office in the party CMC. This body facilitates and manages interaction among China's most senior military leaders.

Security policies are shaped largely by three groups within the Central Committee of the Chinese Communist Party (CCP).[26] More than the so-called Leading Small Group on Taiwan Affairs and Leading Small Group on Foreign Affairs the Leading Small Group on National Security appears to provide a high-level impetus for national security

matters, including the role of the armed forces. The group was established in October 2001 and its mission is to conduct crisis management regarding national security matters and coordinate security policies among the PLA, the Foreign Ministry and other agencies. However, the group's scope of mission, resource availability and decision-making mechanisms are not clear.

The Organization of Chinese Military and Security Forces

The Chinese armed forces are one of several major components of the country's security forces. Their primary mission is to defend China against foreign security threats. Security responsibilities are shared among the People's Liberation Army (PLA), the People's Armed Police (PAP), militia units, the Ministry for State Security, and the Ministry for Public Security. All of these organizations perform different functions, although the greatest burden in an armed conflict against a foreign power will naturally lie with the PLA.

The PLA comprises China's main armed forces and can best be defined by its chain of command. All military units exclusively under the authority of the Central Military Commission (CMC) are part of the PLA. Although it is called People's Liberation *Army*, the PLA consists of four services – the PLA ground forces, the PLA navy (PLAN), PLA Air Force (PLAAF), and the PLA Second Artillery Corps. The Ministry for State Security conducts foreign as well as domestic intelligence; militia and PAP units will support and reinforce the PLA in a contingency on Chinese soil.

Interior security falls under the responsibility of the Ministry for Public Security, which is the highest administrative body for Chinese law enforcement forces. It oversees approximately 1.7 million policemen.[27] In addition, 1.5 million People's Armed Police and militia forces exist, which partly serve as paramilitary forces.

The PAP serves under the command of the CMC and the State Council but is by definition not part of the PLA.[28] Its main responsibility is to serve as internal security forces, and provide reserve forces as light infantry during a war on Chinese soil. Some PAP units are responsible for border security and for guarding critical infrastructure.[29]

The largest paramilitary organizations are the militia under the command of local military district governments. The militia consist of young men organized in a standard military command scheme. There are primary and ordinary militia – the former consists of about ten million men, numbers for the latter are unavailable. The militias' mission is to perform the following tasks: safeguard public infrastructure, assist law enforcement forces in maintaining public order, help to strengthen border area administration.[30]

Operational Command of the Chinese Military

The operational command structure for the Chinese military is shown in **Figure 4**. The CMC maintains overall command and control over the armed forces through four general departments (GD) – the General Staff Department (GSD), the General Political Department (GPD), the General Logistics Department (GLD), and the General Armament Department (GAD). The GDs are the bureaucratic units that combine military planning

and command in lieu of a Ministry of Defense. They each perform several distinct functions:[31]

- GSD: It is responsible for all staff and personnel decisions regarding the entire PLA. Its primary mission is to execute and oversee defense policy to the armed forces and serve as the general command for the PLA. The GSD also holds the General Staff organization for the PLA ground forces. The GSD's second department is responsible for foreign military intelligence. During wartime, the GSD leads the entire PLA under its unified command.
- GDP: The GPD oversees the implementation of the political doctrine into the armed forces and ensures political loyalty, morale, and discipline among the PLA.
- GLD: The GLD's task is to organize supply and transport services within the armed forces and provide services like housing and medical treatment to the armed forces.
- GAD: This GD manages all weapons and equipment testing, procurement, and maintenance. This includes almost exclusive oversight of the production and stockpiles of nuclear weapons.

The operational command levels directly under the CMC/GDs differ among the service branches. For the PLA ground forces, seven Military Regions (MR) that cover all of China's territory represent the command level below the CMC/GD structure. These are divided into subordinate military districts whose number varies among the MRs.

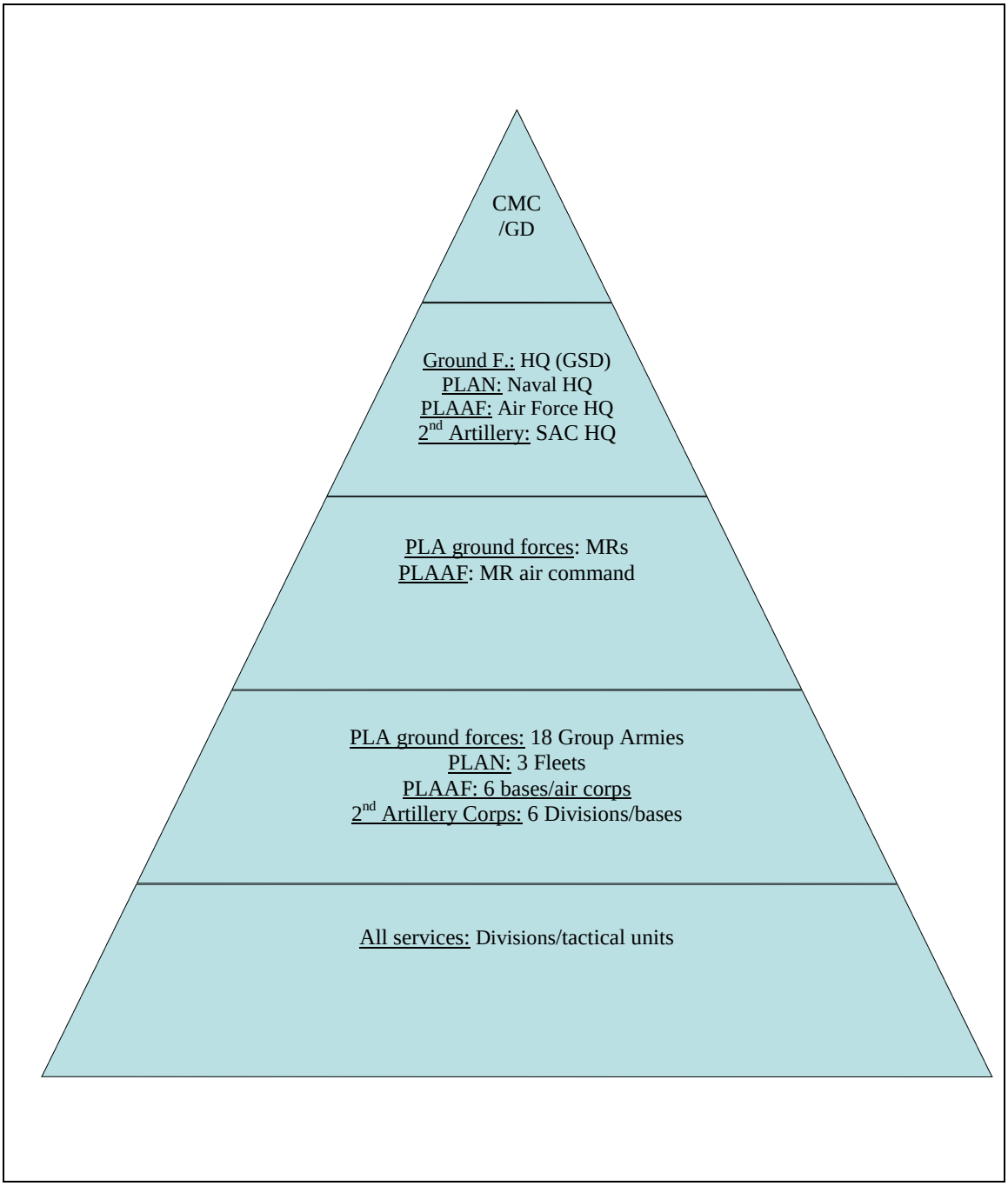
The operational level directly subordinate to the MRs are the 18 Group Armies (GA) for the PLA ground forces. GAs represent the highest, exclusively military command level, roughly similar to a NATO corps. Reports indicate that the average number of troops under GA may decline in the future, as Group Armies appear to be increasingly made up of more brigades rather than divisions and may be organized along a corps-brigade-battalion chain of command.[32]

Below the GA command, ground forces are organized into divisions, brigades, regiments, battalions, companies, platoons and squadrons. The exact order of battle varies with services and branches.

For the PLAN, a naval staff headquarters represents the command level below the CMC/GD. The headquarters is responsible for maintaining combat readiness, force planning and coordination with the GDs. The highest operational command level in the PLAN is made up of three fleets – North, East, and South. These are then divided into coastal defense districts, which in return command sectors. All fleets maintain operational command over the forces in the area of their responsibility. Each fleet is organized to oversee coastal, deep-water and naval aviation operations. Forces afloat are divided into divisions, regiments, and squadrons. In wartime, command over naval forces may be transferred to the MRs.[33] According to reports, only Huludao Navy Base, which commands the nuclear submarine force, represents its own command level, dating back to a pre-2003 order of battle when naval bases were part of the naval chain of command.[34]

The PLAAF maintains air forces headquarters at a command level below the CMC. Operational command over the PLAAF, however, is dispersed among MR air force commands, five air corps, six bases, and operational units.[35] The MR headquarters is retains control over combined operations, whereas the MR air force commander is responsible for flight operations within the MR.[36]

Figure 4: Command Structure of the PLA forces



Source: Based on data provided in this report.

Tactical units include divisions, brigades, regiments, groups, squadrons, battalions, companies, platoons, squads, and flights.[37] Jane's states in a report dating from 2005 that the air corps command level may be eliminated.[38] Allen asserts:[39]

> One of the PLAAF's most visible methods for reducing the high number of staff officers in various headquarters was to downgrade the five air corps (kongjun jun) and restructure the six corp-level bases (jidi) as command posts (zhihuisuo). As a result, the PLAAF

currently has a total of 12 command posts, which includes two in each of six military regions but none in the Jinan Military Region.

The Second Artillery also maintains its own service headquarters. This headquarters commands six divisions also known as bases. Each division consists of 3-5 brigades, except the division based in Anhui province, which commands an estimated nine brigades, mostly equipped with DF-15 missiles.[40] According to Allen, the Second Artillery has six command levels – "Second Artillery Headquarters, six corps-level missile bases, missile brigades, launch battalions, launch companies, and launch platoons."[41]

Jane's points out that a so-called "War-Zone command" may be established in case of a contingency. Such a command would most likely forego the standard chain of command and combine one MR with a number of other additional command elements from other MRs.[42]

Under the oversight of the CMC is the Ministry of National Defense (MND). This ministry does not have any operational control over the armed forces. It rather is responsible for administrative tasks concerning the armed forces, e.g. personnel and budget issues. Since political and operational control lies with the CMC, the MND does not possess independent policy-making authority in regard to the armed forces, but is a purely administrative agency.

The CMC also oversees the Commission for Science, Technology, and Industry for National Defense (COSTIND). Prior to 1998, COSTIND was responsible for coordinating research and development for military purposes and weapons procurement. After insufficient progress in this field, most of COSTIND's original responsibilities were transferred to what is now the General Armament Department under the direct supervision of the CMC.

Manpower Trends

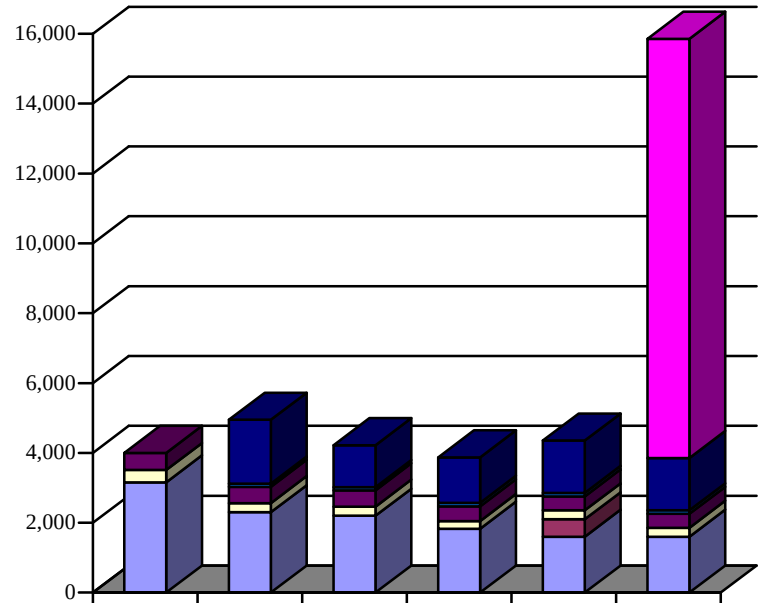
Figure 5 shows the current trends in Chinese military manpower. PLA and all security forces have been reduced in number since the 1980s. The PLA cut its personnel numbers almost in half between 1985 and 2005; the 10th Arms Reduction Plan was announced on September 1, 2003, which cut about 200,000 troops in a two-year span, mainly ground forces.[43]

Chinese military and security forces today consist of about three million active PLA personnel in 2006, plus 1.5 million PAP servicemen, an estimated 12 million militia members and unknown number of military reserve forces. Blasko notes that Chinese reported personnel number counts contain a significant number of uniformed civilians who do not perform combat duties; their number may amount to 20% of the total of all reported personnel figures.[44]

The Chinese reserve forces consist of around 500,000 servicemen and –women. Most reserve forces today are staffed mainly by demobilized ground forces units, information about PLAN, PLAAF, and PLA Second Artillery reserves are unavailable. The organization of Chinese reserve forces reflects a heavy reliance on infantry and air defense capabilities: the entire force is divided into 30 infantry divisions, 13 air defense

divisions and several logistics units.[45] It is likely that reserve forces are structured to provide basic reinforcement power to regular PLA units during contingencies. Although, some reserve units are being staffed with personnel specializing in information warfare (see above), it is unclear what role reserve forces will play in the future beyond basic service providers. This is especially true, as militia units appear to increase in number at the expense of the ground forces reserves.[46]

Figure 5: PLA and security forces manpower (in thousands)



	1985	1990	1995	2000	2005	2006
Militia	?	?	?	?	?	12,000
PAP	?	1,830	1,200	1,300	1,500	1,500
PLA Second Artillery reserves	?	?	?	?	?	?
PLA Second Artillery	?	90	90	100	100	100
PLAAF reserves	?	?	?	?	?	?
PLAAF forces	490	470	470	420	400	400
PLAN reserve forces	?	?	?	?	?	?
PLAN forces	350	260	260	220	255	255
PLA ground forces reserves	?	?	?	?	500	?
PLA ground forces	3,160	2,300	2,200	1,830	1,600	1,600

Source: IISS *Military Balance 2006*; 2005 PLA ground forces reserves number from *Jane's Sentinel Security Assessment – China and Northeast Asia*, 10 April, 2006, p. 1. Militia numbers from State Council Information Office, *China's National Defense in 2004, available at* http://www.china.org.cn/english/2004/Dec/116032.htm.

The militia consists of primary and ordinary units. Primary units may have a membership of ten million people, the numbers for the ordinary militia are unknown, it is possible that exact numbers are not known among the PLA due to poor bureaucratic management.[47]

Three group armies of the PLA ground forces were disbanded between 2000 and 2005. At the same time, reports indicate that independent brigades have increased in number; Jane's mentions that the PLA is "reducing some divisions to better-equipped brigades"[48].

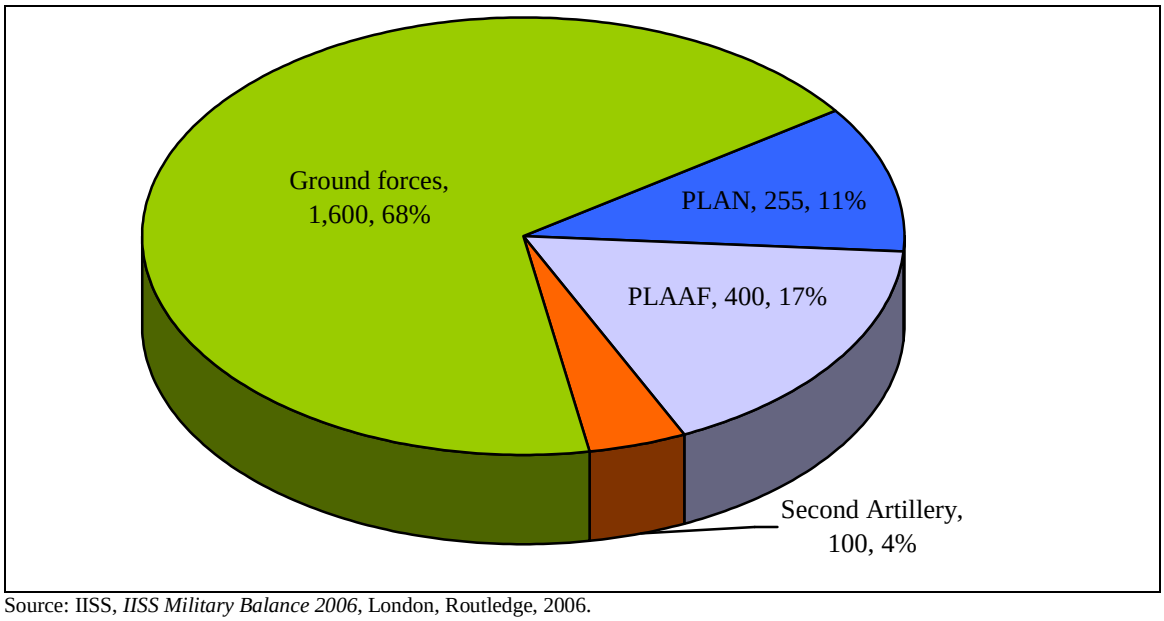
At this point it is not clear if existing divisions have been "shrunk" or brigade units have been synthesized from previously different units. Moreover, though they are supposedly better equipped and trained, it is not clear how these brigades fit into tactical considerations, in particular if they reflect an organizational change to execute joint warfare.

Figure 5 shows the distribution of all military and security forces between 1985 and 2006. Their total number declined gradually over the years. This happened for the most part at the expense of the PLA ground forces. They have cut their personnel numbers by almost half since 1985 (from 3.16 million to 1.6 million men). Some of the released soldiers have been absorbed by the PAP, which has increased its ranks by 300,000 servicemen since 1995.

Except the Second Artillery Corps, which has experienced an almost steady personnel number, the other PLA services have also decreased their personnel. The PLAAF has undergone reductions by almost 20% of its force, and the PLAN of ca. 27% between 1985 and 2006, although the number of PLAN forces has increased by over 15% since the year 2000.

Figure 6 shows each service's individual share of the total PLA force. The dominance, at least in terms of manpower, of the PLA ground forces is very clear – they comprise over two thirds (68%) of all PLA forces. Against the background of the force reductions in the PLA ground forces, the PLAN and the PLAAF have increased their share; they stand at 11% and 17% respectively. The Second Artillery Corps with 100,000 personnel makes up 4% of all PLA forces.

Figure 6: PLA Personnel structure, service share of total



Source: IISS, *IISS Military Balance 2006*, London, Routledge, 2006.

Military Spending

Chinese estimates of the economic burden imposed Chinese military spending, and the components of that spending are shown in **Figures 7 and 8**. The true extent of China's state spending for its armed forces remains uncertain.

Most outside experts feel China's real military expenditures exceed the officially stated numbers, and that Chinese published expenditures for 2006, – $35 billion – do not suffice to support an organization that keeps 2.3 million service personnel and an increasingly sophisticated and therefore expensive arsenal of weapon systems. The U.S. government has gone further and has at least implied that China is hiding information about military spending that should be made public.

One key problem that affects all reporting on international military expenditures is the lack of any clear standard for such reporting, and the radically different costs a given government either faces or can assign to security military expenditures. A command economy like China can assign radically lower costs to virtually any defense activity than a market economy, and most of the world's command economies do so.

At the same time, free market efforts to guess at the market cost of such military efforts are notoriously inaccurate and uncertain. The US intelligence community found after the Cold War, for example, that its attempts to determine the economic burden of Soviet defense expenditure, and determine the equivalent cost of Russian forces in US terms, were little more than econometric nonsense.

What is clear is that Chinese official statistics do not include *some* outlays, which are standard reporting for most other countries. The following items of China's military spending are generally believed to be outside of official disclosure:[49]

- Arms imports, foreign weapon procurement, military aid for and from foreign countries
- Expenses for paramilitary forces
- Expenses for strategic and nuclear forces
- Government subsidies for military production
- Expenses for military R&D
- The PLA's own fundraising

According to Shambaugh, official budget figures also ignore "demobilization and pension costs; maintenance of militia, reserves, and the PAP; commercial earnings; and defense industrial conversion expenditures"[50]. Funds allocated for the PAP in 2003, for example, amounted to $US 3.1 billion at nominal exchange rates ($US 14 billion in PPP exchange rates).[51]

Blasko points out that pay increases and expenditures for social services among the armed forces have increased substantially in recent years with pay increases of 84% and 92% for officers and enlisted personnel respectively; although it is not clear whether pay increases have in relative terms outspent overall military expenditure growth.[52]

Any statement about Chinese military spending must, therefore, at least consider the potential sum of dispersed, partly classified, and sometimes unreported numbers. In

practice, however, this has led to radically different estimates of real Chinese military spending.

The U.S. Department of Defense estimates are compared with the Chinese estimates in **Figures 9 to 11**. The Department explains that its estimates for 2006 range from $65 billion to $95 billion, a variance of about 46%.[53] Thomas Christensen has estimated total Chinese defense spending in 2000 as $40-50 billion. Multiplied with official defense spending growth rates, this would result in a budget in excess of $100 billion in 2006.[54]

Shambaugh reports that there is a consensus among Western analysts that China's actual military expenditures are four to five times higher than officially reported.[55] This would mean a Chinese military budget of up to $165 billion in 2006, about a third of U.S. military spending and by far the second highest military spending in the world.

Most estimates by non-Chinese analysts that put military expenses several times over the official figures rely on purchasing power parity (PPP) models. This conversion rate poses several problems:

The assumed relative buying power of Chinese government funds refers to buying Chinese made goods. The market for military equipment and services in China is highly opaque and transferring average PPP assumptions to the state-run military-industrial complex almost certainly will result in skewed results. Purchasing power theory loses its descriptive value when applied to goods, which are not homogenous; weapons systems and other military purchases are artificially protected by government regulation. The return on investment in buying Chinese-made goods is unclear, and it is not unlikely that an indigenously made product that meets state of the art quality may actually cost more money than arrived at by PPP conversion. Moreover, technological advancement is not fully captured by PPP rates either.

A RAND study by Medeiros et al. states that China's officially stated expenditures for weapons acquisitions in 2003 amount to 64.8 billion *renminbi*.[56] Compared to official figures standing at five billion *renminbi* in 1990, this share of the budget has increased through 1990-2003 at twice the rate as the overall budget. It must be taken into account that this trend may have been augmented by increased R&D efforts and commercialization of defense industries that remain outside of the official budget figures and therefore might be several times higher.

What is clear is that Chinese military spending is on the rise, and annual growth rates are high in comparison with most other countries. If low U.S. estimates approximate real Chinese spending, China's defense spending in 2006 will be the second largest in the world behind only the United States if measured in PPP conversion rates.

Figure 9 contains a comparison of Chinese officially announced defense budgets and U.S. estimations of the actual size of the Chinese budget over the past twelve years; **figure 10** presents the same data but adjusted for inflation. The U.S. estimates shown here are taken from the 2006 DOD report. The U.S. figures try to take into account all military-related expenses, as outlined above. This has resulted in a low and a high estimate, suggesting that the real amount of Chinese defense spending, according to the Department of Defense is somewhere in between. A detailed methodology on how the estimates are arrived at is not available.

The low estimate has been over three times the official Chinese amount for the 1990s, for the years after 2000 the low estimates equaled a rough 2.5 to 1 ratio. The high estimates have been over five times the official figures in the mid-1990s then gradually declined. Today the ratio between the high U.S. estimate and official Chinese figures stands at about 3:1. These data are similar if adjusted for inflation (see **Figures 9** and **10**).

The reason for the closing gap is a marked difference in growth rates for U.S. estimate and Chinese reported data for defense spending. Figure 11 shows that U.S. estimates since 1999 have represented a decline in the share of overall military spending of total GDP (see **Figure 11**). While the high U.S. estimate for defense spending would have amounted to a share of over 13% of the total GDP for 1998, this figure stood at 10.5% in 2004. Official Chinese figures have represented an almost constant share of defense spending of the overall GDP of about two percent.

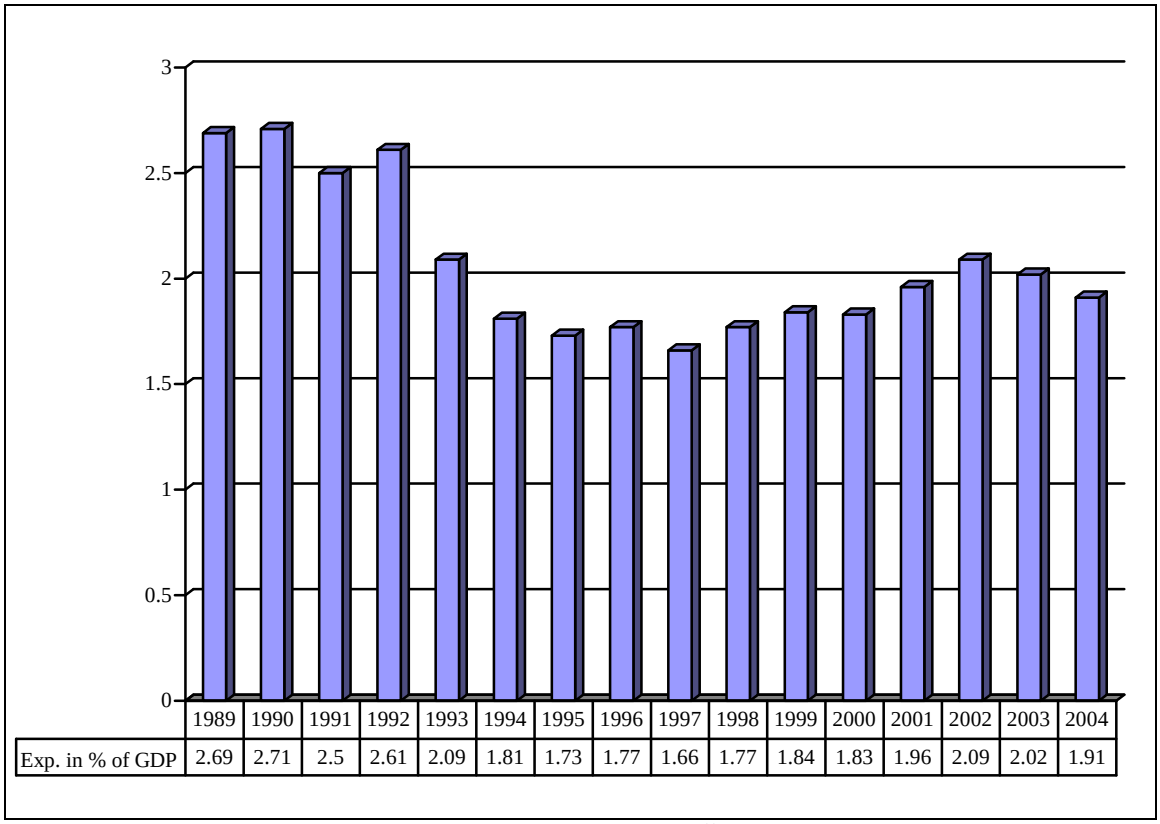
In addition, **Figure 12** corroborates this trend as it suggests an average annual growth rate of 14.5% for defense expenditures since between 1995 and 2006, based on Chinese reported data. Average growth rates for according U.S. estimates stand at 9.4% for U.S. high estimates and 8.9% for U.S. low estimates. These numbers represent approximations, but the trend points to the fact U.S. estimates have applied smaller underlying growth rates for defense spending in contrast to Chinese reported figures.

In 2004, the last year covered the 2006 DOD report, the low U.S. estimate meant a 7.2% share of GDP, the U.S. high estimate equaled a 10.5% share. If one assumes that the real spending comes close to a figure somewhere in between, Chinese defense spending amounts to about 8-9% of its total GDP, though the PPP conversion may have shifted this figure slightly higher.

A defense expenses share of 8-9% of the total GDP is high in international comparison, although not necessarily high among developing countries. Given similar rates in Western countries in the past, this share may be sustainable over time if growth of defense expenditures does not outpace overall GDP growth. If low U.S. estimates approximate real Chinese spending, China's defense spending in 2006 will be the second largest in the world behind only the United States.

Figure 8 shows how, according to official Chinese sources, the budget for the PLA is allocated. Spending for equipment, human resources, and operations are almost equally distributed, with equipment expenses slightly higher than the other titles. More detailed information on a more detailed breakdown of spending allocations are not available.

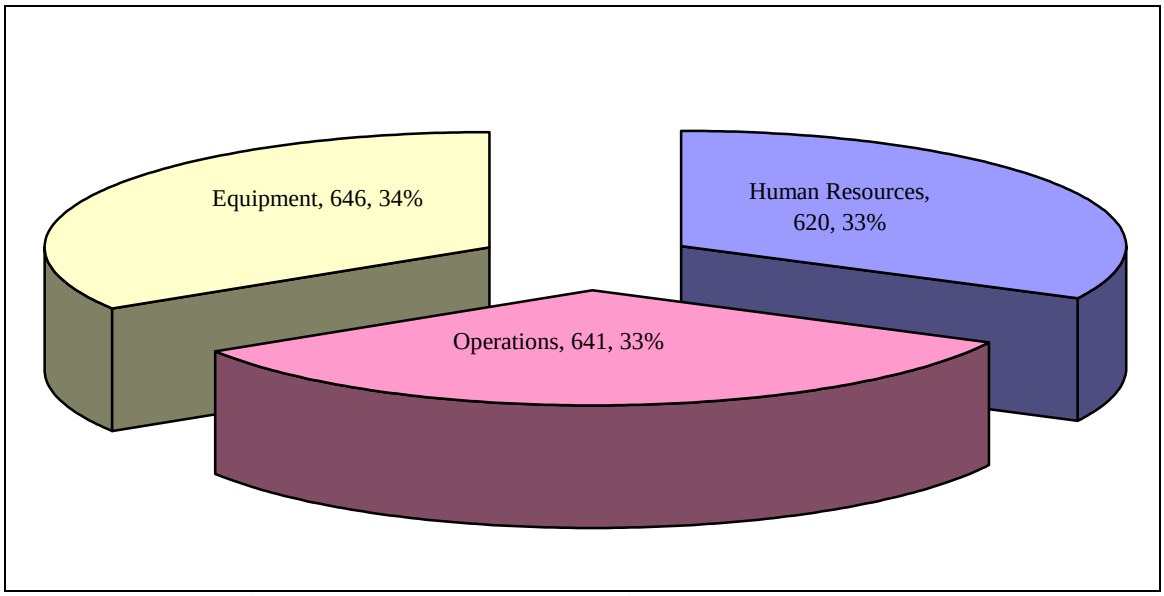
Figure 7: Military spending as percentage of GDP, 1989-2004



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Exp. in % of GDP	2.69	2.71	2.5	2.61	2.09	1.81	1.73	1.77	1.66	1.77	1.84	1.83	1.96	2.09	2.02	1.91

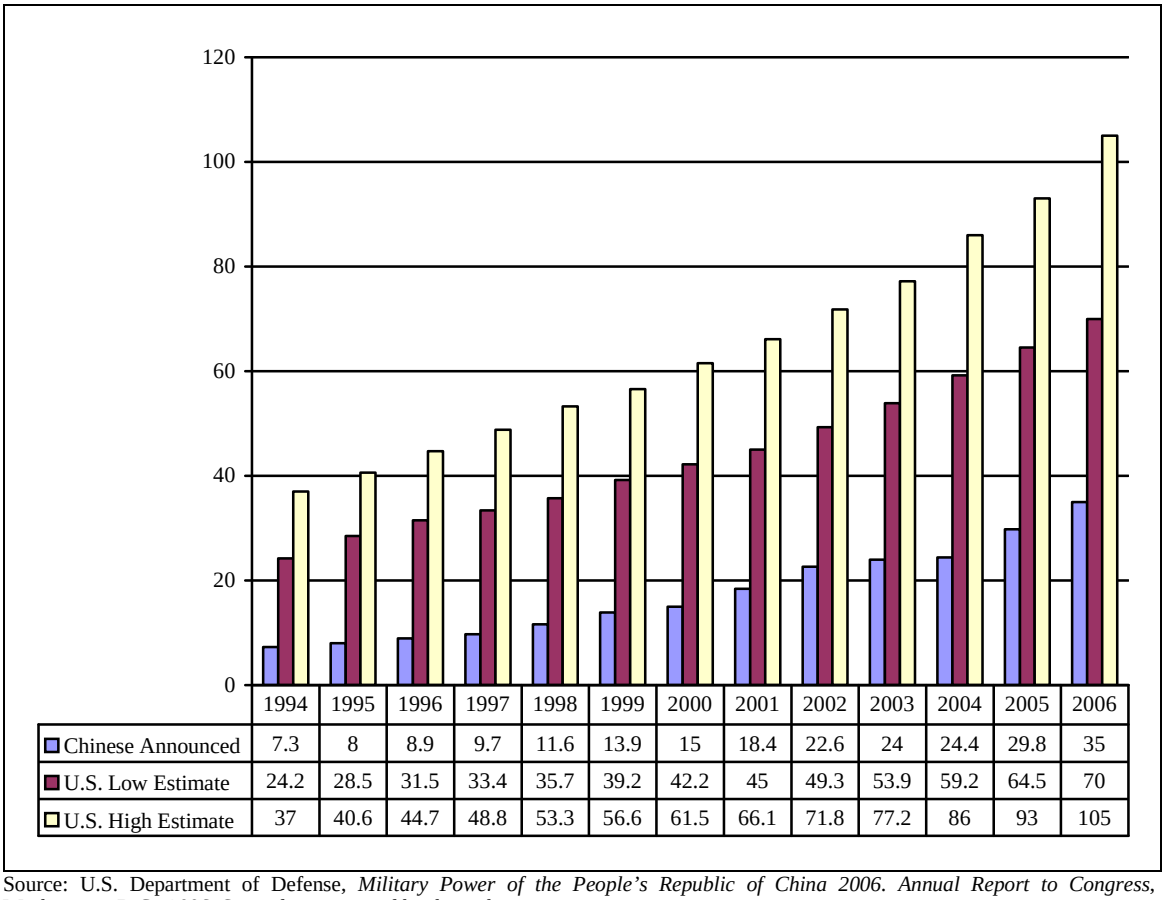
Source: World Bank, *World Development Indicators* database, based on current official US-dollar exchange rate.

Figure 8: Chinese reported Components of military spending 2004



Source: People's Republic of China, State Council, *China's National Defense in 2004*, Beijing 2004.

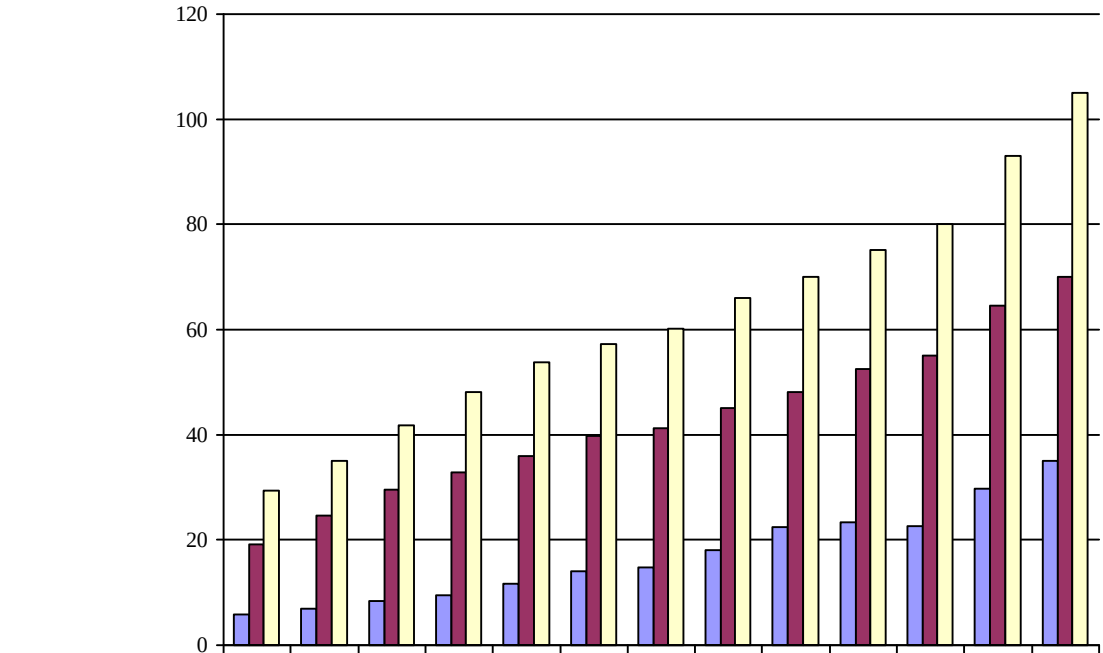
Figure 9: U.S. Estimate of China's Defense Budget 1994-2006



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Chinese Announced	7.3	8	8.9	9.7	11.6	13.9	15	18.4	22.6	24	24.4	29.8	35
U.S. Low Estimate	24.2	28.5	31.5	33.4	35.7	39.2	42.2	45	49.3	53.9	59.2	64.5	70
U.S. High Estimate	37	40.6	44.7	48.8	53.3	56.6	61.5	66.1	71.8	77.2	86	93	105

Source: U.S. Department of Defense, *Military Power of the People's Republic of China 2006. Annual Report to Congress,* Washington, D.C., 2006. Some data estimated by the authors.

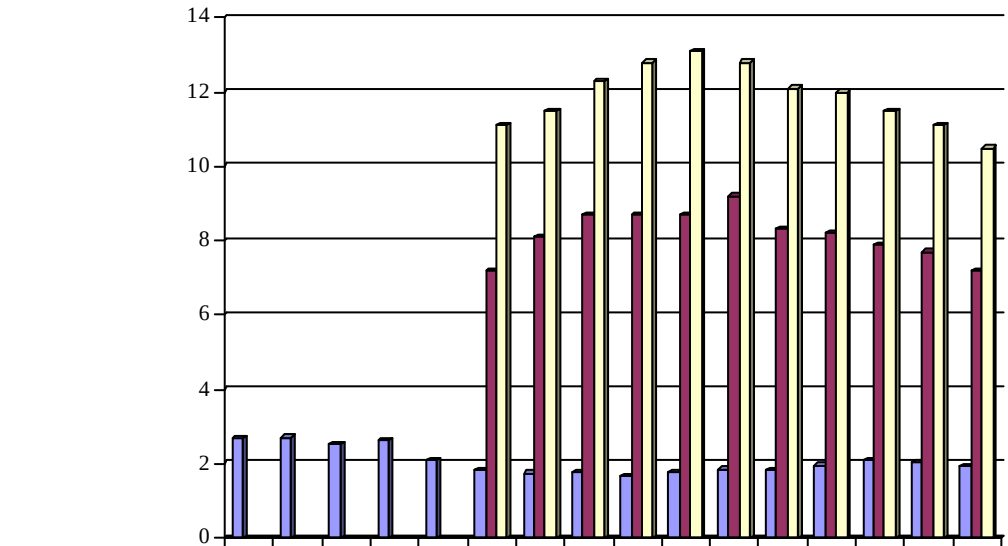
Figure 10: U.S. Estimate of China's Defense Budget 1994-2006, adjusted for inflation



	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Chinese Announced	5,8	6,9	8,3	9,5	11,7	14,1	14,7	18	22,5	23,4	22,7	29,8	35
U.S. Low Estimate	19,2	24,6	29,5	32,9	36	39,7	41,3	45	48,1	52,5	55,1	64,5	70
U.S. High Estimate	29,4	35	41,8	48,1	53,8	57,3	60,2	66,1	70	75,2	80,1	93	105

Source: U.S. Department of Defense, *Military Power of the People's Republic of China 2006. Annual Report to Congress,* Washington, D.C., 2006. Some data estimated by the authors. GDP deflator for 1994-2004 from *World Development Indicators* database.

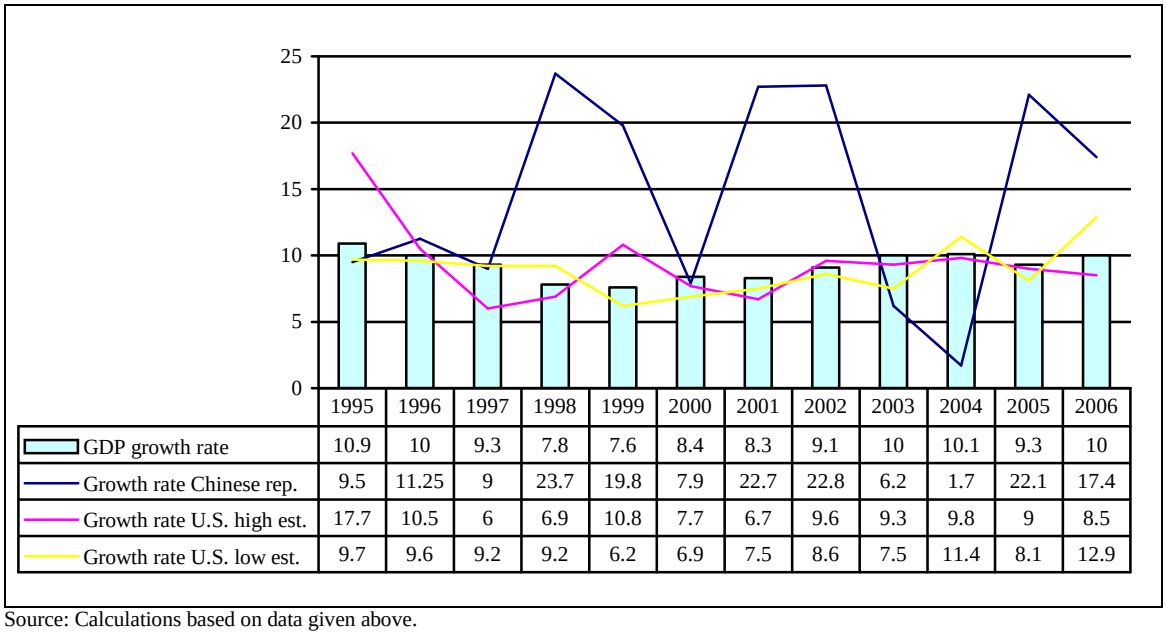
Figure 11: Share of GDP for Chinese reported and U.S. high and low estimates, 1989-2004



	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Chinese Announced	2.69	2.71	2.5	2.61	2.09	1.81	1.73	1.77	1.66	1.77	1.84	1.83	1.96	2.09	2.02	1.91
U.S. Low Estimate	-	-	-	-	-	7.2	8.1	8.7	8.7	8.7	9.2	8.3	8.2	7.9	7.7	7.2
U.S. High Estimate	-	-	-	-	-	11.1	11.5	12.3	12.8	13.1	12.8	12.1	12	11.5	11.1	10.5

Source: World Bank, *World Development Indicators* database for 1989-2004 Chinese announced figures; data for US estimates computed by the authors on the basis of *World Development Indicators* annual GDP rates, measured in current PPP rates.

Figure 12: Chinese Defense Budget Growth Rate vs. GDP Growth Rate, 1995-2006



	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
GDP growth rate	10.9	10	9.3	7.8	7.6	8.4	8.3	9.1	10	10.1	9.3	10
Growth rate Chinese rep.	9.5	11.25	9	23.7	19.8	7.9	22.7	22.8	6.2	1.7	22.1	17.4
Growth rate U.S. high est.	17.7	10.5	6	6.9	10.8	7.7	6.7	9.6	9.3	9.8	9	8.5
Growth rate U.S. low est.	9.7	9.6	9.2	9.2	6.2	6.9	7.5	8.6	7.5	11.4	8.1	12.9

Source: Calculations based on data given above.

A comparison of Chinese defense spending over time leaves no doubt that Chinese absolute military spending is on the rise. Annual average growth rates of over 14% are certainly high in international comparison yet appear to be sustained by almost equally high GDP growth rates. Predictions for further military expenditure growth thus depend on continuously high GDP growth rates. Moreover, social unrest or other domestic problems may lead to a diversion of funds away from defense expenditures yet there is currently no sign that military spending is slowing, especially given the emphasis Chinese leaders place on the modernization of the armed forces.

Modernization

The modernization of the Chinese armed forces is occurring in virtually every aspect of military matters. However, trend analyses shows that faster progress is occurring in some areas while others prove to be more complex and/or resistant to change.

The Uncertain Pattern of Change

The General Staff Department's (GSD) Science and Technology Innovation Laboratories with over 1,000 professional researchers are supposed to spearhead military R&D.[57] On May 25, 2006 COSTIND issued a 15-year plan approved by President Hu Jintao for developing high-tech industries for both military and civilian purposes. The plan calls for a further increase in manufacturing capabilities for military purposes.[58] According to a report in China Daily, some of the initiatives include the development of large aircraft, pressurized water nuclear reactors and high temperature gas-cooled reactor nuclear power stations, along with manned space missions and lunar probe programs.[59]

The modernization of the Chinese armed forces entails the whole spectrum of armed forces development: war-fighting doctrine, strategic and tactical changes guidelines, training methods, C^4SI, procurement services, interoperability between PLA services, equipment, and human resources management. Any meaningful assessment of this modernization must establish a benchmark against which the processes that constitute modernization can be judged.

When one uses the most modern technologies and management methods employed by world armies as comparison, as is often the case, the modernization of the PLA presents a mixed picture that renders quick predictions baseless. It must be understood that any quantitative assessment of increases in modernization spending falls short of describing combat effectiveness.

- Military modernization, especially in a large organization like the PLA, proceeds asymmetrically. While some units may use cutting-edge technology that provides war-fighting superiority, it is almost certain that large parts of the armed forces keep outdated and inoperable equipment and have a low standard of training. The overall force structure of the PLA supports such assumptions (cf. force structure tables)
- If China were to start developing offensive designed weapon systems for power projection and underlying strategic and tactical doctrines, which could be understood as an indicator for aggressive intentions, there is no way in knowing when these systems will be ready. At the same time, other countries continue developing new weapon systems and thereby raising the standards against which China's status quo capabilities can be judged.
- An aspect difficult to quantify but crucial for combat readiness is the quality of training for soldiers and officers. Quantitative comparisons between third- and fourth generation fighters, for

instance, can blur the fact that well-trained pilots in third-generation aircraft might display a higher combat-effectiveness than their counterparts in newer planes. The same holds true for virtually all weapon systems.

- China fought its last international war in 1979, which was relatively limited in scope and lasted barely a month. Virtually no members of the armed forces possess any war-fighting experience. While the lack of experience is also very difficult to quantify and compare to other indicators, it has the potential to become a significant disadvantage in an armed conflict against experienced enemy forces.

The Chinese Technology Base

Most reports stress the quick expansion of the Chinese civilian high-tech industry base as a resource for future military modernization. However, the extent of the exchange between civilian and military industries is extremely difficult to assess. The 2006 DOD report states that only recently the PLA granted civilian companies permission to invest in weapons system R&D and concludes that "most of China's defense industries rely on foreign procurement and development"[60].

The 2003 CFR report asserts that huge problems in terms of industrial output capabilities exist due to the state-ownership of the defense industry and thus the application of cutting-edge commercial technology for military purposes will remain problematic for a decade.[61] While this assessment insinuates a comparatively large gap between Chinese and western technological and managerial capabilities, at the same time it points to a huge growth potential should the Chinese military-industrial complex apply more productive means of production, management methods, and lower capital costs.

A recent RAND study asserts that[62]

> certain Chinese defense-industrial enterprises are designing and producing a wide range of increasingly advanced weapons that, in the short term, will enhance China's military capabilities in a possible conflict over the future of Taiwan and, in the long term, China's military position in Asia.

In particular, they identify the following trends:[63]

- An acceleration of high-tech output in key sectors of the Chinese defense industry
- Due to the quick pace with which Chinese R&D capabilities improve, huge differences in the quality of different sectors become evident.
- The existing political will to modernize China's armed forces within the next 20 years as the "critical stage".

These trends are consistent with the three characteristics in China's modernization strategy, identified by a recent RAND report: selective modernization, civil-military integration, acquiring advanced foreign weapons equipment, materials, and technologies.[64]

Focus on C4SI and Information Technology

Reports indicate that the PLA is investing heavily in the enhancement of all C4SI capabilities and logistics resources, drawing on resources of the civilian computer and high-tech industries.[65] Given that military modernization without comprehensive, modern C4SI capabilities is virtually impossible, modernization efforts in this regard will certainly lie at the center of China's modernization strategy.

Security sector modernization is contingent upon both civilian and military determinants, most notably five-year economic development plans, the set of documents outlining the development of Chinese military doctrine and emphasis, overall GDP growth, arms imports, and growth of productivity in the military-industrial complex. An unexpected economic crisis or changes in technology accessibility may significantly delay the application of modern weapon systems as well as investments in human capital.

The PLA increasingly relies on modern IT applications. Evidence for this are increased efforts to create an advanced C4SI network among the PLA services, enhanced weapon systems, the proliferation of information warfare units, and efforts to recruit highly qualified civilian IT experts. Any assessments of progress in this area are exacerbated by the decentralized organization of IT services within the PLA. While there are many high-tech efforts in progress, many of them seem to originate in state-owned companies whose connection to the PLA remains unclear.

Arms Trade and Technology Transfer by Service

Although the transfer of military technology to China from most European countries and the U.S. halted following the Tiananmen protests in 1989, China imports weapons systems worth several $US billions every year. With arms imports amounting to ca. $13 billion between 2000 and 2005, China is among the world's largest arms importers.[66] Russia is a key player in this process, accounting for about 95% of Chinese foreign acquisitions since 2001.[67] The 2006 DOD report estimates that about 95% of Chinese arms imports since 1996 have come from Russia.[68] Among all developing nations, China ranked first in the value of concluded arms transfer agreements with a total of $10.4 billion in agreements between 2001 and 2004.[69] In 2004, China ranked fourth, concluding agreements worth $2.2 billion.[70] The overwhelming majority of these agreements were signed with arms suppliers from Russia. Among Russia's most notable sales to China are the Su-27 and Su-30 fighter planes, Sovremenny destroyers with SS-N-22 missiles and Kilo-class submarines.

The acquisition of dual-use goods poses a serious problem to construct a comprehensive picture of the PLA's overall technological capabilities. The 2006 DOD report on China states that China is pursuing a systematic effort to exploit dual-use goods for modernizing its armed forces.[71] Medeiros et al., too, assert that there is a political strategy in China to exploit dual-use-technologies for military purposes.[72] Given the dominance of state-run companies in combination with a government-mandated policy of secrecy, it remains very difficult to track down the potential applications of single items. In the light of the information provided in this report, it seems very likely, that China is undertaking systematic efforts to exploit dual-use goods for military purposes.

China no longer relies on weapon imports to modernize its army yet a sudden cessation of imports would certainly delay weapon system development and procurement significantly. China has shown the abilities to contribute to almost all areas of weaponry development to produce modern weapon systems without outside assistance.

Practically, de facto reliance on foreign technology will likely continue for at least one decade. Many of China's most modern weapon systems are imports from Russia or licensed-production of Russian goods, especially in the aviation sector. Given that many

new indigenously developed weapon systems display similar capabilities like Russian products, the reliance on Russian products appears to be driven by economic considerations and China's comparative disadvantage in some crucial high-tech engineering areas.

Figures 13 and **14** show how many major, advanced weapon systems currently in use by the PLAN and PLAAF are Chinese-made and how many are imported from Russia. The PLA ground forces currently do not operate any modern weapon system from Russia, although a great majority of all PLA equipment are reverse-engineered or licensed-produced weapon systems from Russia.

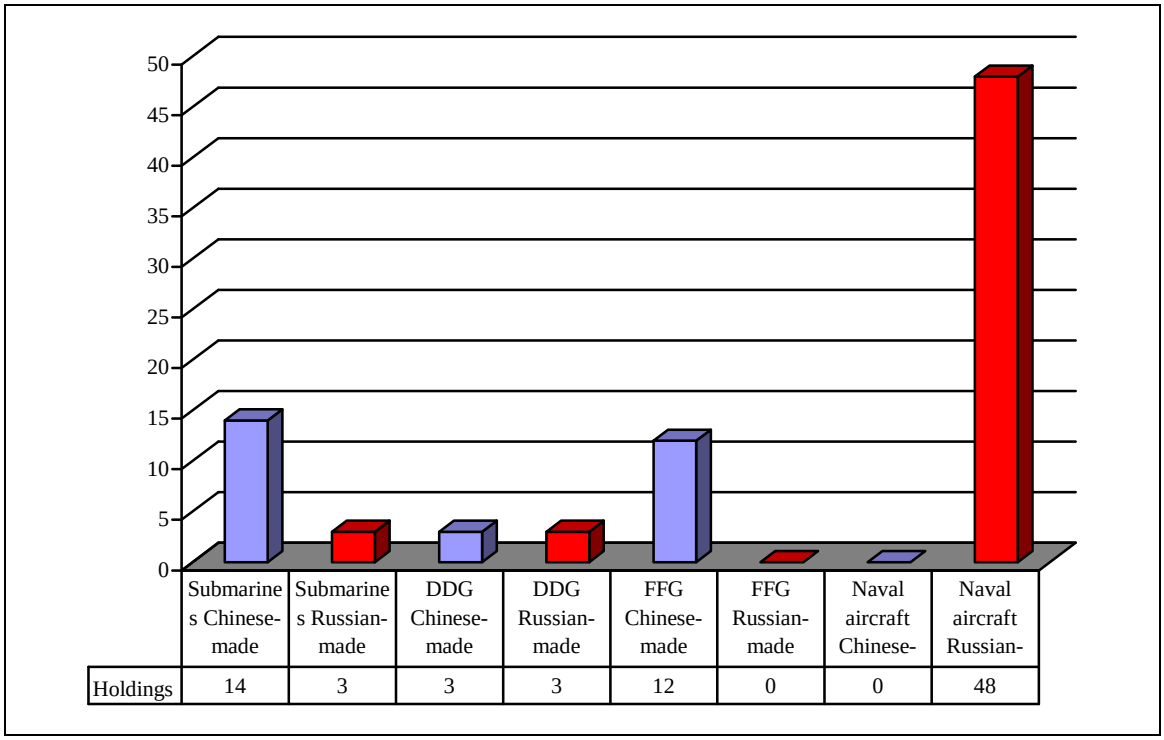
Key Shifts in Naval Systems

Figure 13 shows that most major, modern PLAN naval vessels are Chinese-made; out of the six modern destroyers in service with the PLAN, three are Chinese-made and three are Russian-made. However, the PLAN air force holds 48 Su-30MK2 out of its 296 fighter aircraft. The Russian-made Su-30MK2s are the only modern fighters in service with the PLAN air force.

Key Shifts in Air Force Systems

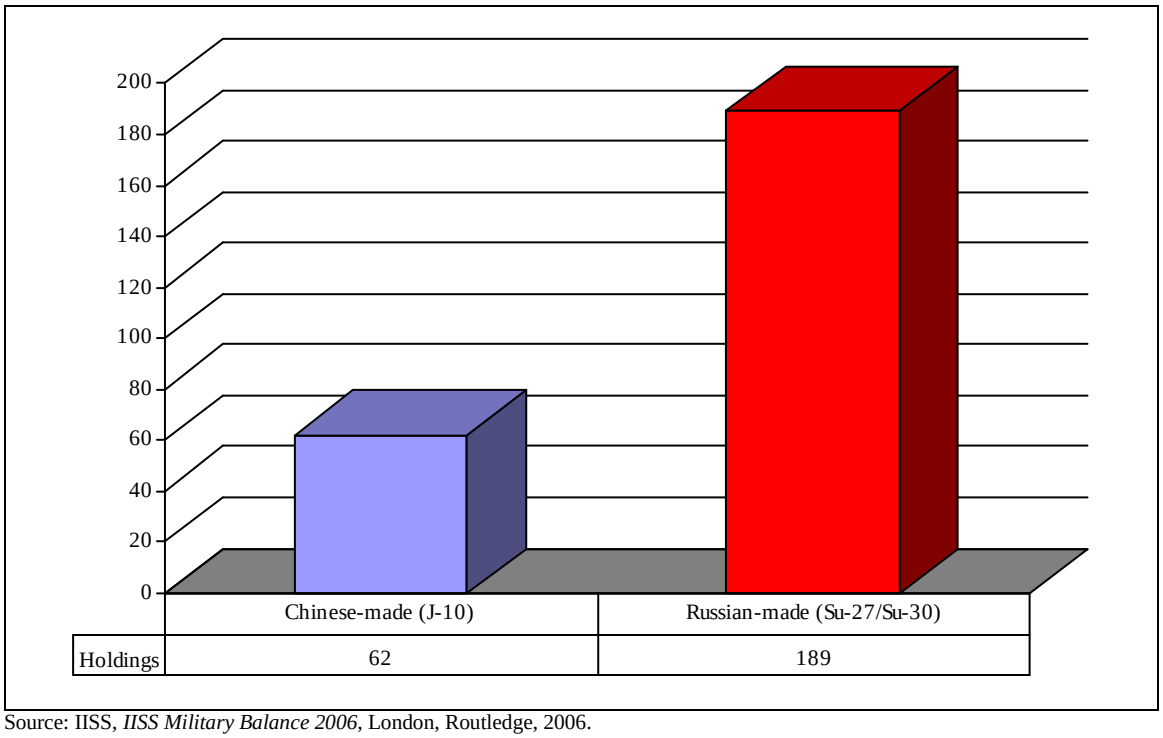
Figure 14 shows that the PLAAF's modern inventory of combat aircraft heavily depends on Russian-made fighters. 189 out of 251, or 75% of all modern fighters in service with the PLAAF are Su-27 or Su-30 aircraft imported from Russia. However, this number represents merely 8% out of all Chinese fighter aircraft.

Figure 13: Chinese vs. Russian-made holdings of advanced navy systems



Source: IISS, *IISS Military Balance 2006*, London, Routledge, 2006.

Figure 14: Chinese vs. Russian-made holdings of advanced air force weapon systems



Source: IISS, *IISS Military Balance 2006*, London, Routledge, 2006.

IV. PLA GROUND FORCES

PLA ground forces still dominate the Chinese military structure, although the air, naval, and missile branches are steadily gaining in strategic importance. Chinese security does not face the same challenges from ground forces on any of its borders that it does in terms of air, sea, and missile forces. China is, however, steadily improving its capability to use ground forces in a clash with Taiwan and its ground force rapid reaction and power projection capabilities.

Command Structure

The overall command structure and organization of the ground forces is shown in **Figure 15**. PLA ground forces are organized into eight branches. These are infantry, armor, artillery, army aviation, air defense missiles, engineers, signals, and NBC warfare defense. In addition, several specialized branches exist, e.g. medical, reconnaissance, and electronic warfare.

PLA ground forces are deployed among seven Military Regions (MR) that host a total of 18 Group Armies (GA), each comprised of about 60,000 men. A GA is a rough equivalent to a NATO corps.[73] Some of the ground forces units (approximately 10-20% of the total) across all three services are classified as Rapid Reaction Forces (RRF). These units are supposed to maintain a higher level of readiness, better equipment and training and are to be able to deploy quickly to missions outside of China. It is impossible to judge how big the gap between regular and rapid-reaction forces in terms of combat-readiness and –effectiveness is.

One estimate of currently assigned rapid reaction forces indicates the following designation:[74]

- PLAAF 43rd, 44th, 45th divisions, 15th Airborne Corps (Guangzhou MR)
- PLA 112th, 113th, 114th one armored and three mechanized infantry divisions, 38th GA (Beijing MR)
- PLA 115th, 116th, 190th one armored and three mechanized infantry divisions 39th GA **(**Shenyang MR)
- PLA 127th mechanized infantry division, 54th GA (Jinan MR)
- PLA 149th mechanized infantry division, 13th GA, (Chengdu MR)
- Seven special operations forces groups, one in each military region
- PLA Navy 1st Marine Brigade, South Sea Fleet

Mulvenon notes that the precise order of battle for each command may vary significantly across geographical deployment.[75] Since units in different parts of China are supposed to execute different types of missions, there are a considerable number of digressions from the default organization structure outlined below.

Figure 15: The Organization of PLA Ground Forces GA[76]

Source 1[77]	Source 2[78]	Source 3[79]	Source 4[80]
Two or three infantry divisions/ brigades	Two to three infantry divisions or brigades	Two to three mechanized or motorized divisions	Three infantry divisions
One armored division/brigade	One armored division or brigade	One or two armored divisions or brigades	A tank division or brigade
An artillery division/brigade	An artillery division or brigade	One or two artillery divisions or brigades	An artillery division or brigade
AAA or Air Defense Brigade	An air defense (SAM/AAA) brigade	An anti-tank brigade	One AAA division or brigade
Engineer regiment	A communications regiment	(increasingly) an aviation (helicopter) regiment	One communications regiment
Communications regiment	An engineer regiment	Engineer units can be attached to Group Armies as required	One engineer regiment
Chemical Defense regiment/battalion	A reconnaissance battalion (group)		One reconnaissance battalion
Reconnaissance battalion	A pontoon bridge regiment (only in some GAs)		Some independent units
Logistics/Armament units	A chemical defense regiment (only in some GAs)		
Helicopter regiment (in selected group armies)	Other combat service support units such as medical and transportation		
	In a few cases, an army aviation (helicopter) group		

Unconfirmed information published on Chinese internet sites suggest the make-up of such independent brigades as follows: four tank battalions with 31 tanks each; one mechanized infantry battalion with 40 armored personal carriers; one artillery battalion with 18 self-propelled guns; and one anti-aircraft battalion with 18 self-propelled anti-aircraft guns. There are also specialist artillery and anti-aircraft rapid reaction forces brigades. Also key to the War-Zone Campaign concept is the PLAAF's 15th airborne corps, with three divisions amounting to 35,000 troops. This strategic force would be

used for the kind of disruptive deep strikes the War-Zone Campaign doctrine calls for. Limitations remain as far as the ability to deploy these forces by air is concerned.[81]

According to the 2006 CFR report, all PLA infantry divisions include armored units and all armored divisions command infantry units.[82] This organization scheme, however, has come into effect only in recent years and it puts into question the ability of a PLA division to plan, execute, and sustain an effective combined-arms operation.

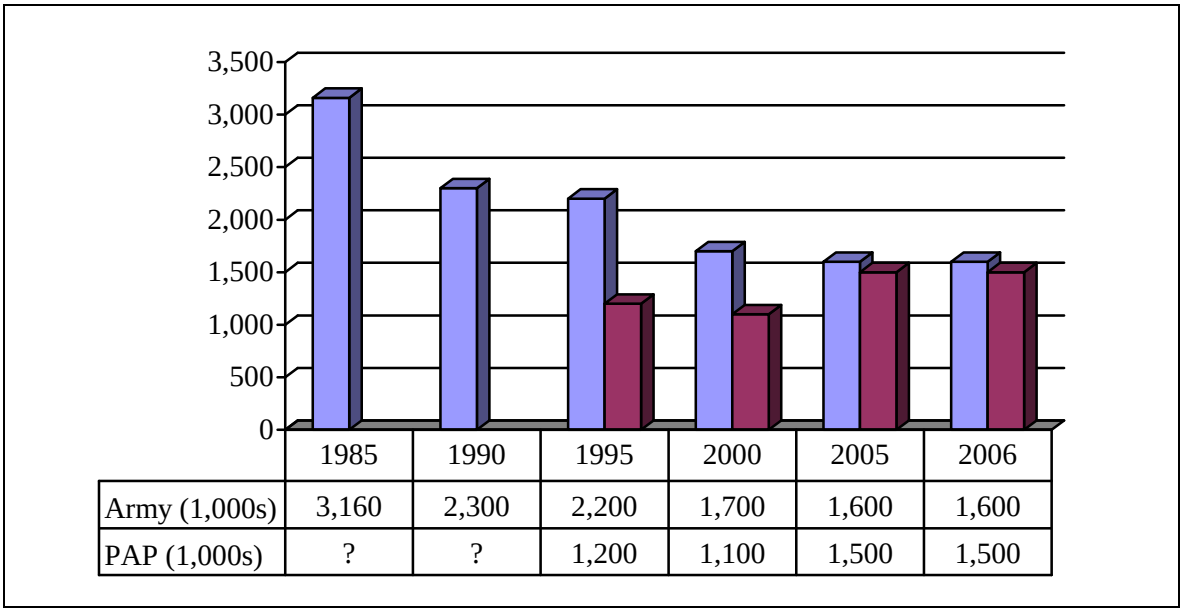
Manpower

As **Figure 16** shows, PLA ground forces have been sharply reduced over the past few decades. Since 1950, the PLA has cut its personnel levels nine times. Between 1985-1987 it released about 1,000,000 people, then it cut another 500,000 between 1997-2000.

Since 1985, PLA ground forces were reduced by 18.6%, naval forces by 11.4%, air forces by 12.4%, and Second Artillery forces by 2.9%.[83] Between 1985 and 1988 37 Field Armies were reduced to 24 Group Armies, and then were further reduced to 18.[84]

Today, PLA ground forces maintain a personnel-strength of ca. 1.6 million men, of which roughly half are conscripts.[85] Estimates put the number of PLA reserves at ca. 500,000 men. They are organized into 30 infantry divisions, 13 air defense divisions, three artillery divisions, and seven logistic support brigades. Militia members may amount to 10 million members.[86]

Figure 16: PLA ground forces manpower vs. People's Armed Police numbers, 1985-2006



	1985	1990	1995	2000	2005	2006
Army (1,000s)	3,160	2,300	2,200	1,700	1,600	1,600
PAP (1,000s)	?	?	1,200	1,100	1,500	1,500

Source: IISS, *IISS Military Balance 1984-1985* to *2006*, London, Routledge, 1985, 2006.

Ground Force Doctrine and Strategy

The 2006 DOD report stresses the PLA ground forces focus of "deep battle" capabilities.[87] Such operations require the PLA ground forces to master far-reaching reconnaissance and strike capabilities, deploy highly mobile forces, and sustain support lines over an extended territory. This can only be done effectively through joint forces operations.

The 1970s saw the first change in China's long-held concept of a guerilla-style People's war. The updated doctrine was then called "people's war under modern conditions"[88]. Under this doctrine, force development towards increased mobility and joint interoperability were the focus.

It is clear that the PLA ground forces do not envision fighting an ideological war of attrition, with mass, low-technology capabilities. What is less clear, is what they do plan for and if their capabilities will match their planning goals. Along with the modernization of human resources and equipment, the PLA will likely conduct military operations in the manner that has evolved over the past 20 years, particularly in the light of U.S. campaigns in the Persian Gulf, the Balkans, and Afghanistan.

This means a constant reliance of inter-service operations with air- and sea-based strikes preceding land operations, quick and massive strikes to gain battlefield superiority and fast movement of troops and material, and capabilities to fight asymmetric warfare. How these experiences will play out in a military contingency with Chinese participation depends not only on the enemy or enemies, the political underpinning of the conflict, terrain, and availability of military resources.

Force Structure

Figure 17 provides a detailed estimate of the trends in the PLA's manpower, force structure, equipment numbers, and modernization over the last two decades. As is explained in the following sections, it shows a consistent – if sometimes slow – trend towards emphasizing force quality over force quantity.

Figure 17: PLA ground forces: Force Structure 1985-2006

	1985	1990	1995	2000	2005	2006
Manpower (PLA + paramilitary forces + reserves)*	9,000,000+	4,230,000	4,130,000	3,570,000	4,655,000	6,324,000
Active	4,000,000	3,120,000	3,020,000	2,470,000	2,355,000	2,355,000
Conscript	?	1,350,000	1,275,000	1,000,000	990,000	990,000
Army	3,160,000	2,300,000	2,200,000	1,700,000	1,600,000	1,600,000
Navy	350,000	260,000	260,000	220,000	255,000	255,000
Air Force	490,000	470,000	470,000	420,000	400,000	400,000
Strategic Missile Forces	?	90,000	90,000	100,000+	100,000	100,000
Paramilitary	?	Incl. in reserve	1,200,000	1,100,000	1,500,000	3,969,000
Reserve	5,000,000	1,200,000	?	?	800,000	?
Army	?	?	?	500-600,000	500,000	?
Navy	?	?	?	?	?	?
Air Force	?	?	?	?	?	?
Combat Units - Army						
Army Group	35	24	24	21	18	18
Armored Division	13	10	10	10	9	9
Infantry division	118	80	78	44	15	15
Mechanized Infantry Division	?	?	2	7	5	3
Motorized Infantry division	?	?	0	0	24	24
Amphibious Assault division	?	?	0	0	2	2
Artillery Division	17	some	5	5	7	7
Air-Defense Artillery Division	16	5-6	0	0	0	0
Armored Brigade	?	?	2	12	12	12
Mechanized Infantry brigade	?	?	0	?	1	1
Motorized Infantry Brigade	?	?	0	?	22	22
Infantry Brigade	?	?	0	13	0	0
Artillery Brigade	some	?	0	20	14	14
Air-Defense Artillery Brigade	?	?	5	4	12	12
Anti-Tank Brigade	?	?	0	0	1	1
Air-Defense Brigade	some	some	0	0	9	9
Anti-Tank Regiment	?	?	0	0	4	4
Helicopter Regiment	?	2 groups	some	7	0	0
Engineer Regiment	50	50	15	0	0	0

Signals Regiment	21	?	0	0	0	0
Reserves						
Infantry Division	?	30+	?	50 inf, arty, AD,	30	30
Air-Defense Division	?	?	?	some	13	12
Logistic support brigade	?	?	?	?	7	7
Artillery Division	?	?	?	some	3	-
MBT	8,650 (+lt. tank)	7,500-8,000	7,500-8,000	7,060	7,580	7,580+
T-34	some	0	700	0	0	0
T-54	some	some	some	0	0	0
Type-59	some	6,000	6,000	5,500	5,000	5,000+
Type-69-I	some	200	200	150	0	0
Type-79	0	some	some	500	300	300
Type-80	0	some	some	0	0	0
Type-85	0	0	some	0	0	0
Type-88A/88B	0	0	0	900	1,000	1,000
Type-96/88C	0	0	0	0	1,200	1,200
Type-98A	0	0	0	10+	80	80
Light Tanks	?	2,000	2,000	2,000	1,000	1,000
Type-62	some	1,200	800	800	400	400
Type-63	some	800	1,200	1,200	600	600
AIFV	?	some	some	4,800 (+ APC)	1,000	1,000
WZ-501	?	0	some	0	0	0
YW-307/309	?	some	some	0	0	0
Type-86A	?	0	0	some	1,000	1,000
APC	2,800	2,800	2,800	5,500	3,500+	3,500+
Type-531C/D/E	some	some	some	0	0	0
YW-534	0	some	some	0	0	0
Type-85 (Type 89 or WZ 534)	0	some	some	0	0	0
Type-55 (BTR-40)	some	some	some	0	0	0
Type-56 (BTR-152)	some	some	some	0	0	0
Type-63	some	some	some	1,800	2,300	2,300
Type-89I	0	0	0	some	300	300
Type-77II	0	0	0	some	200	200
Type-92 (WZ 551)	0	0	0	some	600+	600+
WZ-523/553	0	0	0	some	100	100
BMD-3	0	0	0	100	0	0
Artillery	12,800	14,500+	14,500+	15,800+	17,700+	17,700+

TOWED	some	14,500	14,500	12,000	14,000	14,000
85mm	some	0	0	0	0	0
Type-56	some	0	0	0	0	0
100mm	some	some	some	some	some	some
Type-59 (M-1944)	?	some	some	some	some	some
Type-89	0	some	some	0	0	0
122mm	some	some	6,000	some	some	some
Type-54-1 (M-30)	some	some	some	some	some	some
Type-60 (D74)	some	some	some	some	some	some
Type-83	0	some	some	some	some	some
D-30	some	some	some	0	0	0
130mmm	some	some	1,000	some	some	some
Type-59 (M-46)	some	some	1,000	some	some	some
152mm	some	some	1,400+	some	some	some
Type-54 (D1)	0	some	some	some	some	some
Type-56	some	0	0	0	0	0
Type-66 (D20)	some	some	1,400	some	some	some
Type-83	0	some	some	some	0	0
155 mm	0	0	30	300+	150	150
Type-88 WAC-21	0	0	30	300+	150	150
SP	some	some	some	1,200	1,200	1,200
122mm	some	some	some	some	700	700
Type-53I	some	0	0	0	0	0
Type-54I	0	some	some	0	0	0
Type-70I	0	0	0	some	200	200
Type-85	0	0	some	0	0	0
YW-302	0	some	0	0	0	0
Type-89	0	0	0	some	500	500
152mm	0	some	some	some	500	500
Type-83	0	some	some	some	500	500
MRL	4,500	3,800	3,800	2,500	2,400	2,400+
107mm	some	some	some	0	0	0
Type-63	some	some	some	0	0	0
122mm	some	some	some	some	some	some
Type-63	some	0	0	0	0	0
Type-81	0	some	some	some	some	some
Type-83	0	some	some	0	0	0
Type-89 SP	0	0	0	some	some	some

130mm	some	some	Some	some	some	some
Type-63	some	some	Some	0	0	0
Type-70 SP	0	some	Some	some	some	some
Type-82	0	0	some	some	some	some
Type-85	0	0	some	0	0	0
132 mm	some	some	some	0	0	0
BM-13-16	some	some	?	0	0	0
140mm	some	some	some	0	0	0
BM-14-16	some	some	some	0	0	0
180mm	some	0	0	0	0	0
273mm	0	some	some	some	some	some
Type-83	0	some	some	some	some	some
284mm	0	some	some	0	0	0
Type-74 minelayer	0	some	Some	0	0	0
320mm	some	some	some	some	some	some
Type-96 (WS-1)	0	some	some	some	some	some
425 mm	0	some	some	0	0	0
Type-762 mine clearance	0	some	some	0	0	0
MOR	some	some	some	some	some	some
81mm	0	0	0	some	some	some
Type-W87	0	0	0	some	some	some
82mm	some	some	some	some	some	some
Type-53(M-37)	some	some	Some	some	some	some
Type-67	0	0	0	some	some	some
Type-82	0	0	0	some	some	some
Type-84	0	some	0	0	0	0
YW-304 SP	0	some	0	0	0	0
100mm	0	0	0	some	some	some
Type-71	0	0	0	some	some	some
120mm	some	some	some	some	some	some
Type-55	some	some	some	some	some	some
Type-W86	0	some	0	0	0	0
160mm	some	some	some	some	some	some
Type-56(M-160)	some	some	some	some	some	some
AT	?	some	some	7,000+	7,200+	7,200+
MSL	?	some	some	7,000	7,200	7,200
HJ-73A	?	some	some	some	some	some
HJ-73B	?	0	some	some	some	some

HJ-73C	?	0	some	some	some	some
HJ-8A	?	some	some	some	some	some
HJ-8C	?	0	some	some	some	some
HJ-8E	?	0	some	some	some	7176
HJ-9	?	0	0	0	24	24
AT-5 Sagger	some	0	0	0	0	0
RL	some	some	?	some	some	some
40mm	some	0	?	0	0	0
57mm	some	0	?	0	0	0
62mm	?	0	0	some	some	some
Type70-1	0	0	0	some	some	some
90mm	some	some	some	0	0	0
Type-51	some	some	some	0	0	0
Guns	some	some	some	300+	?	300+
57mm	some	some	some	0	0	0
Type-55	some	some	some	0	0	0
76mm	some	some	some	0	0	0
Type-54	some	some	some	0	0	0
100mm	0	some	some	some	?	some
Type-73 (T12)	0	some	some	some	?	some
Type-86	0	some	some	some	?	some
120mm	0	0	0	some	?	some
Type-89 SP	0	0	0	300+	?	300+
AD	some	some	some	some	some	some
SAM	0	some	some	some	284+	284+
HQ-61(CSA-N-2)/	0	some	some	some	24	24
HQ-7	0	0	0	some	200	200
SA-15 Gauntlet	0	0	0	some	60	60
MANPAD	0	some	some	some	some	some
HN-5	0	some	some	some	some	some
FN-6	0	0	0	0	0	some
QW-1	0	0	0	some	some	some
QW-2	0	0	0	some	some	some
GUNS	15,000	15,000	15,000	some	7,700	7,700+
23mm	0	some	some	some	some	some
Type 80-ZSU-23-2	0	some	some	some	some	some
25mm	0	0	0	some	some	some
Type-85	0	0	0	some	some	some

35mm	0	0	0	some	50+	50+
Type-90 (GDF02)	0	0	0	some	50+	50+
37mm	0	some	some	some	?	7,650
Type-55(M1939)	0	some	some	some	some	some
Type-63	some	some	some	0	0	0
Type-65	0	some	some	some	some	some
Type-74	0	some	some	some	some	some
Type-88	0	0	0	some	some	some
57mm	some	some	some	some	some	some
Type-59(S60)	some	some	some	some	some	some
Type-80	0	some	some	some	some	some
85mm	some	some	some	some	some	some
Type-56 (M1939)	some	some	some	some	some	some
100mm	some	some	some	some	some	some
Type-59(KS-19)	some	some	some	some	some	some
RADAR, LAND	?	?	some	some	some	some
Cheetah (Arty)	?	?	some	some	some	some
RASIT (Arty)	?	?	some	some	some	some
Type-378	?	?	some	some	some	some
Y-8 aircraft	?	?	0	2	0	0
MSL, Tactical	0	some	some	0	?	some
SSM	0	some	some	0	?	some
M-9 (CSS-6/DF-15)	0	some	some	0	0	0
M-11 (CSS-7/DF-11)	0	0	some	0	0	0
HY-2 (CSS-C-3) Seerseeker	0	0	0	0	?	some
HY-4 (CSS-C-7) Sadsack	0	0	0	0	?	some
Helicopters	0	some	62	212+	381	0
Mi-8	0	?	0	30	30	0
Mi-17	0	?	0	24	47	0
Mi-171	0	?	0	30	45	0
Mi-171V5	0	?	0	?	69	0
Mi-6	0	?	0	3	3	0
Z-8A	0	?	0	4	7	0
Z-9A	0	?	30	73	61	0
Z-10	0	?	0	0	some	0
WZ-9	0	?	0	some	31	0
SA-342	0	?	8	8	8	0
S-70C2	0	?	24	20	19	0

Z-11	0	?	0	20	53	0
SA-316	0	?	0	0	8	0

Source: IISS, *IISS Military Balance 1984-1985* to *2006*, London, Routledge, 1985, 2006. *Numbers vary widely due to inconsistent reporting and classification.

Armored Forces and Main Battle Tanks

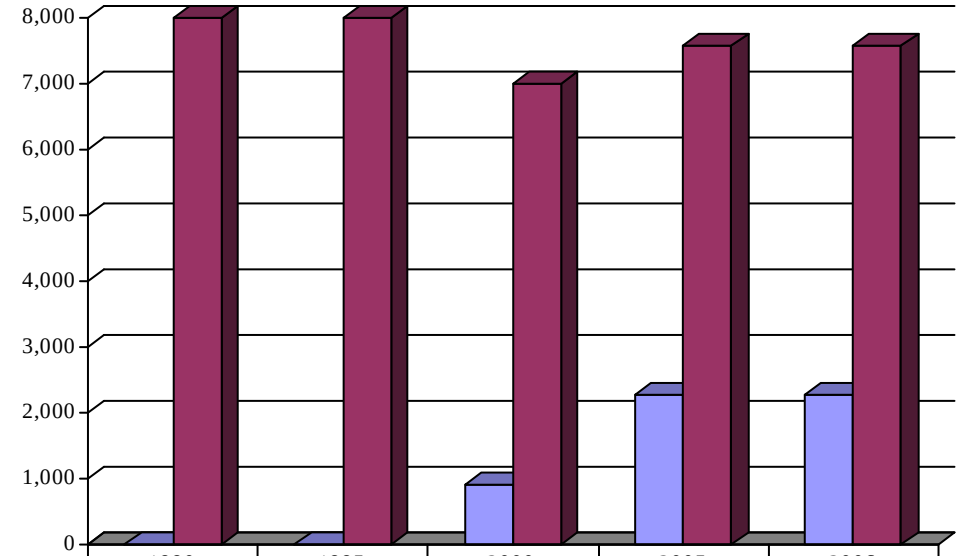
The PLA's total holdings of armored vehicles are shown in **Figure 19**. Although it has cut the size of its total forces, its emphasis on force quality has led to a steady increase in both the quantity and quality of its armored weapons.

Main Battle Tanks

China's holdings of main battle tanks are shown in **Figure 18**. China has very "tank heavy" forces, and its total holdings of main battle tanks remain high. Its holdings of at least 7,580 tanks outweighs any regional power with the exception of Russia, which holds a total of over 22,000 main battle tanks.

While in 1995 the ratio between Chinese modern and total tanks was 0:100, ten years later it stood at 30:100 (see **Figure 18**). Ratios between modern and total main battle tanks in the region are 0:100 for North Korea, 46:100 for South Korea, 41:100 for Taiwan, 29:100 for Japan, 1:1 for USPACOM, and 69:100 for Russia, albeit all of these countries have differing total numbers.

Figure 18: Chinese main battle tanks: Ration of modern to total MBTs*



	1990	1995	2000	2005	2006
Modern	0	0	910	2,280	2,280
Total	8,000	8,000	7,010	7,580	7,580

Source: IISS Military Balance 2006, *"modern" includes Type-88A/B, Type-96, Type-98/99. Jane's reports only 450 Type-96 in service, putting the total of modern tanks at 1,450, whereas the 2004 DOD report estimates 1,500 Type-96 in service.[89] The IDSS estimates a total of 10,100 tanks for 2000.[90] It is not clear however, if this count includes vehicles in addition to main battle tanks.

China has reduced the total number of tanks as compared to the 1990s, yet there was an increase of over 500 tanks (roughly the size of two armored divisions) between 2000 and 2005. Given the speed of force modernization and continuing funds and research effort provided, the increase of modern tanks as a share of the total inventory is likely to continue. The number of main battle tanks is, of course, contingent upon available personnel. Should reductions in overall manpower continue (see **Figure 16**), a large increase in the of number of tank holdings is not feasible, except if doctrinal changes heavily favor armored land warfare, for which there is currently no indication.

The backbone of the PLA's armored force remains the Type-59 main battle tank, which is comparable to a Russian T-54. Production of the Type-59 was reportedly completed in 1980.[91] The current number of tanks in use exceeds 5,000, which include several upgraded versions. This tank lacks basic modern features like weapon stabilization, protection, and fire-and-control system, although several updates were introduced in recent years, most notably a new Chinese-made smoothbore gun and improved ammunitions. The Type-59D is the most advanced upgrade with explosive-reactive armor, 105mm missile launching capabilities and an upgraded fire control system.[92] It is not known how many of the Type-59 tanks, which represent two thirds of all PLA tanks, have received which upgrades. It is clear, however, that the Type-59 remains inferior to any modern tank.

The Type-69 builds on the Type-59 chassis and is an improved version of the latter. Current figures from the IISS Military Balance do not state any holdings of Type-69 within the PLA, but since this tank is marked by only slight differences to the Type-59 it is not unlikely that stated numbers for Type-59 tanks include Type-69 tanks. Some versions have been upgraded, such as the Type-69III (also Type 79), which features an improved night vision and a British fire control system.[93] This tank features a 105mm-gun and was first introduced to the PLA forces in 1986. This late introductory date for a comparatively outdated tank may explain why the PLA only acquired 500-800 tanks. As of 2006, 300 Type-79 are reported to be in use.[94]

The major Chinese development for a second-generation main battle tank is the Type-80 (also Type-88 or Type-69III in some variants). This tank features improvements in virtually all areas of tank building. Its main weapon is a 105mm rifled gun, which can fire Chinese and Western-made ammunitions as well as laser guided missiles. Some improved variants of this tank must be considered modern; about 1,000 are reported to be in use with the PLA. According to reports, production of this tank is completed.[95]

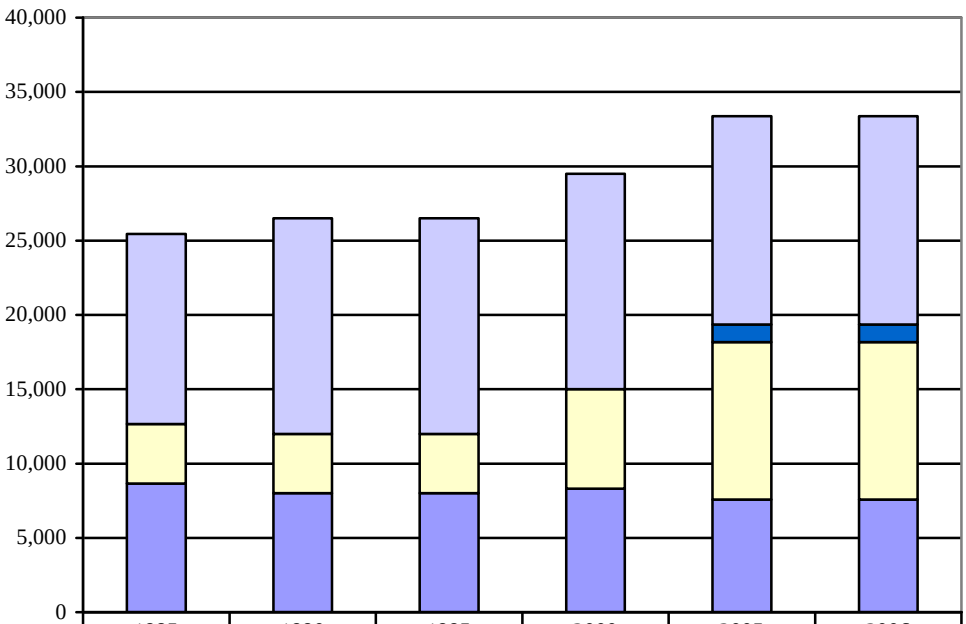
A further development of the Type-80 is the Type-85II (also Type-96 or Type-88C in variants). This tank reportedly has a fully welded steel turret and its fire control system allows the gunner to engage moving targets when in motion. The PLA has undertaken major upgrades to its Type96/88C main battle tanks. Those include a new turret with composite armor and the ability to fire missiles through the main gun.[96]

The most advanced PLA main battle tank is the Type-99 (Type-98I) that succeeded the third-generation prototype Type-98, which apparently was never deployed with field units. The Type-99 is based on the Russian T-72 chassis and has modern features in every aspect of tank building. According to Jane's, the Type-99 was introduced to field units in 1999 and the IISS reports holdings of 80 tanks for 2006, which equals the size of two

battalions.[97] Reports suggest that Type-99 tanks were deployed with the 38th and 39th group armies, which were and/or are the PLA's premier strategic rapid-reaction units.[98] According to reports, China equipped some Type-99 with a 140mm smoothbore gun for experimental purposes, however, there is no indication that tanks with this new gun have been fielded.[99] Blasko states that fewer Typ-99/98I will be introduced into active service as compared to Type-96 due their higher costs.[100]

Main battle tanks still serve a role as one of the main weapon systems for a high-intensity offensive or defensive land war. Tank warfare is restricted by terrain and asymmetric warfare. Newer developments in tank warfare, e.g. U.S. experiences with deploying tanks in urban areas, are still in the experimentation phase among U.S. forces and may have found little application in other armies. New-generation tank developments like armored-platform concepts appear to have attracted less attention in western countries. A project for an entirely new main battle tank, CSU 152, is reported to be under way in China. Specifications of this project remain unknown.[101]

Figure 19: Holdings of total and modern* tanks, armored fighting vehicles, and artillery 1985-2006



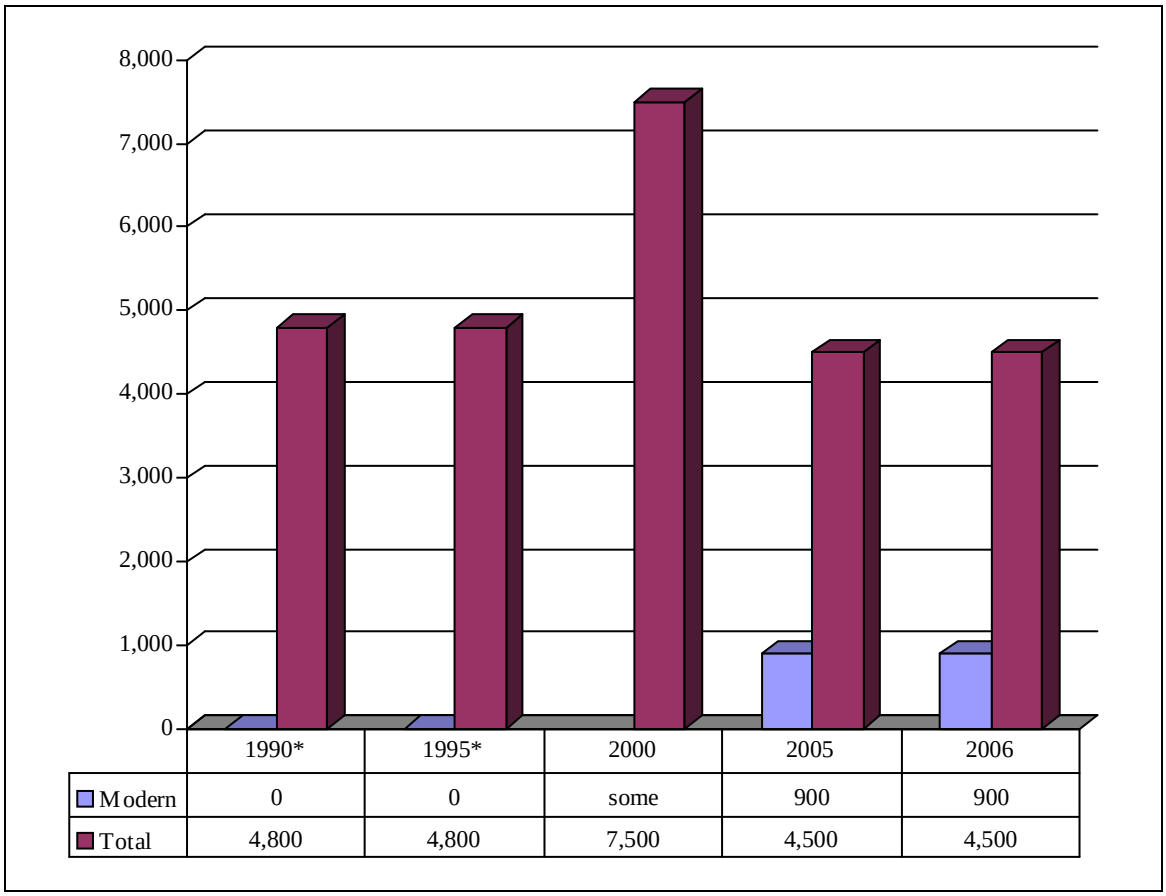
	1985	1990	1995	2000	2005	2006
Arty towed	12,800	14,500	14,500	14,500	14,000	14,000
Arty SP	some	some	some	some	1,200	1,200
APC/AIFV modern	0	0	0	some	-3,580-	-3,580-
APC/AIFV total	4,000	4,000	4,000	6,700	10,580	10,580
MBT modern	0	0	0	0	-2,280-	-2,280-
MBT total	8,650	8,000	8,000	8,300	7,580	7,580

Source: IISS, *IISS Military Balance 1984-1985* to *2006*, London, Routledge, 1985, 2006; *modern by 2006 standards. AIFV holdings for 1985-1995 likely are higher.

Mechanized Infantry and Light Tanks

The PLA's main holdings of other armored vehicles are shown in **Figure 19**; the current ratio of modern infantry vehicles to total holdings currently stands at 20:100 (see **Figure 20**). These holdings are dominated by the Type-63 tank and its variants. The tank's weapons include a three-person turret armed with an unstabilized 85 mm gun, a 7.62 mm co-axial as well as a 12.7 mm roof-mounted machine gun. According to reports, recent modifications to the vehicle stress improved amphibious capabilities; a version with a 105mm gun and better armor has been developed, too. An estimated 500 improved versions (Type-63A) have been fielded.[102] Jane's Defense Weekly reports that the Type-63A is fully operational with PLA ground forces units; many of these upgraded vehicles have also been fitted with outboard motors for amphibious capabilities.[103]

Figure 20: Ratio of Total to Modern Holdings of AIFVs (incl. light tanks)



	1990*	1995*	2000	2005	2006
Modern	0	0	some	900	900
Total	4,800	4,800	7,500	4,500	4,500

Source: IISS, *IISS Military Balance 1989-1990* to *2006*, London, Routledge, 1990, 2006. Modern: Type-89I (T), Type-92 (W). *actual figures for these years are probably higher.

The Type-77II of which there are currently 200 vehicles in service with the PLA ground forces, is an armored personnel carrier based on the Russian BTR-50.[104] The Type-77II as well as the Type-63 are outdated in terms of their mobility, armor, and firepower capabilities. Given their comparatively old age, it is not unlikely that these two types of vehicles will gradually be replaced by newer models. Moreover, as is the case with many

vehicles that have been fielded decades ago, it is probable that a high percentage of the vehicles require extensive maintenance work.

The PLA maintains an inventory of about 100 WZ-523/553. This vehicle appears to be mainly used for reconnaissance purposes. Judging from the comparatively low number of vehicles deployed it is possible that the WZ-523/553 mainly serves in artillery and other combat support units rather than as a combat personnel carrier in infantry units.

The only modern variant of tracked vehicles is the Type-89I (modified Type-85) vehicle. The IISS reports a total of 300 vehicles in use, and Jane's estimates that there are 10 different versions in use – from ambulance to radar carrier.[105] Although exact numbers for holdings of each variant are not available, the number of combat-ready fighting vehicles probably does not exceed a regiment-size unit.

Reports suggest, that China is developing a new type of armored fighting vehicle that places a 105mm gun on the Type-90/92 (WZ551) chassis.[106] Apparently, this vehicle is supposed to replace the 1,000 light tanks currently in use, which are outdated and are based on Russian designs of the 1960s. According to IISS estimates, over 600 vehicles under the designation Type-92 have been deployed. Different variants of this vehicle can be armed with surface-to-air and anti-tank-missiles, mortar launchers and different types of guns. The Type-92 is a comparatively modern, multi-purpose vehicle that reportedly has also been deployed with the PAP.[107]

Other reports state a new infantry fighting vehicle with a 100mm gun is under development (Type-97).[108] Reaching a weight of approximately 20-22 tons, such a vehicle is compatible with China's sea- and airborne transport capabilities. According to Jane's, China will produce a turret very similar to the BMP-3 and use it in its new type of infantry fighting vehicle.[109] This design includes with a 30mm gun and a design similar to Western vehicles in use. Jane's World Armies describes this new Chinese vehicle as having "significant improvements in key areas of armour, mobility and firepower over existing vehicles employed by the PLA"[110].

Blasko reports that in 2004 images of a new tracked airborne combat vehicle surfaced. The vehicle might have been deployed with the 15th Airborne Army. Its specifications remain unknown, it may have been developed on the basis of the Russian BMD-3.[111] The IISS reports that the PLA ground forces had an inventory of 100 BMD-3s in the year 2000 but not in subsequent years.[112]

A comparison of main battle tanks and armored fighting vehicles shows that less than a third of armored and mechanized ground forces operate modern fighting vehicles. Moreover, this is a theoretical number. It is unclear how many units and vehicles are truly operational. The disparity between comparatively modern and outdated combat vehicles means a significant impediment to combined and joint war-fighting capabilities. Cooperation between modern and outdated equipment significantly slows down military operations on the battlefield and reduces combat-readiness.

Still, the absolute numbers of PLA fighting capabilities remain high, certainly by regional standards. As outlined above Russia poses a notable exception to the rule. Among China's neighboring countries, North Korea comes second to China in terms of

mechanized land warfare capabilities yet does not reach half the number of Chinese main battle tanks and largely possesses outdated equipment.

The PLA ground forces reportedly have an inventory of about 1,000 light tanks – 400 Type-62 and variants, and 600 Type-63.[113] The former is a lighter version of the Type-59 main battle tank; it production reportedly was ceased in 1978.[114] Some versions reportedly were upgraded with the Type-63 turret.[115] In contrast to the Type-62, the Type-63 is an amphibious tank; apparently 500 tanks in service have received or are receiving upgrades (Type-63A), which mostly include a 105mm rifled gun, an improved fire control system, and, in some cases, explosive reactive armor.[116] Both vehicles are based on the models above and outdated in terms of combat effectiveness. It is unclear to which units light tanks are deployed, reports indicate that PLAN marines operate the Type-63.[117]

Anti-tank Weapons

Chinese ground forces retain an unknown number of Type-73 and Type-86 100mm guns.[118] According to Blasko, both types of cannons may be phased out in the near future. The same holds true for recoilless guns, although they are being replaced by anti-tank missiles.[119]

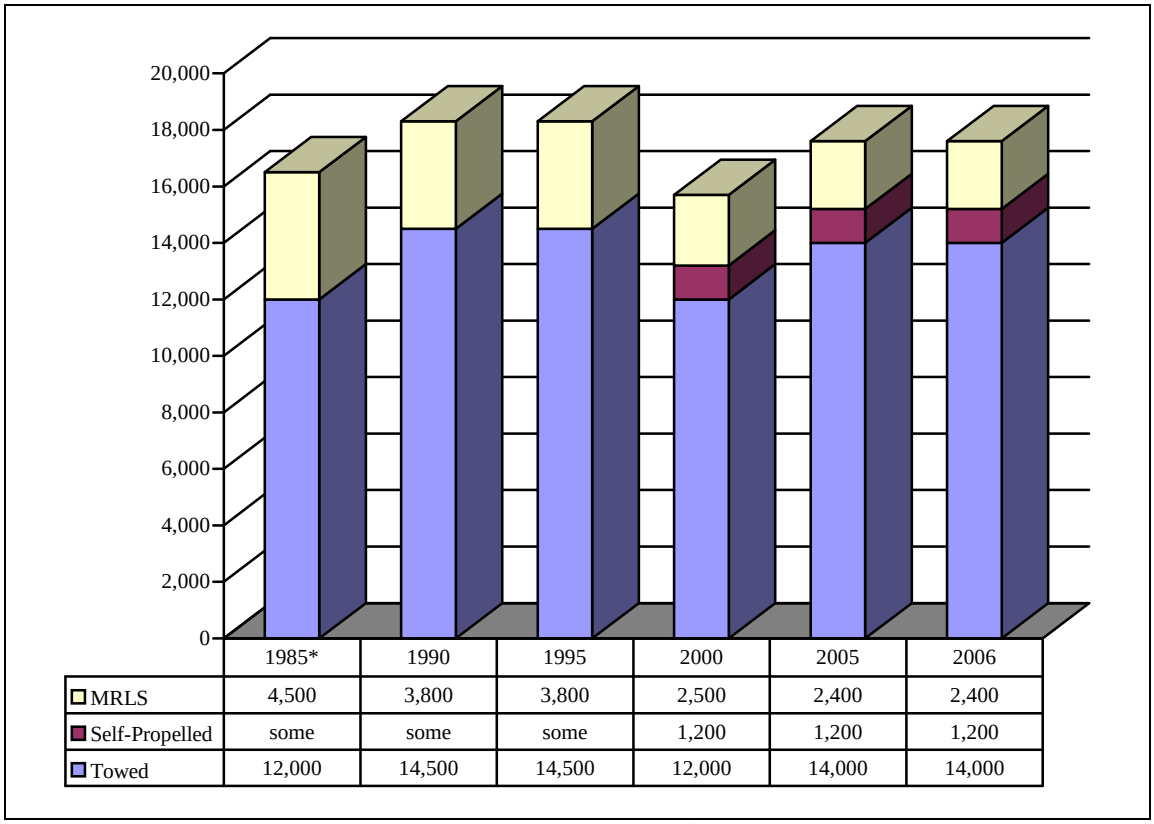
In addition, PLA forces have some 7,200 anti-tank guided missiles, which except 24 HJ-9 are comprised of HJ-73A/B/C and HJ-8A/C/E. All HJ-73 and HJ-8 missiles are wire-guided and resemble Sagger and TOW missiles; the HJ-9 is laser-guided.

Artillery

Figure 21 shows that PLA ground forces maintain a large inventory of artillery pieces, including towed field artillery howitzers, self-propelled howitzers, and multiple rocket launchers. In addition, an unknown number of mortar pieces are in service. The PLA ground forces artillery branch commands a small number of ballistic missiles, too. However, the total number of China's artillery pieces appears to be slightly less than neighboring North Korea's.

Trends show that the total number of artillery is increasing slightly with a greater share of self-propelled howitzers in service. The total number of towed howitzers in 2006 has increased by almost 17% in comparison to 2000, just to reach the numbers that prevailed in the 1990s. Holdings of self-propelled artillery pieces have remained steady in the past six years, precise numbers for the 1990s are not available. The number of multiple rocket launchers, however, has decreased by 37% between 1995 and 2006.

Figure 21: Holdings of towed vs. SP vs. MRLS artillery pieces



	1985*	1990	1995	2000	2005	2006
MRLS	4,500	3,800	3,800	2,500	2,400	2,400
Self-Propelled	some	some	some	1,200	1,200	1,200
Towed	12,000	14,500	14,500	12,000	14,000	14,000

Source: IISS, *IISS Military Balance 2006*, London, Routledge, 2006, *estimate for towed artillery.

Towed Artillery

The inventory of the PLA's field artillery includes approximately 15,200 howitzers, for which precise estimations about the holdings of each model are not available. The great majority of China's artillery pieces are towed howitzers, some of which are copies of Soviet World War II-era guns.

The IISS reports an unspecified number of Type-59 100mm guns.[120] Blasko suspects that this classification actually denotes the Type-86 100mm anti-tank gun, which is also in use ith the PLA artillery.[121] The Type-59 is believed to derive from the Russian M-1944 100mm field cannon. There are no information available as to whether the PLA actually has acquired Soviet M1944 and/or copied them.

122mm howitzers reported to be in use are the Type-54-1, Type-60, and Type-83. The Type-54-1 is a copy of the Russian M-30. The Type-60 122mm gun, once the backbone of China's field artillery forces, is likely to be replaced soon. The howitzer was developed in the 1950s and apparently it only remains in service with a few militia and reserve units.[122] According to reports, the Type-83 was developed in the early 1980s as a substitute for the Type-54 as the primary division indirect artillery weapon.[123] Blasko asserts that the Type-83 equals the Type-85 (D30) howitzer.[124] These howitzers have ranges of approximately 12, 24, and 18 km, respectively.

130mm howitzers include the Type-59-I, which is a copy of the Russian M46. The Type-59-I reportedly has a maximum fire range of over 30km with extended range ammunitions.[125] Sources indicate that the Type-59 130mm gun will be replaced by the Type-88 (PLL01 or WAC-21), a comparatively modern Chinese-developed gun that features a NATO-standard 155mm caliber.[126] This gun can fire extend range ammunitions to up to 39 km range and it can be fielded as a towed or self-propelled version.[127] The IISS reports current holdings of 150 Type-88 howitzers.[128]

Apparently, there are two types of 152mm guns in use, the Type-54 and the Type-60. The former is a copy of the Soviet D1 and the latter is a copy of the D20.[129] Blasko estimates that there may only be a few Type-54 left in service.[130] Jane's, on the other hand, reports an inventory of 6,000 that are currently in service.[131] The Type-60 152mm gun, on the other hand, appears to be introduced to the PLA ground forces in increasing numbers, although the howitzer was developed in the 1960s, based on the Russian D-20. This gun is ready to fire indigenously developed, laser-guided ammunitions.[132]

Self-propelled artillery

More than half of China's 1,200 self-propelled howitzers are made up of the 122mm Type-89. The Type 89 is deployed in artillery regiments (one howitzer battalion) of an armored division or brigade. Its maximum range is about 21km with extended range ammunitions.[133] A new variant mounted on a wheeled chassis with reduced combat weight is reported to be currently under development.[134]

The other 122mm howitzer is the Type-70I, for which the IISS reports holdings of an estimated 200 yet other sources report that less than 200 have been produced.[135] This weapon system is a 122mm mortar mounted on a Type-63 APC. Its combat-effectiveness most likely is comparatively low.

In addition, 500 Type-83 self-propelled howitzers are reportedly in service. The Type-83 is the self-propelled variant of the Type-66 152mm gun. It can fire laser-guided ammunitions up to a 20km range.[136]

Reports indicate developments of different types of howitzers. According to Blasko, the PLZ-45 155mm self-propelled howitzer has been exported to Kuwait yet it remains unclear if it has been introduced into service with the PLA. Other sources state that there might be a new development for a self-propelled vehicle based on the PLZ-45. According to Jane's *World Armies*, NORINCO is producing a new heavy 155mm self-propelled howitzer named PLZ05, which uses a turret design based on the Russian MSTA-2S19.[137] This production line has only been revealed in late 2005 and it is not clear when and in which variant the new howitzer will be introduced to the PLA forces. Other artillery modernization efforts include more laser- and satellite-guided 155mm (based on the Russian Kitolov) and 300mm artillery ammunition.[138] In addition, this howitzer is believed to be equipped with a Chinese copy of the 2S19's fully automatic loading system. Further, there might be an ongoing development of a 203mm howitzer, which may be deployed in either towed or self-propelled versions. The status of this development is unknown.

Multiple Rocket Launchers

China holds an inventory of about 2,400 multiple rocket launcher systems. This number stand in contrast to 2,500 for North Korea, 110 for Japan, 185 for South Korea, and over 300 for Taiwan.[139] The PLA has reduced the number of its MRLS by 37% between 1995 and 2006.

The weapons system in use, according to the IISS Military Balance 2006, are Type-81 122mm, Type-89 (SP) 122mm, Type-70 (SP) 130mm, Type-82 130mm, Type-83 273mm, and the Type-96 (WS-1) 320mm MRLS.[140] Specific numbers for each weapon system are unavailable. In addition, Jane's reports 48 284mm minelaying MRLS and 240 425mm mine disposal MRS. According to Blasko, a number of 107mm 12-tube MRLS remain in use, primarily with light infantry forces.[141]

It is not unlikely that the 122mm MRLS, particularly the Type-81, make up a large number of the total inventory. The Type-81 weapon system was introduced to the PLA in the 1982. It can fire 40 rockets in 20 seconds at a range of 20 to 30km. The launching system has also been used on tracked vehicles and in improved versions (Type-89 and Type-90 respectively, although the Type-90 has not been confirmed to be in use with the PLA).[142] According to Blasko, these MRLS are used in divisional artillery regiments and higher level units.[143]

Most 130mm MRLS appear to be phased out of service. Reportedly the Type-70, which used a Type-63 chassis was retired from service in the early 1990s. The Type-82 MRLS appears to be largely out of service, too. This weapon system reportedly entered service with the PLA in the early 1980s and has been replaced by the Type-81. Only a few Type-82 MRLS are reported to be in service with reserve forces. Both the Type-70 and the Type-82 have maximum firing ranges of about 10km.[144] Blasko, on the other hand, states that several types of 130mm are deployed with the PLA. A 30-tube version of the 19-tube system used with the Type-70 and Type-82 is called Type 85 when it is mounted on a Type-85 APC.[145]

The 273mm Type-83 MRLS appears to be phased out of service with the PLA. Its production reportedly was stopped in 1983. The four-tube MRLS with a maximum range of 40km is succeeded in development by an eight-tube 273mm MRLS that has a maximum range of 80km. However, it is not know whether a wheeled version called the WM-80 has been introduced into the PLA.[146]

Longer-range artillery includes the Type-96 320mm MRLS, that can reach up to 200km with WS-2 rockets. Jane's reports that some PLA ground forces units are receiving the 300mm A-100 MRLS which is based on the Russian Smersh, the IISS, however, does not include holdings for this in the latest Military Balance.[147] Other sources report that the A-100 has been seen in service with the PLA since 2002.[148] The A-100 appears to be a significant advance to older systems as it reportedly features GPS, a fully computerized targeting, and potentially advanced ammunitions.

Reports indicate that ongoing MRLS development includes the WeiShi series.[149] It features 302mm rockets for the WS-1 and WS-1B versions, 122mm rockets for the WS-1E, and 400mm for the WS-2, all launched from a wheeled vehicle. These systems have

been developed in the late 1980s and 1990s but they are not known to have been deployed with the PLA.[150]

Air Defense Artillery

The PLA ground forces employ a wide range of air defense artillery weapons. The inventory of about 7,700 air defense guns includes at least 50 Type-90 35mm guns and an unspecified number of Type-55 37mm, Type-56 85mm, Type-59 (KS-19) 100mm, Type-59 (S-60) 57mm, Type-65 37mm, Type-74 37mm, Type-80 (ZSU-23-2) 23mm, Type-80 57mm (SP), Type-85 25mm, and Type-88 37mm (SP) cannons. According to Blasko, larger caliber weapons (37mm and higher) will likely be found in air defense divisions and brigades as compared to smaller caliber guns in maneuver units. He also notes that many air defense cannons will likely be replaced by air defense missiles.[151]

Missile holdings consist of a reported 284 SAM, an unspecified number of MANPADS, and an unspecified number of HY-2 and HY-4 SSM. The SAM consist of 24 mid-range HQ-61 (probably one brigade unit), 200 short-range HQ-7 SAM, and 60 SA-15. According to Blasko, the PL-9 short range missile system has been developed, but has not yet been confirmed to be in service with the PLA ground forces.[152]

Army Aviation

The PLA ground forces aviation branch, according to numbers provided in the IISS Military Balance 2006, consists of at least 375 helicopters and according personnel. Around 10% of the total helicopter inventory are made up of attack helicopters (31 WZ-9 and 8 SA-342).

The army aviation branch within in the PLA has steadily been built up in recent years, totaling 12 regiments as of 2004 according to Jane's; eight regiments plus two training regiments reported by the IISS.[153] A major modernization includes the service of variants of over 150 Mi-17 currently inn service with PLA ground forces aviation. Jane's reported that the PLA ground forces "will remain committed to purchasing additional Russian Mi-17I".[154]

A new medium helicopter is being developed together with Eurocopter, apparently resembling the Agusta A-129.[155] This advanced attack model is called WZ-10 or Z-10, for which testing reportedly commenced in April 2003.[156] Reasonable information about this project are not available, some observers state that this helicopter will feature advanced flight performance capabilities and cutting-edge ammunitions.[157] Also, development for a WZ-11 version has been reported, although details remain unknown.[158] Currently in use is the WZ-9, of which 31 helicopters are reported to be in use with more being delivered.[159] The WZ-9 closely resembles the Eurocopter Dauphin.

Numerous sources cite the PLA's strong interest in acquiring unmanned aerial vehicles (UAVs).[160] The 2006 edition of the IISS Military Balance reports holdings of some Chang Hong UAVs.[161] These are based on U.S. Firebees that were captured during the Vietnam War.[162] Current holdings include an unspecified number of ASN-15/104/-105/-206/WS50.[163] Jane's reports that the PLA has a "significant interest" in UAVs and that it already operates several UAVs, some of which feature laptop-controlled units.[164] There have also been reports of imports of Israeli HARPYs (cf. Figure x). Blasko reports that

ASN-7, Chank Kong 1, and several drones are in service that serve as targets for artillery.[165]

At the same time, it is not clear which units are responsible for operating UAVs. Aside from target drones, and reconnaissance drones, it remains unknown whether the PLA has deployed armed UAVs or UAVs for combat support missions. According to Blasko, most drones of the ASN series perform reconnaissance, surveillance, and/or electronic jamming missions.[166]

Ballistic Missiles

Chinese ballistic missiles are discussed in more depth later in this analysis. The PLA ground forces do, however, maintain control over weapons like the M-11 SRBM weapons system. Reports indicate that these will be supported by a newly developed system of cruise missile equivalents.[167] Jane's reports in June 2006 that, according to Taiwanese sources, the 821st and the 819th Missile Brigades in the Guangzhou MR have made ground-launched land-attack cruise missile capabilities operational.[168] The same source reports that the type of missile in use with these units may be the DH-10.

Key Weapon Acquisitions and Procurements (SALW not included)

Figures 22 and **22** list major ongoing Chinese weapons imports and major weapons procurement activities in recent years. These figures reflect the trends discussed earlier in this analysis.

Figure 22: Chinese PLA Ground Forces Major Weapons Imports since 2000

Type	Source	Armament	Year	Number	Comments
Mi-17 helicopter	Russia	-	To be in service by 2005, IISS only lists 0	200	To be distributed to army aviation
Novator 3M-14E	Russia	LACM	?	?	Status unknown

Source: Jane's Sentinel Security Assessment, *China and Northeast Asia, Army*, 10 April, 2006, p. 4.

Figure 23: Chinese PLA Ground Forces Major Weapons Imports and Developments since 2000

Type	Class	Armament	Number and year to be completed	Comments
ZLC-2000	Airmobile tracked vehicle	30mm gun, HJ-73 ATGM IRV/HJ-8 ATGM	?	10 ton weight, first reported in use during 2005 "Peace Mission"
IFV	IFV, tracked	100mm/30mm gun/missile-launcher (Russian-based), may be replaced/modified by indigenous 105mm/350mm and HJ-9 ATGM	Ongoing	China is co-producing a version of the Russian BMP-3 turret for this vehicle.
Air-droppable vehicle	Based on Italian Iveco 4 WD truck	HJ-9 ATGM	?	
Type-59	Main battle tank		Ongoing	Upgrade of older Type-59 into Type-59D
LJ-63	LACM		200 by 2006	200-300km, derived from C-601 family
PLZ05	Self-propelled howitzer	155mm tube	Production revealed in 2005	based on the Russian MSTA-2S19
*A-100	MRLS, based on Russian 300 mm BM 9A52 (12-round) Smerch	300mm	Have entered service	100km+ range
*WS-2	MRLS	400mm		200km range
LD2000	Air-Defense	Seven-barrel 30mm		

Source: Jane's Sentinel Security Assessment, *China and Northeast Asia, Army*, 10 April, 2006, p. 3. *2006 DOD report.

Force Training and Readiness

Changes in training and exercises appear to underscore the PLA's doctrinal shift towards further modernization. Jane's reports that the PLA places increasing emphasis on joint exercises named "integrated joint operations"[169]. This corresponds with more joint logistical training efforts. In June 2004, the PLA commenced its first "triservice theatre joint logistics department"[170] operations.

Numerous reports draw inferences from the nature of PLA exercises to China's strategic contingency planning. These include the ability to intervene in a conflict in the Korean peninsula as well as intervening in Central Asia in order to secure regime stability or

resource supplies. Such analyses must be considered vague at best. Speculations about the large-scale 2005 exercise "Peace Mission 2005" with Russia ranged from underscoring political support toward Russia and the Shanghai Cooperation Organization, preparations for the invasion of Taiwan, and anti-terrorism.

Military training appears to be guided largely by the issuance of the Military Training and Examination Program (MTEP) in 2001. This guideline is a PLA-wide manual that focuses military training to concentrate on unit's core missions, a more realistic training, and improving the capabilities to operate in a high-tech combat environment.[171] Jane's notices that training development and evaluation centers have received increased funding in recent years.[172]

Amphibious exercises appear to have received particular emphasis among training development. It is very likely that an overwhelming presentation of joint amphibious capabilities aims at deterring Taiwan from taking political steps unpopular in Beijing. The Military Regions of Nanjing and Guangzhou feature constant joint exercises. In the summer of 2004 the armed forces held a joint exercise with 18,000 personnel that prominently relied on PLAAF and strategic missile forces.[173]

V. PLA NAVY (PLAN)

The PLAN's traditional and current major mission is to defend China's coastlines. Jane's states that the PLAN is increasingly preparing for combat operations further away from the coast as well as playing a role in a potential conflict over Taiwan.[174] The basis for this information remains unclear, but the PLAN undoubtedly possesses the capabilities to provide means for troop transport to Taiwan as well as conduct operations around Taiwan. Any meaningful assessment must weigh the actual ability of the PLAN to plan and sustain operations in such a contingency as well as how effectively the PLAN is able to operate in cooperation with the PLA ground forces, PLAAF, and Second Artillery Corps. This becomes even more important, should a conflict over Taiwan involve other powers.

As in the other PLA branches, the underlying doctrine for China's maritime force is "active defense". Against the background of this concept, the PLAN has structured its forces according to a three-stage naval deployment. The first stage concerns the immediate coastlines and the so-called first island chain, which together represent the maritime areas most vital to China's national interests, i.e. including Taiwan.

The first island chain near China's coast extends up to 200 nautical miles from China's seashores to the Kuriles in the north, following a line through Japan, the Ryuku Islands, encompassing Taiwan, the Philippines to Borneo (*brown water navy*). The second islands chain roughly follows the same line but extends to up to 700 nautical miles and encompasses all of Indonesia (*green water navy*).[175]

The third level would be represented by a virtually global force, capable of reaching and sustaining battle operations around the world (*blue water navy*).[176] Apart from the necessary equipment and logistical support infrastructure, there is little indication now that the PLAN can execute operations anywhere near blue water capabilities. The 2006 DOD report states that PLAN vessels conducted naval maneuvers outside their home waters for the first time in 2005, however single PLAN activities have been spotted outside China's 200-mile zone as early as during the 1980s.[177]

Doctrine

Recent developments in the PLAN's modernization have led to assign the term "Sea denial" as a key component of China's naval warfare strategy. This approach centers on capabilities to deter or prevent an enemy by force or to capture and hold a certain area. If China employs sea denial operations they will most likely involve a conflict or the prevention thereof in the Taiwan Strait. A capable submarine fleet is a key ingredient to sea denial.

China's White Paper on National Defense of 2004 states that the expansion of naval capabilities is going to be a focus of its overall armed forces development.[178] This has led many analysts to assume that China will develop blue water capabilities. In 1980 the appearance of a PLAN vessel in South Pacific waters was reported.[179] In September 2004, the PLAN dispatched a nuclear-powered submarine to the waters near Guam. Reportedly, its mission was to test U.S. and Japanese reactions to its presence and monitor these two countries' naval exercises.[180] The 2006 DOD report concedes that China's blue water

capabilities will materialize in a time frame described as "over the long term"[181]. The trend in naval modernization indicates that the PLAN concentrates on acquiring the means to lead and sustain warfare in the Taiwan Strait rather than build up a worldwide power projection force (see **Figure 25**).

McVadon states that "naval aviation no longer stands alone as though an almost separate service"[182]. At the same time a marked difference in understanding the purposes of naval aviation and thus joint operations between younger and senior officers seems to persist. References like this indicate that a separation between the naval aviation branch and the PLAN chain of command impedes joint campaign planning and execution even within one PLA service.

Command Structure

As part of the PLA, the PLAN's highest command authority lies with the CMC and its General Departments. In contrast to the PLA ground forces, a naval headquarters remains outside of the GSD, yet it is ultimately subordinate to the latter. The operational command chain consists of the three fleets, which are divided into coastal defense districts, which in return command sectors. The operational chain of command consists of divisions, regiments, and squadrons.[183]

Force Structure

The growth of Chinese naval capabilities is shown in detail in **Figure 24**. Once again, the scale of Chinese military modernization is clear, as is the tradeoff between force quantity and force quality. The Chinese PLAN is clearly evolving from a low technology coastal force to a far more effective deep-water navy.

Figure 24: Chinese Navy: Force Structure 1985-2006

	1985	1990	1995	2000	2005	2006
Manpower	350,000	260,000	260,000	220,000	255,000	215,000
Navy	350,000	260,000	260,000	220,000	255,000	215,000
Conscript	?	35,000	40,000	40,000	40,000	40,000
Reserve	?	?	?	?	?	?
Naval Aviation	some	25,000	25,000	26,000	26,000	26,000
Marines	some	6,000	5,000	5,000	10,000	10,000
Submarines	103	93	50	65	69	58
Strategic	0	0	0	1	1	1
Xia (SLBM)	0	0	0	0	1	1
SSBN	?	1	1	1	0	0
Tactical	102	92	48	64	68	68
SSN	2	4	5	5	5	5
Han (Type 091)	2	4	5	5	5	4
SSG	0	1	1	1	1	1
Romeo(Type S5G)	0	1	1	1	1	1
SSK	100	87	42	57	61	61
Kilo (RF Type EKM 636)	0	0	0	3	2	0
Kilo (RF Type EKM 877)	0	0	0	2	2	3
Ming (Type ES5C/D)	0	3	0	2	3	3
Romeo (E3SB)	78	84	33	34	35	20
Song (CSS-N-8)	0	0	0	1	3	9
Ming (ES5E)	0	0	9	15	16	16
W-class	21	0	0	0	0	0
SS	1	1	1	1	1	1
Golf (SLBM trial)	1	1	1	1	1	1

Destroyers	14	19	18	20	21	27
Guided Missile Destroyer	14	0	18	20	21	27
Sovremmeny	0	0	0	1	2	3
Luda III	0	0	0	1	1	1
Luda (Type-051)	10	16	15	13	11	11
Luda (Type-051DT)	0	0	0	0	2	2
Luda (modified)	0	1	2	2	2	2
Luhai	0	0	0	1	1	1
Luhu	0	0	1	2	2	2
Anshan (Soviet Gordy)	4	2	0	0	0	0
Frigates	22	37	37	40	42	44
Guided Missile Frigate	17	32	35	40	42	44
Jianghu Type I	11	13	13	26	26	14
Jianghu Type II	0	9	9	1	1	10
Jianghu Type III	0	2	5	3	3	3
Jianghu Type IV	0	2	2	0	0	1
Jiangwei I	0	0	3	4	4	4
Jiangwei II	0	0	0	6	8	10
Jiangdong	2	2	1	0	0	0
Chengdu	4	4	2	0	0	0
Ma'anshan	0	0	0	0	0	2
Patrol and Coastal Combatants	48	915	870	368	331	254
PCC	20	20	4	22	21	21
Haijui	0	10	4	2	2	2
Haiqing	0	0	0	20	19	19
Kronshtadt	20	10	0	0	0	0
PCI	0	290	350	111	87	50

Haizui	0	0	0	11	8	15
Shanghai	305	290	300	100	79	35
Huludao	0	0	5	0	0	0
Shantou	0	0	45	0	0	0
PCR	0	50	45	30	30	30
PFC	28	90	96	96	88	98
Hainan	28	90	96	96	88	98
PFM	0	215	217	93	96	55
Houkou	0	0	0	30	31	14
Houxin	0	0	6	20	22	16
Huang	0	0	1	5	5	7
Huangfeng/Hola	0	125	120	38	38	15
Hegu/Hema	0	90	90	0	0	0
PHT	290	160	100	16	9	0
Huchuan	140	100	100	16	9	0
P-4	80	0	0	0	0	0
P-6	70	60	0	0	0	0
Haikou	3	0	0	0	0	0
Swatow	30	0	0	0	0	0
Shandong	3	0	0	0	0	0
?	56	0	0	0	0	0
Mine warfare	23	56	121	39	34	69
Mine Sweeper Coastal	?	?	81	57	55	4
Lienyun	?	?	80	50	50	0
Wosao	?	?	1	7	5	4
Mine Sweeper Drone	?	60	60	4	4	46
Mine Sweeper Inshore	?	?	4	4	4	4

Shanghai	?	?	1	3	1	1
Wochang	?	?	3	3	3	3
Mine Sweeper Ocean	23	35	35	27	24	14
T-43	23	35	35	27	24	14
Minelayer	?	?	1	1	1	1
Belejan	?	?	1	0	0	0
Wolei	?	?	0	1	1	1
Amphibious	73	58	50	70	50	108
Landing Ship Medium	35	42	34	41	31	47
Yudao	?	1	4	1	1	1
Yudeng	?	0	0	0	1	1
Yuhai	?	0	0	12	12	13
Yuliang	?	30	30	28	17	22
Yuling	?	1	0	0	0	0
Yunshu	0	0	0	0	0	10
Hua (US LSM-1)	0	10	0	0	0	0
Landing Ship Tank	18	16	16	18	19	26
511-1152	18	0	0	0	0	0
Shan	0	13	13	3	3	0
Yukan	0	3	3	7	7	7
Yuting	0	0	0	8	9	10
YutingII	0	0	0	0	0	9
Craft	470+	400	400	285+	285+	?
Logistics and support	46+	118	164	159	163	163
AF (storage)	23	1	14	14	14	14
AGB (Icebreaker)	0	3	4	4	4	4
AGOR (oceanographic research)	0	35	33	33	33	33

AH (hospital ship)	0	0	0	2	6	6
AO (tanker, replenishment at sea)	0	3	2	2	3	3
AOT (tanker)	23	25	33	33	33	33
AR (repair ship)	0	2	2	2	2	2
AS (anti-submarine)	0	0	0	10	10	10
ASR (submarine rescue)	0	0	2	1	1	1
ATF (tug, ocean going)	0	23	25	25	25	25
Submarine support	0	8	0	0	0	0
Transport	?	17	30	30	30	30
Training	?	1	1	1	2	2
Naval Aviation						
Bombers	150+	180+	155+	75	68	130
H-5/ F-5/ F-5B	100	130	130	50	50	50
H-6	some	50	25	7	0	0
H-6D	0	some	some	18	18	30
IL-28	50	0	0	0	0	0
Fighter	600	600	600	378	74	346
J-5	some	some	some	0	0	0
J-6	some	some	some	250	0	0
J-7 (MiG-21)	some	some	some	66	26	0
J-8/J-8A/J-8B Finback	0	0	some	40	36	120
J-8D	0	0	some	12	6	0
J-8IIA	0	0	some	0	12	200
Fighter Ground Attack	0	100	100	50	250	296
JH-7	0	0	0	20	20	18
Q-5 Fantan	0	100	10	30	30	30
Su-30Mk2	0	0	0	0	0	48

J-6 (MiG-19S)	0	0	0	0	200	200
ASW	8	14	20	4	4	4
PS-5	0	4	5	4	4	4
Be-6 Madge	8	10	15	0	0	0
RECCE	some	some	some	7	7	7
H-5	some	some	some	0	0	0
HZ-5 Beagle	0	0	0	7	7	7
Maritime Patrol	0	0	0	4	4	4
Y-8X	0	0	0	4	4	4
Tanker	0	0	0	0	3	3
HY-6	0	0	0	0	3	3
Transport	60	60	some	68	66	66
An-12	?	?	0	0	4	4
Y-5 (An-2)	?	?	0	50	50	50
Y-7 (An-24)	?	?	0	4	4	4
Y-7H (An-26)	?	?	0	6	6	6
Y-8	?	?	some	6	0	0
Yak-42	?	?	0	2	2	2
Training	?	?	some	73	73	73
JJ-5	?	?	some	0	0	0
JJ-6 (Mig-19)	?	?	some	16	16	16
JJ-7	?	?	0	4	4	4
PT-6	?	?	0	53	53	53
Helicopters	some	68	68	35	51	78
SAR	some	68	53	21	27	35
SA-321	0	12	0	9	15	15
Z-5	some	50	40	0	0	0

Z-8/Z-8A	0	0	3	12	12	20
Z-9	0	6	10	0	0	0
Z-9C	0	0	0	12	0	0
Anti-Submarine Warfare	12	0	15	4	8	10
Super Frelon	12	0	0	0	0	0
SA-321	0	0	15	0	0	0
Ka-28 (Ka-27PL) Helix A	0	0	0	4	8	10
Assault	0	0	0	0	8	0
AS-565	0	0	0	0	8	0
Support	0	0	0	10	8	8
Mi-8	0	0	0	10	8	8
Missile, Tactical	?	some	some	some	some	some
YJ-6 (CAS-1)	?	0	0	0	some	some
YJ-6 (CAS-1),improved	?	0	0	0	some	some
YJ-8K (CSS-N-4)	?	0	0	0	some	some
Air-launched cruise missile	?	0	0	some	?	?
YJ-6/C-601	?	some	some	some	0	0
YJ-61/C-611	?	0	0	some	0	0
YJ-81/C-801K	?	0	0	some	0	0

Source: IISS, *IISS Military Balance 1984-1985* to *2006*, London, Routledge, 1985, 2006.

Submarines

The trends in PLAN major combat strength are summarized in **Figure 25**, and submarines are a key element of such forces. Over the past 20 years, the PLAN has cut the number of submarines almost in half to 58 and at the same time modernized its fleet. According to Shambaugh, Song-class submarines are supposed to replace Ming and Romeo-class vessels.[184]

In 2006, the PLAN operates 9 Song-class vessels and 39 Ming and Romeo-class submarines.[185] There are no confirmed reports if and how fast the replacement process is taking place. However, between 2000 and 2006 the number of Song-class vessels in service has increased from 1 to 9.[186] Other submarine replacement programs have not taken place yet; the decommissioning of holdings of Romeo-class submarines is largely

responsible for the reduction of the total submarine fleet. Jane's expects China to deploy a total of about 50 modern or near-modern submarines by the year 2010.[187] Starting with 15 in the year 2006, such an effort would require the production of 8 modern submarines per year.

In terms of SSBN capabilities, the IISS mentions one Xia-class vessel in operation for 2006, while Jane's reports that a Jin-class (094) SSBN was launched in July 2004.[188] If either of the vessels is operational is unclear. According to Jane's, the Northern Fleet commands all nuclear powered submarines, which include all strategic. The Xia-class submarines can carry up to 12 JL-1 ballistic missiles. The 094 class, which supposedly has a range of 6000 nautical miles is supposed to be equipped with the JL-2, which reportedly is in its developmental stage; it is a modified version of the DF-31 (see section VII). The SSBN submarines serve conventional naval as well as strategic roles.

The four ongoing submarine development programs represent a formidable force that will intensify and broaden China's ASW capabilities significantly if the current developments are pursued (see **Figures 25** and **26**). According to McVadon the four classes of submarines have the potential to engage in operations that combine advanced detection, and massive first- and second-strike abilities, particular with the Kilo-class' SS-N-27 missiles.[189] O'Rourke states that the Shang-class SSNs (093-class) may be equipped with LACMs.[190]

However, any measure of combat-superiority must take into account the integrated warfare capabilities with surface ships, naval aviation, and the other services. **Figure 25** shows that the modernization of submarine forces out of all major naval vessel categories has been the quickest and the most comprehensive in recent years. The further improvement of the submarine forces, ASW and ballistic missiles still depends on Russian deliveries and the access to Russian technology.

Moreover, submarines will not be able to exert its striking abilities they are not embedded in a multi-layer defense that includes advanced targeting, air defense, and radar capabilities. McVadon assesses that China is beginning to overcome a long-standing weakness in the latter two areas.[191] It remains to be seen in the interaction with other vessel classes, whether PLAN submarines can effectively utilize their capabilities.

Major Surface Combatants

The PLAN currently operates 27 destroyers (DDG). They include two Guangzhou-, three Sovremmeny-, two Lanzhou-, 16 Luda- (including modified versions), one Shenyang, two Luhu, and one Luhai-class destroyers.[192] Its indigenously-developed Luhu- and Luhai-class vessels must be considered the most modern in addition to the three Russian-made Sovremenny-class, which currently are the ships with the biggest displacement in service with the PLAN.

The Luhu- and Ludai-class vessels are equipped with two triple 324mm torpedo tubes, HQ-7 SAM systems, HJ-83 SSMs, and a 100mm twin guns. The Luhu-class vessels are also equipped with a FQF 2500 anti-ship mortar. Each ship carries two Z-9C ASW helicopters.[193]

The Sovremmeny-class vessels feature two twin 533mm torpedo tubes, 2 SA-N-7 SAM, 2 Smerch 3 anti-submarine rocket launcher, 2 twin 130mm cannons, and eight SS-N-22 SSM. In addition, the vessel carries one ASW helicopter, usually a Z-9C or a Ka-28.[194]

Most of the PLAN's destroyers will receive upgrades, replacing the 130mm guns that are currently in operation with new 100mm twin-gun turrets and improved fire control systems. Reports indicate that China is developing a new class of DDG, named the Luzhou-class (051C). This vessel is based on the Luhai-class (051B) hull but will be equipped with a SA-N-6 Russian air defense missile system.[195] Apparently, two vessels are currently undergoing tests. Information about when and how many vessels will be introduced into service are unavailable. Apart from its air defense capabilities, the 051C does not introduce any improved capabilities in terms of surface and submarine warfare, lest major upgrades will be installed.

The IISS reports 44 frigates in use with the PLAN. They include 14 Jianghu I-, ten Jianghu II-, three Jianghu III-, one Jianghu IV-, two Ma'anshan-, four Jiangwei I-, and ten Jiangwei II-class vessels. The latter two must be considered China's most modern frigates. With almost one-third of the entire frigate inventory reaching modern standards, in terms of modern-to-total holdings ratio, frigates are the most advanced out of any vessel types in the PLAN.

Jane's reports that China launched two new stealthy frigates (Jiangkai-class) in 2003 and one more in 2005.[196] The IISS Military Balance does not provide any inventory numbers for this frigate-class for the year 2006. Though the Jiangkei relies on French technology resembling the Lafayette-class, most of its weapons reportedly are either Chinese-made or Russian.[197]

Patrol and Coastal Combatants

China has reduced the number of its patrol and coastal combatants in recent years. The current holdings of 254 vessels contrast with 368 in the year 2000. At the same time the ratio of missile craft to total holdings has decreased from about 25% to 21%.[198] Today, the PLAN operates 14 Houku and 15 Hunagfeng/Hola craft that are equipped with CSS-N-1 SSM, and 16 Houxin and 7 Huang craft, which both feature CSS-N-4 SSM.[199] The remainder is represented by 98 Hainan-class coastal boats and other inshore vessels.

Landing Ships and Amphibious Capabilities

Within the PLAN, only the East and South Sea fleets maintain command over major landing ships.[200] Current holdings include 47 medium landing ships, including one Yudao-, one Yudeng-, 13 Yuhai-, 22 Yuliang-, and ten Yunshu-class vessels. These ships can carry two to six tanks plus up to 250 troops; a Yudeng-class vessel holds up to nine tanks plus 500 troops.[201]

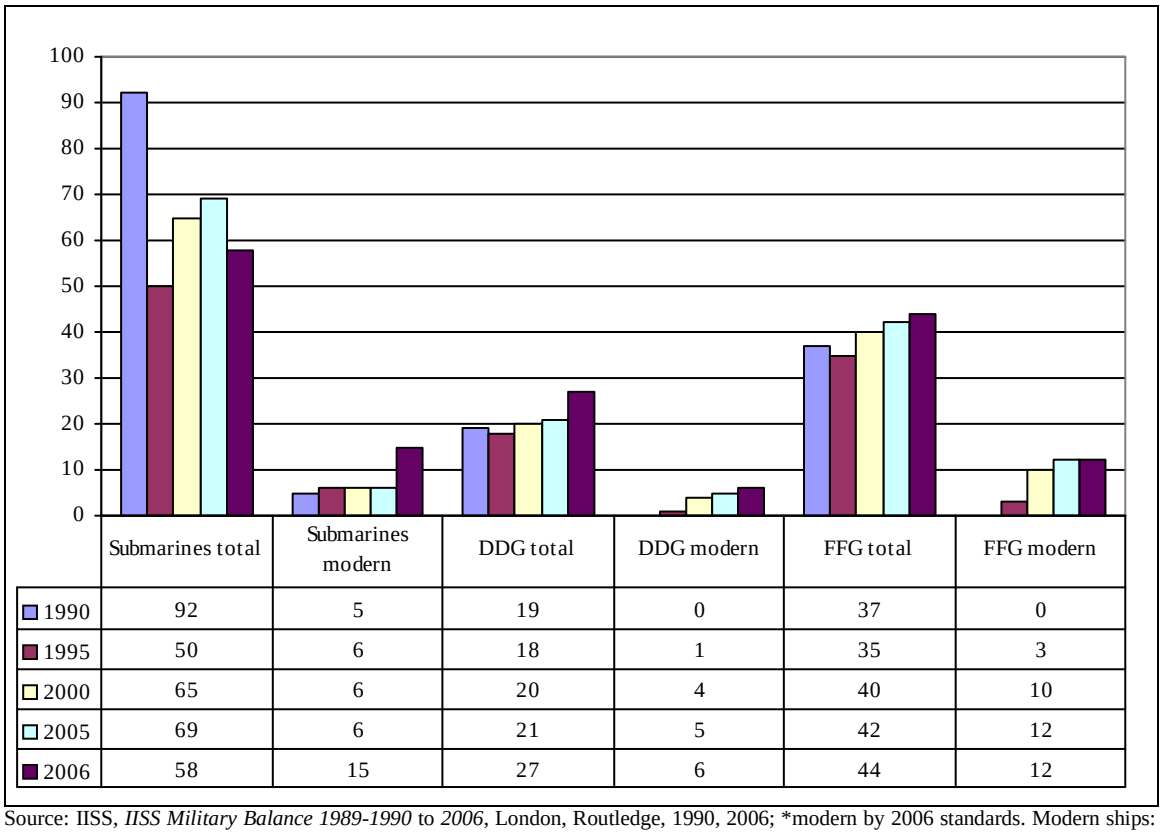
All of the seven Yukan-, ten Yuting-, and nine Yuting II-class tank landing ships cam hold at least ten tanks in addition to 250 troops. The Yuting II-class vessels, which were introduced in the 1990s, can also carry up to four landing craft vehicles.[202]

In addition, according to the IISS Military Balance 2006 the PLAN operates 158 landing craft, of which 120 are reported to be Yunnan-class vessels that hold either 10 tanks or

150 troops.[203] Other sources state holdings of 30 to 40 Yunnan-class ships.[204] Given that 280 boats of this class were produced in the 1960s and 1970s, the actual operational number may vary greatly.

If all PLAN landing ships and craft that, according to the IISS Military Balance 2006, are in service with the PLAN were deployed with maximum carrying loads, this would amount to a transportation capacity of about 620 tanks and 15,000 troops.

Figure 25: Development of Major Modern* Naval Vessels



	Submarines total	Submarines modern	DDG total	DDG modern	FFG total	FFG modern
1990	92	5	19	0	37	0
1995	50	6	18	1	35	3
2000	65	6	20	4	40	10
2005	69	6	21	5	42	12
2006	58	15	27	6	44	12

Source: IISS, *IISS Military Balance 1989-1990* to *2006*, London, Routledge, 1990, 2006; *modern by 2006 standards. Modern ships: SSN, SSBN, Kilo, 093 (Shang), 094 (Jin); DDG: Luhu, Luhai class, Hangzhou which is the Chinese classification for the Russian-made Sovremenny class; FFG: Jiangwei class.

PLAN Marine Forces

The South Sea Fleet maintains operational command over all PLAN marine forces. The IISS Military Balance estimates the number of forces as 10,000; other sources indicate two brigades composed of 6,000 troops each consisting of infantry, artillery, armor, engineer, communications, chemical defense, anti-tank, and reconnaissance units.[205] Jane's, in contrast, reports force strength as one peacetime brigade, which will be increased to divisions during wartime, which will be of 24 infantry, 8 armored, 8 artillery, and two independent tank regiments.[206] Currently, a marine brigade is made up of an armored regiment, an infantry battalion, a Special Forces battalion, an anti-tank battalion, an engineers/chemical defense battalion, and a signals battalion in addition to some specialized companies; all marine forces reportedly belong to rapid reaction forces.[207] Blasko points out that the PLA ground forces have more amphibious troops than PLAN

marines. The 1st and 124th divisions are amphibious, mechanized units. The 1st division is located in the Nanjing MR, the 124th in the Guangzhou MR.[208]

It is difficult to assess the tactical role and combat-effectiveness of the PLAN marine forces because their reliance on the PLAN. Reportedly, the marines do not have control over aviation assets but instead rely on the PLAN naval aviation.[209] This leaves the question of how well marines fit into the overall command and to what degree they are constrained by centralized decision-making. Not unlike PLAN aviation, the PLAN marines appear to be a relatively dependent service branch. It is questionable, how well one or two marine brigades can operate in any large-scale mission if cooperation with PLAN supply, combat-support, and air support fails to meet the needs of the PLAN marines.

PLAN aviation

The naval aviation forces (PLANAF) provide air support for the PLAN surface ships and submarines, reconnaissance and transportation missions. Currently, about 26,000 personnel are organized into nine aviation divisions. Each fleet command has one or two fighter divisions, a bomber division, one or two independent special mission regiments, and a ship-based helicopter regiment with its helicopters assigned to a specific surface ship.[210]

The navy aviation branch in recent years has undergone significant modernization. Out of its 346 fighter planes, 48 are Russian-made Su-30MKKs. These aircraft are arguably the most modern among all Chinese aircraft. KRIS assesses the combat strength of 24 of China's Su-30MKKs as almost equal to a U.S. battle carrier group.[211] Reports indicate that a third batch of 24 (approximately one regiment-size) Su-30MKK may be delivered by Russia in the near future.[212] All fighters currently in operation may be replaced by JH-7A, Su-30MKK2 and possibly J-10 fighter aircraft in the near future.[213]

The PLAN's 130 bomber aircraft, which consist of 100 H-5 bombers and variants, and 30 H-6Ds (based on Tu-16), are outdated by any standards. Given that production for these series commenced in the 1960s, it is questionable how many aircraft are actually in operation. According to Jane's some H-6Ds have been converted into tankers to provide refueling support to J-8D fighters.[214] The PLANAF reportedly has not started to conduct refueling operations before the late 1990s.[215]

Newer bomber developments apparently still use the H-6 as a platform. Reports indicate that an H-6M version with improved ASM missile pylons is being produced.[216] If and when any new bombers will enter service remains unknown.

Naval aviation holdings of patrol and reconnaissance aircraft remain fairly limited. The IISS reports holdings of seven HZ-5 reconnaissance aircraft, and four Y-8X maritime patrol aircraft.[217] Given poor coordination between PLAN forces and naval aviation (see above), it remains unclear to what extent PLAN vessels rely on naval aviation reconnaissance. The number of eleven reconnaissance aircraft is certainly comparatively low, given that South Korea's navy, which is one tenth of the PLAN's size, operates 8 reconnaissance aircraft, and Japan 80.[218]

Reportedly, Russian sources claim that China is interested in acquiring Su-33 aircraft – a modified version of the Su-27 that is used on aircraft carriers. According to Russian sources, China has expressed interest in developing its own aircraft carrier; despite long-standing rumors currently no indication of the beginning of planning an aircraft carrier is available.[219]

Naval Modernization

Any estimate of future PLAN modernization is necessarily uncertain. However, **Figure 26** indicates that the PLA will continue to modernize significantly over the next half decade. If these numbers are correct, it will gain a large number of modern submarines as well as greatly improve the ASW, air/missile defenses, and attack capabilities of its surface fleet.

The PLAN has commissioned several major new vessels in recent years, and reports suggest that modernization efforts will continue at a comparatively fast rate. Overall modernization, however, leaves a mixed picture. A RAND study states that:[220]

> China's shipbuilding industry now produces a wide range of increasingly sophisticated naval platforms using modern design methods, production techniques, and management practices. China's shipyards are now producing more-advanced naval vessels more quickly and efficiently than in the past.

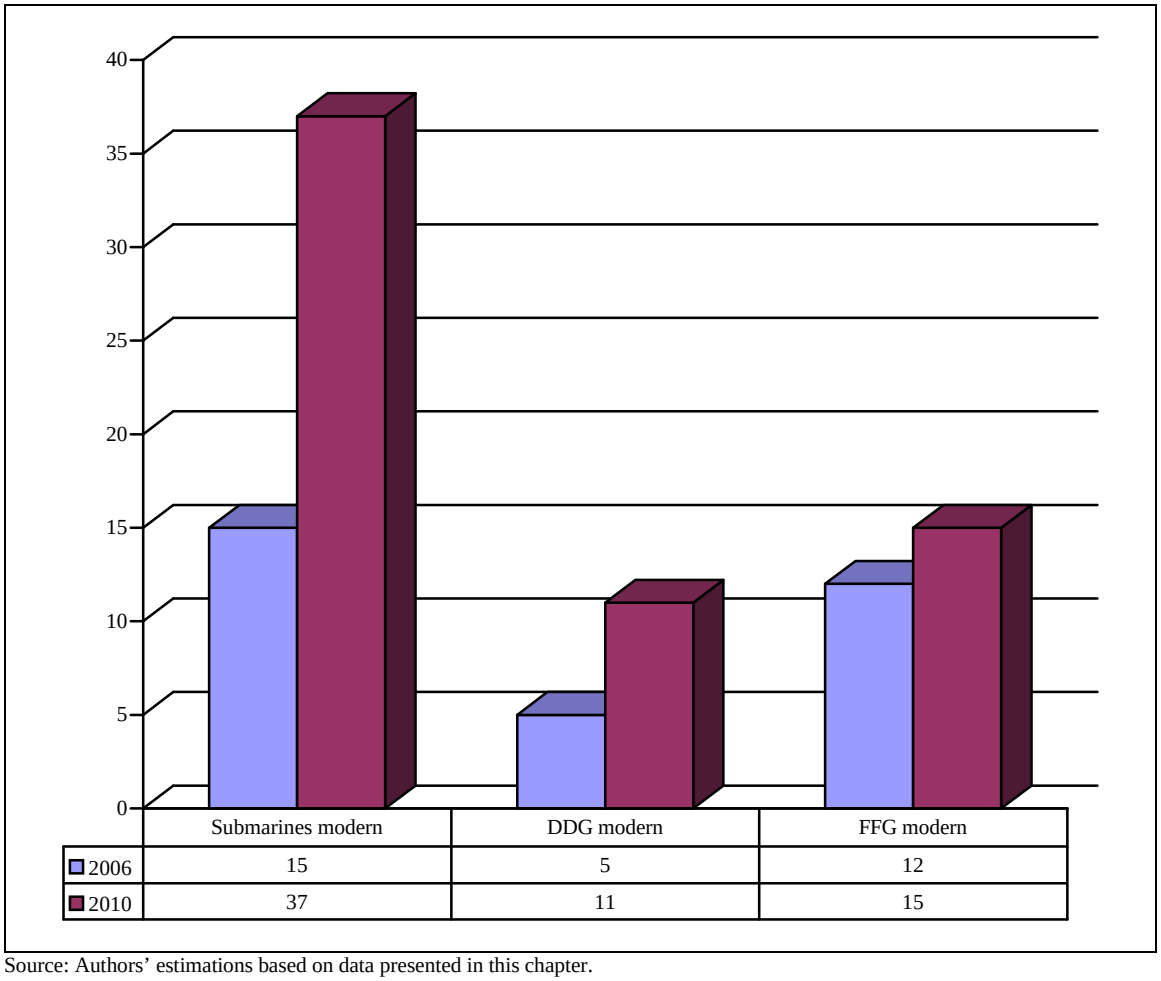
Although PLAN modernization has received countless praises as a pillar for China's military buildup, the overall picture is mixed. **Figure 25** indicates that of all major surface combatants and submarines, the number of submarines and missile-guided frigates has increased substantially. China has certainly demonstrated that it is capable to launch modern combat vessels.

At the same time, an examination of ongoing vessel developments suggests that if completed, new ships will enhance the PLANs war-fighting capabilities significantly by the end of this decade. For instance, the completion of new 094-class submarines will double China's sea-based nuclear missile capabilities by 2010. Such extrapolations often reveal themselves in retrospect to be too optimistic, however.

Whether the new PLAN ships will in service by the projected time, as has been indicated in **Figure 26**, depends on continued funding, control of technical difficulties, and introduction into the tactical guidelines of the PLAN. Failure to master these challenges may delay the modernization of the PLAN significantly.

It has become commonplace to equate the procurement of modern naval vessels, especially those for blue water capabilities, with expanded geopolitical ambitions. In the case of China, the nature of this correlation remains unclear. It is obvious that China has an interest in preventing a major armed conflict in Northeast Asia, possibly with U.S. involvement and expand its influence around its borders to stabilize potential crisis regions and raise economic clout. Yet this hardly can serve as a basis for predicting the use of the PLA.

Figure 26: Total major naval vessels 2006 vs. 2010 (based on reported current developments)



Source: Authors' estimations based on data presented in this chapter.

China's blue water capabilities remain yet to be developed, though China's ambitions in this regard continue to be fiercely debated. Numerous sources report of Chinese plans to acquire and/or develop an aircraft carrier in the future. Jane's states that attacking a U.S. aircraft carrier battle group is an objective that leads PLAN weapons procurement and order of battle considerations.[221] Currently, there are no indications that the construction of such a vessel is under way or that they have been purchased. Apparently, in 2000 Chinese military leaders devised a plan to build two 48,000-ton aircraft carriers. This plan is has also been referred to as the "891 project".[222] No reliable, concrete information on this project are available.

Some analysts estimate that China may first develop an aircraft carrier in the range of 30,000-40,000 tons displacement within the next 15 years.[223] Estimates about the date of an operational aircraft carrier range from 2015 to around 2020.[224] At this point, China does not possess any aircraft that can be deployed on an aircraft carrier yet this may be changed by the purchase of Russian Su-27s. Reports indicate that the PLAN is likely developing a twin-turboprop carrier aircraft similar to the U.S. S-1/E-1.[225]

Future developments will, of course, rely on ship building capabilities that use modern technologies and production techniques, available funding, and the determination that aircraft carriers are essential for China. As of 2006, every of these three aspects appear to be disputed in the Chinese foreign policy decision-makers' discourse. Reports state that China is significantly increasing its resources and management activities, and in this regard. As **Figure 25** shows, in the past five years, the commissioning of modern vessels has increased significantly as compared to five-year periods before. **Figure 26** extrapolates current trends until the end of 2010; if actual ship-construction will meet expectations, the number of submarines and destroyers will double in number.

Even if the PLAN will actively secure sea lines of communication, analysts disagree whether an aircraft carrier will add utility to maritime operations.[226] A deployment of submarines in combination with destroyers, frigates and land-based aircraft may prove to be sufficient and politically more viable.

PLAN weapon acquisition and procurement (SALW not included)

Figures 27 and **28** show the rate of PLAN major weapons imports and the level of modern ships now under development.

Figure 27: Chinese naval weapon systems imports since 2000

Type	Source	Armament	Year	Number
Submarine Kilo 887 and 636	Russia	3M-14 land attack cruise missile (300km) 3M-54 anti-ship cruise missile (220km) 91RE1 ASW torpedo later versions: Novator Club	2005	2 (eight ordered), 8 being delivered*
DDG 956E Sovremenny II	Russia	Moskit anti-ship missile (SS-N-22) (200km) Kashtan CIWS	2002, four 956EM to be delivered in 2006-07	2
FAC Molnya class	Russia	Moskit anti-ship missile (200km)	?	10-12
Su-30MKK2 Fighter aircraft	Russia	Kh-31A anti –ship missile Kh-59A anti –ship missile M400 SAR	Ordered in 2002	24, two more batches of 24 aircraft expected to be ordered
Tu-142 AEW helicopter	Russia		Reportedly in advanced negotiation phase	
Ka-28	Russia			IISS: 12, for DDG
Ka-29 Assault helicopter	Russia		Reportedly in advanced negotiation phase	40**
Ka-31 AEW helicopter	Russia		Reportedly in advanced negotiation phase	20**
Berlev Be-200 multipurpose amphibious aircraft	Russia		Reportedly in advanced negotiation phase	15
SS-27N Sizzler LACM***	Russia		?	To be used in Kilo-class submarines

Source: Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, p. 3. * Eric A. McVadon, "China's Maturing Navy", in *Naval War College Review*, Spring 2006, vol. 59, no.2, p. 100; **Wendell Minnick, "China Eyes Russian Warplanes", in: *DefenseNews*, 15 May, 2006, p. 1; *** Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, p. 29.

Figure 28: Chinese naval weapon systems development since 2000

Type	Class	Armament	Number and year to be completed	Additional comments
Submarine	093 SSN *Shang*	To be developed Tomahawk-class LACM.	3-6 until 2010, 2 entered service in 2004.	*U.S. Navy estimates the 093 series as quiet as Los Angeles-class
Submarine	094 SSBN *Jin*	JL-2	2-3 until 2010	
Submarine*	041 SSK *Yuan*		10 until 2010	
Submarine	039 SSK *Song*	YJ-82 ASCM*	20 until 2010, 11 by 2005	
Destroyer	051C DDG *Luzhou*	SA-N-6 SAM SA-N-20*	2, ?	
*Destroyer	052B DDG *LuyangI*	SA-N-7B SAM YJ-83 ASCM		
*Destroyer	052C DDG *LuyangII*	HHQ-9 SAM		
Frigate	054 FFG	SA-N-12 HHQ-7 SAM CS-802 ASCM		
FAC	Based on civilian AMD-150 made by Hang Tong comp.		30	New class of stealth FAC
Support ship	Fuchi class			
Landing dock amphibious assault ship	?	US LCAC style hovercraft, several attack helicopters		
Amphibious APC	Type-63C			Can fire Russian Bastion RPGs up to 5km.
LSM new class			1	
Large LDH	?			
LST	*Yuting*		7 in 2003-2004	
Z-10 attack and medium transport helicopter				
Z-8 small attack helicopter				
JH-7A fighter aircraft		C-801K, Kh-31 missiles		

Source: Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, p. 3. *Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, p. 15.

VI. AIR FORCE

The PLAAF currently has a force strength of about 400,000 personnel and 2,643 combat aircraft.[227] It comprises aviation forces, airborne, surface-to-air missile, anti-aircraft artillery, and radar forces. The PLAAF is organized along MR lines, with an operational command in each MR, except the Jinan MR.[228] The further command chain includes divisions, brigades, regiments, groups, and squadrons. A bomber division has about 10-12 bombers.[229]

Doctrine

The PLAAF prepares its training and order of battle for three possible campaign scenarios – offensive, defensive, and blockade missions.[230] The primary mission of the PLAAF is to conduct offensive as well as defensive operations, and joint and independent missions under high-tech warfare conditions.[231] The five PLAAF branches appear to still be relatively independent in terms of operational command. Only recently has the PLAAF begun to fly regiment-size units simultaneously during training exercises.[232] However, the PEACE MISSION exercises in 2005 have shown that the PLAAF tries to employ the full range of its combat aircraft in joint warfare with other service forces. Out of all PLA services the PLAAF still appears to be the last to develop a vision and doctrine of joint warfare.

The PLAAF since 1999 employs three tactical combat modes – stealth aircraft, cruise missile, and armed helicopter attacks and defense against precision air strikes, electronic jamming, and electronic surveillance and reconnaissance.[233] Allen identifies three key changes that have taken place in the development of the PLAAF doctrinal guidelines:[234]

- In 1999, the PLAAF revised its campaign strategy, assigning the PLAAF the mission to execute three types of campaigns - air offensive, air defense, and air blockade campaigns.
- In 2001, the PLAAF changed its training guidelines. The new guidelines stress training against assumed enemies and the increased reliance of technological applications in the
- This was accompanied by a change in its underlying Outline for Training and evaluation in 2002.

The sea change in doctrine on all levels in contrast to the 1990s refers on the one hand to an expansion from defensive to offensive and air blockade missions, and, on the other hand, the ability to perform joint missions with all other PLA branches on a tactical level.[235]

In terms of strategic doctrine, the PLAAF was designated in June 2004 to play a strategic role alongside the other two services of the PLA. The force structure provided below shows, that the PLAAF's equipment, in particular modern, long-range bombers, at this time does not meet the demands this doctrinal shift. Allen states that the employment of poses "the biggest technical obstacle China will face in building a strategic air force"[236]. Future Chinese procurement of long-range bombers and/or ballistic missiles will allow more detailed assessments of what kind of warfare the Chinese strategic air doctrine envisions.

Force Structure

The trends in the PLAF's force structure and equipment are shown in detail in **Figure 29**. Allen argues that the PLAAF has significantly changed its force structure as well as equipment and command facilities during the time of the eighth and ninth five-year plans (1996-2006). This change has resulted in a shift to a force that appears to be capable of conducting "mobile, offensive, joint operations"[237]. U.S. reports such as those written by the DOD and CFR reach similar conclusions.

Figure 29: Chinese Air Force: Force Structure, 1985-2006

	1985	1990	1995	2000	2005	2006
Manpower	490,000	470,000	470,000	420,000	400,000	400,000
Air Force	490,000	470,000	470,000	420,000	400,000	400,000
Reserve	?	?	?	?	?	?
Total Aircraft	5,300	5,000	4,970	3,000	1,900+	2,643*
Bomber	620	395+	470	120	180	222
H-5/F-5/F-5B	500	275+	350	0	40	94
H-6 (Tu-16)	120	120	120	0	0	20
H-6E/H-6F/H-6H	0	0	0	120	140	62
Possibly with YJ-63 cruise missiles	0	0	0	0	20	46
Fighter	4,000	4,000	4,000	1,015	936	1,252
J-5	400	400	400	0	0	0
J-6B/D/E	3,000	3,000	3,000	0	0	0
J-7	200	300	500	0	0	0
J-7II	0	0	0	400	400	400
J-7IIH	0	0	0	|	50	0
J-7IIM	0	0	0	|	24	0
J-7III	0	0	0	100	0	0
J-7C	0	0	0	0	50	36
J-7E	0	0	0	200	150	296
J-7G	0	0	0	0	0	24
J-8	30	200	100	100	20	153
J-8B	0	0	0	150	0	0
J-8IIA	0	0	0	0	40	52
J-8IIB	0	0	0	0	50	0
J-8IID	0	0	0	0	24	0
J-8III	0	0	0	0	0	40
J-8IIE	0	0	0	0	50	0
J-10	0	0	0	0	0	62
Su-27	0	0	24	65	78	116

Su-30 MKK	0	0	0	0	0	73
FGA	500	500	500	1,800	626	1,169
J-4	some	0	0	0	0	0
J-6	0	0	0	0	300	0
J-6A	0	0	0	0	50	0
J-6B/D/E	0	0	0	1,500	0	0
JH-7	0	0	0	0	0	13
JH-7A	0	0	0	0	0	26
Q-5	some	500	500	0	0	0
Q-5C/D	0	0	0	300	300	408
MiG-19	0	0	0	0	0	722
Su-30MKK	0	0	0	40 (delivered)	76	0
RECCE	130	290	290	290	290	53+
HZ-5	some	40	40	40	40	0
JZ-5	0	150	150	0	0	0
JZ-6 (MiG-19R)	some	100	100	100	100	45
JZ-7 (MiG-21)	0	0	0	some	some	some
JZ-8 Finback	0	0	0	0	20	8+
Tu-154M	0	0	0	2	4	4
Tanker	0	0	0	6	10	10
HY-6	0	0	0	6	10	10
Transport	550	420	600	425	513	296+
BAe Trident 1E/2E	18	18	18	0	0	0
An-12	some	25	25 (some tkr)	68	49	4
B-737-200	0	0	0	6	8	15
CL 601 Challenger	0	0	0	2	5	5
Il-14	some	30	30	0	0	0
Il-18	some	10	10	2	2	0
Il-76 Candid	0	0	10	14	20	13
Li-2	some	50	50	0	0	0
Tu-154	0	0	0	15	15	17+
Y-11	0	Some	15	15	15	20
Y-12	0	some	2	8	8	8
Y-5 Colt	300	300	300	300	300	170
Y-7/Y-7H (An-26)	10	20	25	45	93	41
Training	some	some	some	200	200	493+
CJ-5	some	some	some	0	0	0
CJ-6	some	some	some	0	0	0

HJ-5	some	some	some	some	some	0
J-2	0	some	some	0	0	0
JJ-2	0	some	some	0	0	0
JJ-4	some	some	some	0	0	0
JJ-5	some	some	some	0	0	0
JJ-6 (MiG-19UTI)	some	some	some	some	0	142
JJ-7 MongolA	0	0	0	some	50+	some
JL-8 (K-8)	0	0	0	some	8+	179+
PT-6 (CJ-6)	0	0	0	some	0	140+
Helicopters	400	400	400	170	90-100	80
Support	some	36	36	36	46	56
SA-321 Super Frelon	some	0	0	0	0	0
AS-332 Super Puma	0	6	6	6	6	6
Mi-8	0	30	30	30	40	50
Utility	some	338+	465+	134	24	24
S-70C-2	0	24	20	0	0	0
Z-5	some	300	250	100	0	0
Z-6	some	some	100	0	0	0
Z-8	0	0	15	0	0	0
Z-9 (AS-365N Dauphin 2)	some	10	50	30	20	20
Mi-17	0	0	28	0	0	0
Bell 214	0	4	4	4	4	4
UAV	0	0	0	some	some	some
Chang Hong	0	0	0	some	some	some
AD	0	some	some	?	?	?
SAM	0	0	0	100+	100+	?
TOWED	0	some	some	500+	500+	500+
HQ-2 (SA-2)	0	some	some	500+	500+	500+
HQ-61	0	some	some	0	0	0
SP	0	0	0	240+	228+	1,078+
HQ-7	0	0	0	100+	60+	60
HQ-9	0	0	0	0	24	24
S-300PMU1/2 (SA-10A/B)	0	0	some	120	0	850
S-300PMU2 (SA-10C)	0	0	0	0	144	144
HQ-15 FT-2000	0	0	0	20+	0	0
GUNS	16,000	16,000	16,000	16,000	16,000	16,000
35mm	0	some	some	0	0	0
57mm	some	some	some	0	0	0

85mm	some	some	some	?	?	?
100mm	some	some	some	?	?	?
Missile	some	some	some	?	4,500	4,500
ASM	0	some	some	some	some	some
C-601	0	some	some	0	0	0
C-801	0	some	some	0	0	0
AS-14 Kedge	0	0	0	0	some	some
AS-17 Krypton	0	0	0	0	some	some
AS-18 Kazoo	0	0	0	0	some	Ssome
YJ-61	0	0	0	some	0	0
YJ-63	0	0	0	0	some expected	some
YJ-81K	0	0	0	some	0	0
HY-2	0	0	0	Some	0	0
HY-4	0	0	0	some	0	0
AAM	0	0	0	600+	4,500+	4,500+
AA-12 Adder	some	some	some	100 on order	100	100
P-27 (AA-10 Alamo)	0	0	0	250+	1,200	1,200
P-37 (AA-11 Archer)	0	0	0	250+	3,200	3,200
PL-2	0	0	0	0	0	0
PL-2B	some	some	some	some	some	some
PL-5B	0	0	0	some	some	some
PL-7	0	some	some	?	?	?
PL-8	0	some	some	some	some	some
PL-9	0	0	some	some	0	0
PL-12	0	0	0	0	some	some

Source: IISS, *IISS Military Balance 1984-1985* to *2006*, London, Routledge, 1985, 2006.

Chinese Air Strength by Category

The broad trends in Chinese air force strength, modernization, and readiness are shown in **Figures 30** to **33**. **Figure 30** shows Chinese aircraft modernization by type. **Figures 31** and **32** indicate that despite all modernization efforts, the PLAAF's modern combat aircraft have a share under 10% of the total inventory. Growth rates over the last decade have been impressive, the PLAAF increased its holdings of modern aircraft more than tenfold between 1995 and 2006.

The number of flying hours shown in **Figure 33** should not be overestimated since it does not take the quality of the training into consideration. The 2003 CFR report states that PLAAF pilot training has improved in recent years but still remains "a challenge", especially when flying fourth-generation planes.[238]

Bombers

Modernization has not been consistent in this aircraft category. The Chinese bomber force of about 222 aircraft is largely outdated. The current inventory consists of 94 H-5 bombers and variants, which were developed in the 1950s, based on earlier Russian designs and 126 H-6 bombers and variants.[239]

The H-6 and its variants is the most common bomber plane in the PLAAF. This model serves as a nuclear bomber, and tanker aircraft in variants. Sources indicate that H-6 production has resumed in the 1990s after it was halted.[240] A new H-6H version is equipped with improved electronic devices for reconnaissance and command purposes and can carry two KD-63 air-to-surface missile. According to the IISS Military Balance 2006, 46 aircraft are possibly equipped with YJ-63 LACM missiles.[241]

Reportedly, China has had a long-standing interest in acquiring Russian Tu-22M3 bombers.[242] This aircraft is a nuclear-capable medium-range bomber. Acquisition of this aircraft in large numbers will certainly boost China's bomber capabilities. Any procurement of medium- and long-range bombers will certainly hint to China's strategic ambitions.

Fighters and Fighter Attack Systems

Chinese tactical aviation, in contrast, has had substantial modernization, but still has large obsolete and obsolescent elements. The PLAAF's inventory of fighter airplanes is now estimated at 1,252 aircraft. More than half are represented by the J-7 and variants. This plane is a 1950s design based on a Russian MiG-21, although the J-7E and/G variants were introduced into the PLAAF in the 1990s and in 2002 with improved avionics.[243]

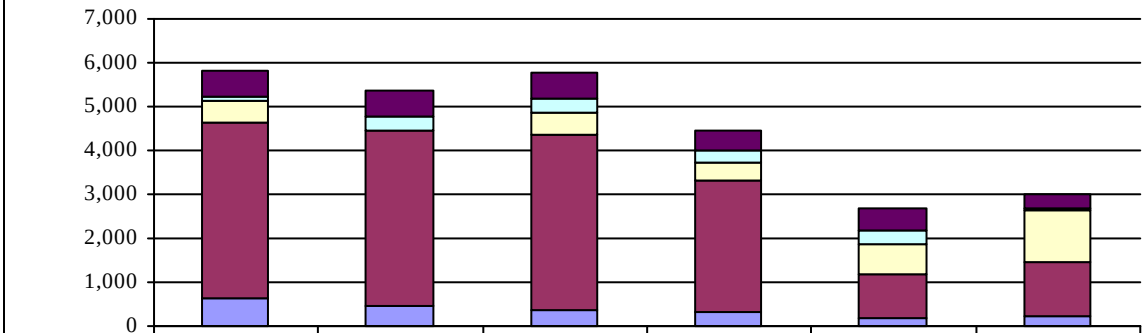
The 245 J-8s plus variants are an indigenously-developed fighter plane that was first fielded in the mid-1980s. The aircraft are equipped with PL-5 and PL-8 air-to-air missiles. The IISS Military Balance states that 40 J-8III aircraft are in service, while other sources state that this program has been cancelled after the only prototype crashed.[244]

Indigenous production of a fourth-generation fighter (J-10) is in progress. Shambaugh reports that the development for this model is based on the F-16A/B that entered China through Pakistan in the 1990s.[245] Shambaugh and other sources claim that the Israeli Lavi program provided serious input for the J-10.[246] Apparently, the J-10 has entered service with the PLAAF in 2004.[247] The J-10 reportedly can carry PL-8, PL-12 AAMs, Russian-made R-73, R-77 AAMs, or YJ-8k and YJ-82K and supposedly will be fitted to carry the YJ-9 if it enters service.[248]

The PLAAF also holds 116 Russian-made Su-27SK and 73 Su-30MKK aircraft, arguably its most modern fighter aircraft. All Su-30MKK in service are deployed in the Nanjing and Guangzhou areas.[249] These aircraft are ready to be equipped with precision-guided missiles such as the R-77 AAM.[250] In addition to the roughly 150 acquired Su-27/30 airplanes, 200 were licensed for Chinese domestic production.[251]

Reports indicate that China may have up to three indigenous 5th-generation fighter programs running, one by Shenyang, one by Chengdu.[252] Details of these programs remain unknown.

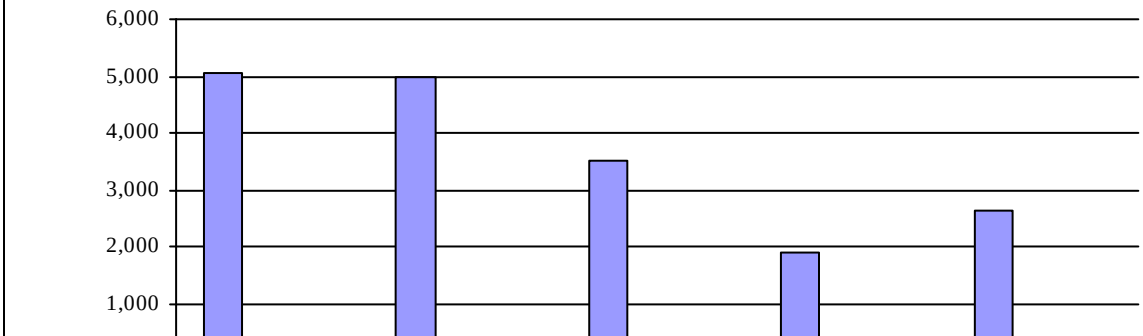
Figure 30: Aircraft holdings by type, 1985-2006



	1985	1990	1995	2000	2005	2006
Transport	550	600	600	425	513	296
Recce	130	290	290	290	290	53
Fighter GA	500	*	500	400	700	1,169
Fighter	4,000	4,000	4,000	3,000	1,000	1,252
Bombers	620	470	370	320	180	222

Source: IISS, *IISS Military Balance 1984-1985* to *2006*, London, Routledge, 1985, 2006, *only total fighters number available.

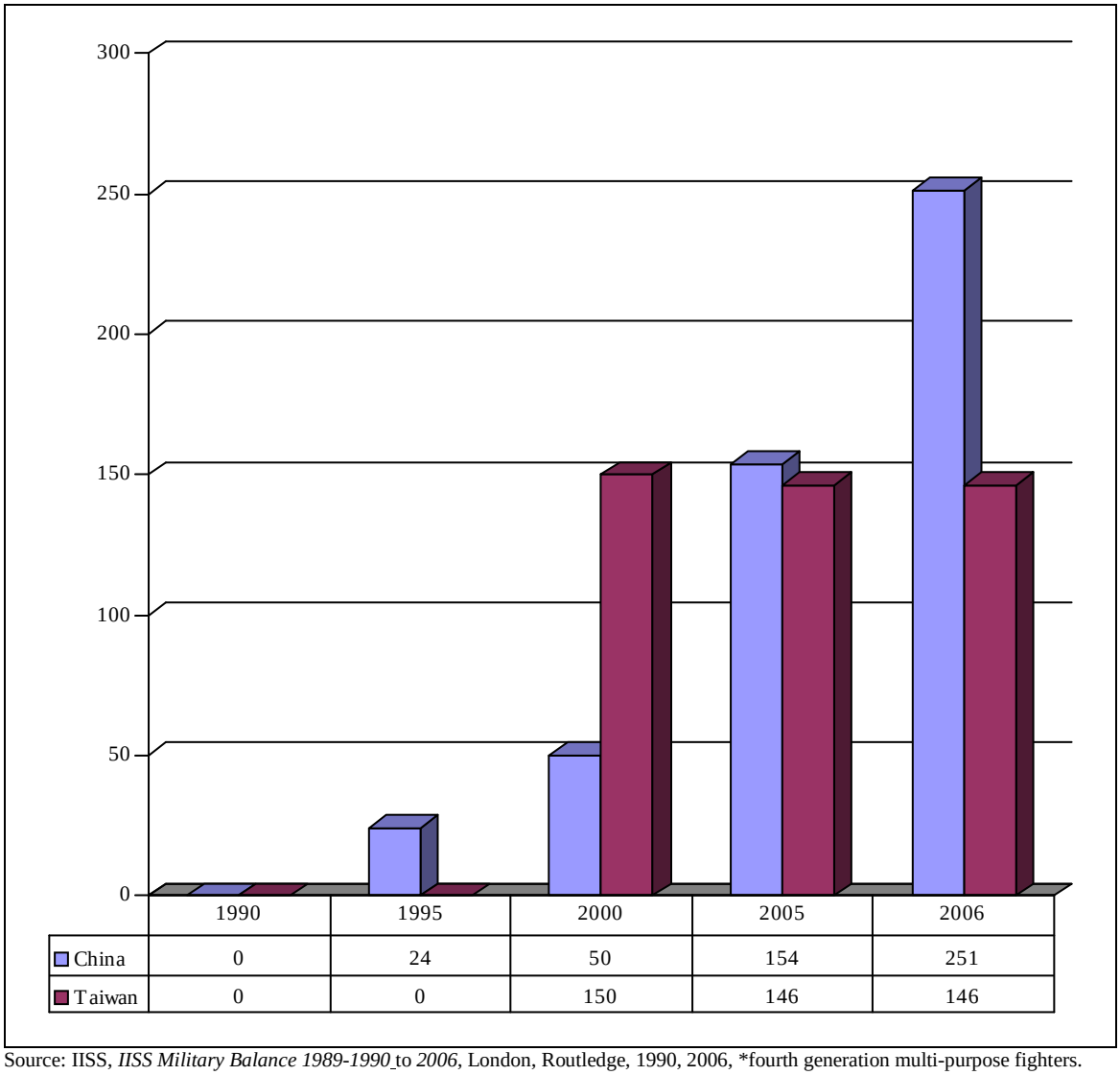
Figure 31: Holdings of modern combat aircraft vs. total aircraft



	1990 - total	1990 - modern	1995 - total	1995 - modern	2000 - total	2000 - modern	2005 - total	2005 - modern	2006 - total	2006 - modern
FC-1		0		0		0		0		?
J-10		0		0		0		0		62
Su-30MKK		0		0		0		76		73
Su-27		0		24		50		78		116
Total	5,070	0	4,970	-24-	3,520	-50-	1,900	-154-	2,643	-251-

Source: IISS, *IISS Military Balance 1989-1990* to *2006*, London, Routledge, 1990, 2006.

Figure 32: Holdings of PLA modern* combat aircraft vs. Taiwanese modern aircraft



Source: IISS, *IISS Military Balance 1989-1990* to *2006*, London, Routledge, 1990, 2006, *fourth generation multi-purpose fighters.

Figure 33: Training flying hours for select countries (per year)

Country	Flying Hours			
	Fighter	Bomber	Tanker	Airlift
China	130-180 (Su-27/-30)	80	?	?
Taiwan	180			
North Korea	20			
South Korea	?	?	?	?
Japan	150			
Russia	20-60			
USA	189	260	308	343

Source: IISS, *IISS Military Balance 2006*, London, Routledge, 2006.

Reconnaissance

According to the IISS Military Balance 2006, the PLAAF has reduced the number of its aircraft denoted for reconnaissance purposes by over 81%.[253] 45 of the remaining 53 aircraft are JZ-6 that are by any standards outdated in terms of avionics and reconnaissance capabilities. The remaining few JZ-7 and JZ-8 aircraft do not represent a major improvement over the JZ-6.

It appears that China is expanding its airborne early warning program. It currently operates four Y-8 and an unspecified number of A-50, but is reported to have tested an improved version with different radar systems in 2005.[254]

The overall number of reconnaissance aircraft appears comparatively low; there has been a steep decline in numbers in recent years. At this point it remains unclear, if reconnaissance missions will increasingly be shared with other branches such as ground forces aviation or naval aviation, or if China plans to shift reconnaissance roles to UAVs, satellite systems or other non aircraft-based means.

Tanker and Transport

According to the 2006 IISS Military Balance, the PLAAF holds about 296 transport plus ten tanker aircraft.[255] 170 of all transport aircraft are of the Y-7 type, which is a Chinese copy of the Russian An-24.[256] This aircraft can carry a maximum cargo of up to 5,700 kg, or 50 passengers, or 24 equipped troops. The biggest Chinese transport airplane is the Russian IL-76MD, which has a maximum payload of 47 tons. The PLAAF has twelve of these aircraft in operation with further orders pending, but reportedly seeks a successor model for replacement.[257]

The IISS Military Balance 2006 reports ten HY-6 aircraft as refueling planes in service with the PLAAF.[258] This model is based on the H-6 bomber and technically outdated. Other sources claim that the PLAAF has concluded sales agreements for eight IL-78 aerial tanker aircraft in September 2005.[259]

Only the Russian Su-30MK2 and some upgraded version of other fighter airplanes have refueling capabilities. The number of aerial tankers will likely depend on the number of combat aircraft with refueling capabilities.

Air Defense Forces

Three SAM divisions, one mixed SAM/AAA division, and ten other air defense brigades make up the PLAAF air defense forces.[260] Their most important weapons system is the Russian-made S-300PMU1/2. The largest holdings are the Russian-acquired S-300 regiments with SA-10B/C missiles. According to estimations, one regiment possesses 16-24 launchers that could fire 64-96 missiles to protect one area.[261] By 2004, 12 battalions had this SAM in use, with potentially 144 launchers and 576 missiles. The most common SAM remains the HQ-2 (SAM-2).[262] Reports indicate that China heavily invests in the Russian S-400 program, which is a markedly enhanced version of the S-300.[263] It therefore seems likely that China will procure these missiles once they will be available for sale.

The PLAAF air defense forces have shifted from static point defense tactics to a joint air defense system, which combines artillery and SAM forces, aircraft operations and naval forces.[264] Air defense forces are concentrated in the vicinity of Taiwan, particularly in the Nanjing MR. The regiments equipped with S-300PMU1/2 will be deployed there.

According to Jane's, China has mastered active-guided radar technologies for its SAM. It comprises parts of Russian and American technology, some of China's missile guiding radars are reportedly to very similar to the PATRIOT SAM.[265]

Cruise missile and anti-cruise missile development appears to be centerpiece of modernization and core of future air force operations.[266] Reports indicate that China has reached advanced stages in the development of the DH-10 LACM cruise missile.[267] Apart form naval attack cruise missiles, the PLA will have a 1,000+ km land based cruise missile system that can be fielded in ground-, air-, and sea-based versions and reportedly approximate the U.S. TOMAHAWK system.[268]

Airborne Forces

The PLAAF maintains one airborne Army Group. It is the 15th Airborne Army (AA), which consists of 43rd, 44th, and 45th airborne divisions, located in Kaifeng, Gunagshui, and Wuhan respectively. Mission, organization, and deployment of the 15th AA remain opaque. Reportedly, the 15th AA is under direct command of the CMC and serves as a "strategic reserve".[269] Allegedly, there has been increased funding for the unit as well as a reevaluation of its mission, shifting to enabling the 15th AA to conduct offensive operations. Some of China's weapon development and procurement projects, such as the purchase of IL-76 aircraft and the ZLC-2000 vehicle, may also indicate an update in equipment quality. Further, the 45th divisions are relocating to unknown garrisons, which

has caused some observers to speculate that the PLAAF might create an additional airborne army.[270]

Reports indicate that the 15th AA is capable of conducting and sustaining a range of airdrop operations. According to an assessment of a 2001 airborne exercise, the 15th AA can deploy an airborne regiment and accompanying support units plus equipment in one airdrop.[271] Older versions of DOD reports on China's military power indicated that a shortage of airlift might restrict a quick increase in operational readiness for airborne forces. The latest report from 2006, however, omits these concerns. The 2003 CFR report estimates the current airlift ability to deploy 5,000-7,000 airborne troops.[272]

Radar and Sensor Aircraft

In early June of 2006, Chinese authorities reported the crash of a military AWACS aircraft in the Anhui province in central China. Apparently, the plane was a KJ-2000 equipped with indigenously developed AWACS. The death of all 40 crew may have caused a significant setback in human resources employed to develop an indigenous AWACS.[273]

Modernization

The patterns in PLAF weapons imports are shown in **Figure 34** and the patterns in weapons developments are show in **Figure 35**. Judged against U.S. standards, the PLAAF resources for its aspired tactical and campaign war-fighting principles remain very modest. China does not possess stealth aircraft or any significant stealthy cruise missile capabilities. In addition, the PLAAF does not have any attack helicopters, and the PLA ground forces' holdings of attack helicopters are comparatively small, currently numbering 39.[274]

Figure 34: Development of Chinese air force weapon systems 2000-2006

Type	Class	Armament	Number and year to be completed	Additional information
Xian H-6 (Tu-16)	Bomber	YJ-63	2004,	
Xian JH-7A	Fighter			
Chengdu J-10	Bomber			
Chengdu J-7G	Fighter			
Shenyang J-8H	Fighter			
F-10/F-10A/Super-10*	Fighter		1200, finished development in 2004*	
Chengdu J-13	Fighter			
KJ-2000	AWACS			In use, based on IL-76
FC-1	Fighter			Chinese-Pakistani joint-venture, might be only for export**
WZ-10/Z-10	helicopter			To be developed in part with Eurocopter
SD-10/PL-12	AAM		2004	Active-radar missile

Source: Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*. *Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006. **Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, "A new direction for China's Defense Industry", *RAND Project Air Force*, Santa Monica 2005, p. 42.

Figure 35: Recent Imports of Chinese air force weapon systems 2000-2006

Type	Class	Armament	Number and year to be completed	Additional comments
** Su-27UBK	Fighter	Russia	2000	28, trainers
** Su-30MKK	Fighter	Russia	2004	28
Kh-31P ARM	Missile	Russia	2002	110-200km range
Kh-29 ASM	Missile	Russia	2002	115km
**Kh-35 ASM	Missile	Russia	?	For Su-30MKK
Kh-59 ASM	Missile	Russia	2002	
KAB-1500kr	Self-guided bomb	Russia		
A-50E/IL-76		Israel	1 reportedly failed	For AWACS purposes, named KLJ-2000 program, IAI Phalcon radar.
IL-76 Heavy transporters		Russia	30	
Kolchuga passive radar	Radar system	Ukraine	6	Used in S-300 SAMs.
Tu-22/Tu-95		Russia		Reports, which do not exceed the state of rumors, state that Russia might give up its reluctance to export these aircraft as China has expressed interest in them.
IL-78M	Air-to-air refueling	Russia	8	
*SA-20/S-300PMU-2	SAM	Russia	2 batallions in 2004, 2 in 2006	First battalion expected to arrive in 2006
*HARPY	UAV	Israel	2001	

Source: Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*; *Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006. ** IISS, *IISS Military Balance 2003-2004*, London, Routledge, 2004.

VII. SECOND ARTILLERY CORPS/NUCLEAR FORCES

The 100,000-strong Second Artillery Corps (SAC) functions as an independent branch of the armed forces. The General Staff Department exercises direct operational control over the Second Corps through a SAC headquarters within the GSD. This information has been mentioned in the 2002 Chinese White Paper on National Defense yet it is not included in the 2004 version. The Corps is divided into six ballistic missile divisions (bases), an early warning division, a communications, security as well as a technical regiment.[275] According to Allen, the chain of command for the Second Artillery consists of "Second Artillery Headquarters, six corps-level missile bases, missile brigades, launch battalions, launch companies, and launch platoons"; the Second Artillery has 16, or possibly over 20 brigades.[276]

The Corps' mission is to execute control over China's land-based nuclear missiles. Some tactical nuclear munitions remain under army control. In 2005, the Second AC reportedly controlled a stock of 180 to 200 nuclear warheads out of a Chinese total of 330 to 350.[277] In addition, the Second AC retains control over a considerable number of conventional strategic missiles. It reportedly controls 400 to 500 DF-15 SRBMs.[278] In the case of a contingency, the PLA intends to use the Second AC conventional capabilities in combination with the PLAAF's long-range air strikes.

Ballistic missiles

Information on the number, commissioning data, and technical specifications vary widely and reporting suffers from differing underlying definitions. A rough estimate of Chinese missile capabilities is shown in **Figure 36**. The approximate maximum range of each missile is shown in **Figure 37**.

Chinese president Hu Jintao said on the occasion of the 40th anniversary of the Second Artillery on June 30, 2006: "To establish a strategic missile armed force and build up the Second Artillery Corps is a major strategic decision of the Communist Party Central Committee and the Central Military Commission"[279].

Figure 38 shows an estimate of Chinese missile strength by major type. Chinese inventories of ballistic missiles are largely made up of SRBMs. According to China Post, Taiwanese president Chen Shui-bien declared in May of 2006, that China has over 800 missiles targeting Taiwan.[280] Jane's deduces that there are three Second AC brigades with 96 DF-15 missiles each, and 208 M-11 controlled by the army.[281] The same source states that according to Taiwanese estimates, China will have 700 ballistic missiles deployed in the Taiwan region by 2005 and 800 by 2006. Jane's reports that USDIA estimates put the number of deployed nuclear warheads at 300.[282]

The 2003 CFR report estimates that China's warheads are assigned by one third with each medium- and long-ranged missiles, one third with aircraft, on third theater artillery and short-range missiles (DF-15 and DF-11).[283]

The development of China's missile inventory indicates that China can deploy sea-based, land-mobile and silo-based missiles. Reports indicate attempts to deploy more solid-fuel missiles, increase the availability time for missiles, and deploy silo-, truck-, cave-,

submarine-, and possibly, train-based missiles.[284] **Figure 36** suggests that China attempts to diversify its inventory of missiles in terms of strike-capabilities and mobility.

The deployment of ballistic missiles clearly has important political and strategic implications for China's security policy, both in terms of regional security and multilateral non-proliferation regimes. Any information about progress in this regard therefore should be careful to draw quick inferences about China's strategic intentions. Some reports indicate that China seeks to enhance its missile capabilities, by improving solid fuel motors, diversifying its range of warheads and increasing their accuracy, the deployment of missiles with multiple warheads, and the development of PENAIDS and MIRVs.[285] However, at this time it simply is unknown how far China has gotten in each of these areas of missile development.

Figure 36: Chinese Missile Profiles in 2006

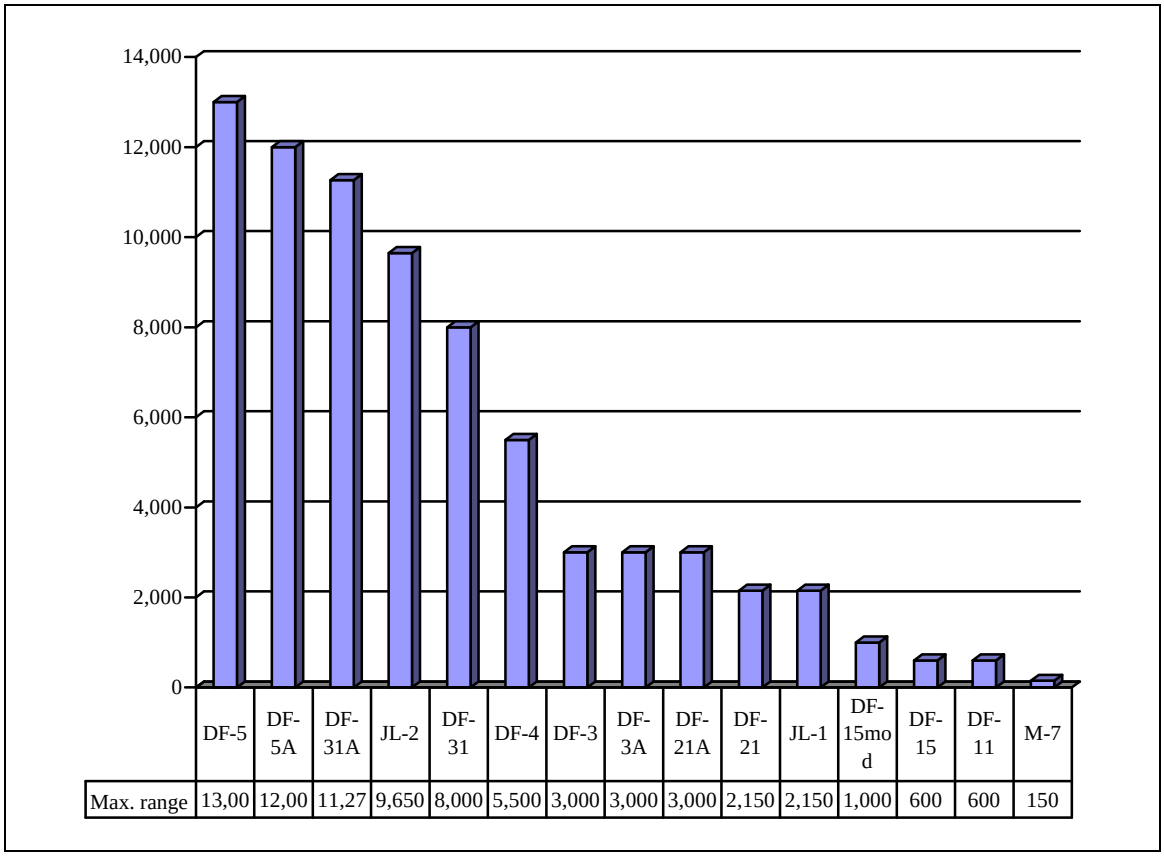
Designation	Alternate Designation	Stages	Propellant	Range in kilometers	Warheads and Payload (kg)	Year of Commission	Inventory
ICBMs							
DF-31	**CSS-9**	3	solid	F: 8,000 DOD, J: 7,250	CFR: 700 R: 1,050-1,750	R: 2010	J: 8-12
DF-31A		3	solid	DOD: 11,270+ R: 10,000	possibly multiple warheads, and MIRV capability* R: 1,050-1,750	J: 2005+ DOD: 2007 R: 2010?	?
DF-5	**CSS-4 Mod 1**	2	liquid	F: 13,000 J: 12,000 DOD: 8,460 R: 12,000	Single, S: 3,000, 1-5 megaton if nuclear R: 3,000	R: 1981 J: To be phased out by 05	IISS: 20 F: 20 J: >10
DF-5A	**CSS-4 Mod 2**	2	liquid	J: 12,000+	J: possible MIRV capbility S: 3,300, 4-5 megaton if nuclear R: 3,200	R: 1986 J: 2005	J: 19-23
DF-41	**CSS-X-10**	3	solid	F: 12,000-14,000	S: 700-800, MIRV	?	J: curtailed in favor of DF-31A

IRBMs and MRBMs							
DF-21	**CSS-5 Mod1**	2	Solid	J: 2,150 F: 1,800 DOD: 1,770+ R: 2,150	R: 600	R: 1987 F: 1986	33/60(s Korean white paper) J: 19-23 for Mod1/2 F: 36-50
DF-21A	**CSS-5 Mod 2**	2	solid	J: 2,400-3,000 R: 2,500	R: 500	?	DOD: 19-50
DF-3	**CSS-2**	1	Liquid	J: 2,000-3,000	Single, S: 2,150	?	J, DOD: 14-18
DF-3A	**CSS-2A**	1	Liquid	2,650 DOD: 2,790 R: 2,800 F: 3,000	S: 2,150	R: 1971	C: 2 F: 50-80
DF-4	**CSS-3**	2	liquid	F, J: 4,750 DOD: 5,470+ R: 5,500+	J: Single S, M: 2,200	R: 1980 F: 1980	J: 20-24 DOD: 20-24 F: 20-30
DF-25	DROPPED						
SRBMs							
DF-15/M-9	**CSS-6**	1	solid	J: 600 R: 600 DOD: 600	500-950 R: 500	?	F: 200+ J: 230-270 DOD: 275-315
DF-15 Mod2		1	solid	F: 600 J: 1,000 R: 600	R: 500	F: 1995 R: 1990	?
DF-11/M-11/11A	**CSS-7**	1/2	solid	C: 350 F: 300 J: 500-600 R: 350 DOD: 600	J: 800 R: 500/800	R: 1992/1998 F: 1995	C: 500 F: 40+ J: 420-460 DOD: 435-475

M-7	**CSS-8**	?	solid/liquid	100-150	S: 190	?	?
SLBM							
JL-1	**CSS-3**	2	solid	F: 1,700-2,000 R, J: 2,150 DOD: 1,770+	J: Single, 600 R: 600	F: 1986 R: 2003	J: 12 F: 24
JL-2	**CSS-NX-5** (Modified DF-31)	3	solid	F: 8,000 J: 9,656 R: 8,000 DOD: 8,000+	J: Possible multiple, S: 700 R: 1,050-2,800	To be deployed in 2007-2010* R: 2010	12
IRCM							
DF-61	J: Ongoing development with North Korea; F: program cancelled						

Source: J=Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Armed Forces;* S=Michael D. Swaine with Loren Runyon, "Ballistic Missile Development", in: Robert J. Ellings and Aaron L. Friedberg, eds., *Strategic Asia*. *Power and Purpose 2001-2002*, Seattle 2001, p. 304; F: http://fas.org/nuke/guide/china/index.html, DOD=Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington, 2006; R= Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, "A new direction for China's Defense Industry", *RAND Project Air Force*, Santa Monica 2005, p. 80.; CFR=2003 CFR report; C=The Claremont Institute: *Ballistic Missiles of the World*, available at http://www.missilethreat.com/missiles/index.html. Jane's reports that DF-31 missiles will be deployed in the second half of 2006 and the DF-31A version will enter service in 2007.[286] *Wendell Minnick, "China speeds ICBM plans to debut missiles with longer reach in 2007", in *DefenseNews*, 10 July, 2006, p. 1.

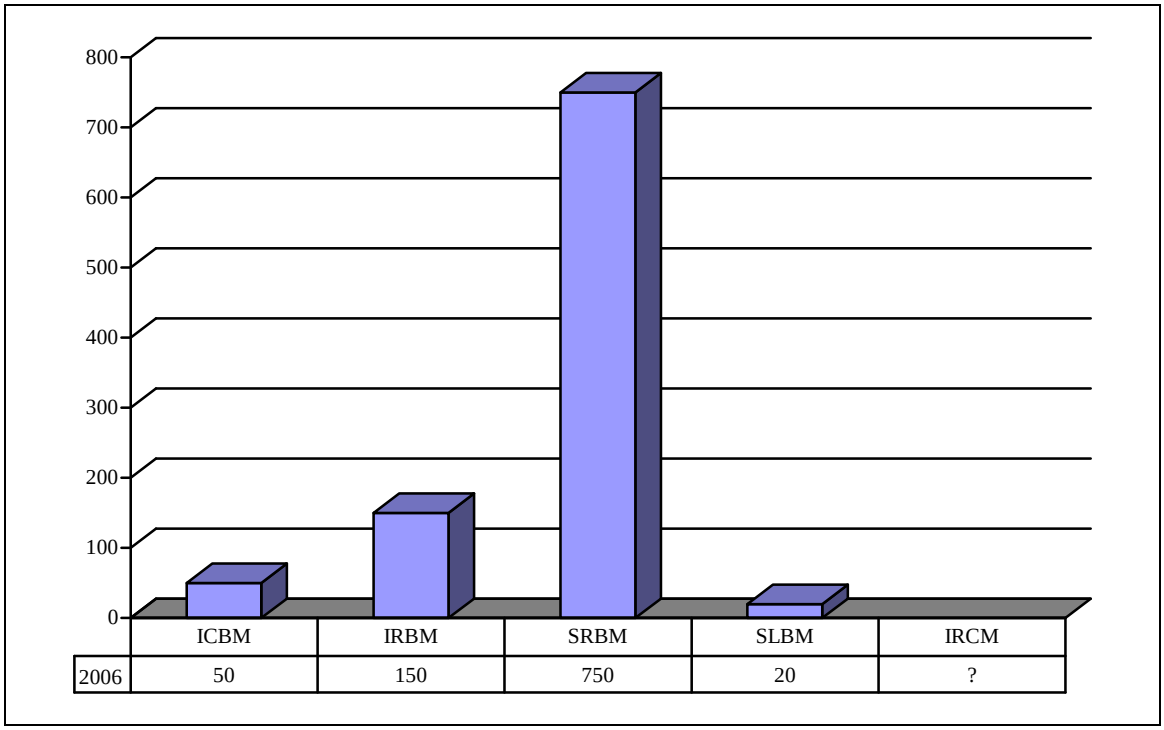
Figure 37: Maximum Range (In Kilometers) of Selected Chinese Ballistic Missiles



	DF-5	DF-5A	DF-31A	JL-2	DF-31	DF-4	DF-3	DF-3A	DF-21A	DF-21	JL-1	DF-15mod	DF-15	DF-11	M-7
Max. range	13,00	12,00	11,27	9,650	8,000	5,500	3,000	3,000	3,000	2,150	2,150	1,000	600	600	150

Source: **Figure 35**.

Figure 38: Holdings of types of missiles: 2006, based on average estimates



Source: Authors' estimations based on data presented above.

Missile Forces By Category

The major developments taking place in each category of PLA ballistic missiles may be summarized as follows:

ICBMs

China's inventory of ICBMs reportedly consists of a few DF-31 (CSS-9) and about 40 DF-5 (CSS-4) missiles and upgraded versions, usually denoted by the letter A added to the name (see **Figure 36**). The DF-5 was China's first ICBM and it is supposed to be replaced by the DF-31 and DF-31A missiles as soon as the latter will be ready to be deployed, yet some reports claim that efforts are under way to develop a multiple warhead system for the DF-5.[287] Some reports suggest that the DF-31A will be the first missile of striking virtually any place in the United States, yet several sources estimate ranges for the DF-5 as 12,000 km and more, thus enabling it to hit the United States, too.[288]

According to reports, the DF-31 represents a considerable advance in technical terms over the DF-5. The latter uses a solid propellant and can be fielded on land-mobile vehicles.[289] According to reports, the DF-31A may carry three[290] to five[291] warheads. Minnick reports that China plans to deploy 60 DF-31 ICBMs by the end of 2006.[292] According to a report dating from July 2006, China plans to deploy 60 DF-31 missiles until the end of 2006. They reportedly will replace 20 silo-based DF-5s.[293]

Some sources speculate about Chinese intentions and efforts to develop missiles that can overcome a U.S. missile-defense system. Harrington reports that recent DoD reports

about the China's military power have not addressed this issue since 2002. The same source quotes some observers that believe that the development to defeat a U.S. missile-defense system is one of China's primary focuses.[294]

IRBMs and MRBMs

According to Swaine, China could deploy ca. 100 DF-21s in the coming years; Taiwan is currently developing its own version of an MRBM.[295] The DF-3/3A may have been engineered to carry multiple warheads.[296] The 3A-version has a longer range and flies at a higher altitude. Swaine predicted in 2001 that the DF-3/3A would be phased out within two or three years. More up-to-date reports indicate still existing missile holdings, it is not clear for how long stocks of this type will be held.

SRBMs

Judging from indicators such as increased defense spending, some observers conclude that that the number of ballistic missiles in Asia, and particularly China, will increase in coming years. Swaine argued in 2001 that China may acquire 150-1,000 SRBMs until the year 2015.[297] Recent U.S. estimates put the number of Chinese SRBMs at 800 and assume a procurement rate of about 100 per year.[298]

In April 2005, reports surfaced that according to Ukraine's new government the former Kuchma administration had been illicitly trafficking cruise-missile systems to China.[299] Six Raduga Kh-55 (AS-15) cruise missiles had been supplied to China during 2001. However, there are fears that the actual number transferred may be significantly greater. These missiles promise to provide China with important technological components such as navigation and propulsion technology.

Such reports corroborate assumptions that China uses a wide range of foreign technologies to augment its missile programs. For instance, the B611 SRBM, a battlefield tactical-missile system that has been produced by China and Turkey.[300] Under development since the mid-1990s the B611 was not seen in public until 2004 when it was displayed at Zhuhai's air show. Based on the DF-15/DF-11 SRBM series the B611 is smaller with a 480 kg warhead.[301]

The missile can be fired from a transporter erector-launcher (TEL) vehicle, fitted with two B611s in containerized launch tubes.[302] The first live-firing tests for the missile occurred in 2001 and the weapon has already been tested to a range of more than 150 km. A 250 km range version has been proposed and CASIC has alluded to a terminal-maneuvering capability that would make the missile much more difficult to defeat with an ABM system such as the PATRIOT.[303] The service and production status of the B611/Toros programs is unclear, but it undoubtedly represents a mature level of engineering and technology.

Based on the B611/Toros experience it is more than possible that other, less publicized, joint-development programs have been initiated elsewhere. As far as ballistic missile exports are concerned, allegations and contradictory reports about China's activities abound. Pakistan is most likely the major recipient of Chinese exports. China may also have delivered ballistic missile assistance to Syria.[304]

Cruise missiles similar to the American-made Tomahawk are reported to be in development with several branches and believed to be operational by 2006.[305] The IISS reports that a future acquisition of Russian 3M14E missiles is probable since the fire-control-system of SSN-27 missiles can also be used for 3M14E missiles.[306]

SLBMs

China maintains the JL-1 SLBM (also CSS-N-3) and reportedly is developing a JL-2 SLBM. The JL-1 SLBM is based on the Xia-class submarine, which can hold up to 12 missiles.[307] About 20 missiles appear to be in service (see **Figure 38**). According to reports, China introduced the improved JL-1A with increased range in the late 1990s.[308] The JL-2 is a modified version of the DF-31A, may carry multiple warheads and is to be deployed on new Jin-class submarines.[309] The JL-2 will likely have a significantly increased strike range, according to estimates quadrupling the 2,000km range of the JL-1 (see **Figure 36**).

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[1] Bundesagentur für Außenwirtschaft, *VR China - Wirtschaftsentwicklung 2005*, available at http://www.bfai.de/DE/Content/__SharedDocs/Links-Einzeldokumente-Datenbanken/fachdokument.html?fIdent=MKT20060406080931, 25 July, 2006.
[2] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington, 2006, p. 1.
[3] National Bureau of Statistics, http://www.stats.gov.cn/english/statisticaldata/monthlydata/t20060808_402343230.htm, 09 August, 2006.
[4] C. Fred Bergsten et al., *China: The Balance Sheet. What the world needs to know about the emerging superpower*, New York 2006, p. 47; CIA, *The World Factbook: China*, available at: https://www.cia.gov/cia/publications/factbook/geos/ch.html, 30 July, 2006.
[5] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Security*, p. 10.
[6] Murray Scot Tanner, "Challenges to China's Internal Security Strategy", *Testimony presented to the US-China Economic and Security Review Commission on February 3, 2006*, p. 2.
[7] Thomas Lum, "Social Unrest in China", *CRS Report for Congress*, 8 May, 2006, p. 1.
[8] Murray Scot Tanner, "Challenges to China's Internal Security Strategy", *Testimony presented to the US-China Economic and Security Review Commission on February 3, 2006*, p. 7.
[9] People's Republic of China, State Council, *China's National Defense in 2004*, Beijing 2004.
[10] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, p. 13.
[11] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, p. 13.
[12] People's Republic of China, State Council, *China's National Defense in 2004*, Beijing 2004.
[13] Council on Foreign Relations, *Chinese Military Power. Report of an Independent Task Force Sponsored by the Council on Foreign Relations Maurice C. Greenberg Center for Geoeconomic Studies*, New York 2003, p. 39.
[14] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 8.
[15] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 9.
[16] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, p. 17.
[17] People's Republic of China, State Council, *China's National Defense in 2004*, Beijing 2004.
[18] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 19.
[19] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 19.
[20] Wendell Minnick, "Taiwan faces increasing cyber assaults", *DefenseNews*, June 12, 2006, p.16.

[21] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, p. 36.
[22] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, p. 36.
[23] Thomas J. Christensen, "China", in: Robert J. Ellings and Aaron L. Friedberg, eds., *Strategic Asia. Power and Purpose 2001-2002*, Seattle 2001, p. 55.
[24] Korea Research Institute for Strategy, *The Strategic Balance in Northeast Asia*, Seoul 2005, p. 58, 235.
[25] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 2.
[26] Sarah V. Lawrence, "One Leader Too Many?" in *Far Eastern Economic Review*, 28 November, 2002. pp. 29-30; Richard Bush, *Policy Towards Taiwan*, available at www.chinavitae.com/reference/conferencepapers/Bush.pdf, 09 August 2006.
[27] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 17.
[28] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 23.
[29] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 23.
[30] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 24-25.
[31] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 30.
[32] People's Daily online, *Chinese military to be restructured*, 13 July, 2005, available at http://english.people.com.cn/200507/13/eng20050713_195881.html, 9 August, 2006. The authors thank Dennis Blasko for bringing this to their attention.
[33] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April 2006, p. 10.
[34] http://www.sinodefence.com/navy/orbat/default.asp, 27 July, 2006.
[35] Jane's Sentinel Security Assessment, *China and Northeast Asia, Air Force*, 7 November 2005, p. 11.
[36] Kenneth Allen, *PLA Air Force Operation and Modernization*, available at http://www.china-defense.com/aviation/plaaf-ops/plaaf-ops_06.html, 9 August, 2006.
[37] Jane's Sentinel Security Assessment, *China and Northeast Asia, Air Force*, 7 November 2005, p. 11.
[38] Jane's Sentinel Security Assessment, *China and Northeast Asia, Air Force*, 7 November 2005, p. 11.
[39] Kenneth Allen, *The PLA Air Force: 2006-2010*, p. 5.
[40] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 16.
[41] Kenneth Allen, *Understanding the PLA's Organizational Structure*, p. 6.
[42] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 8.
[43] Korea Research Institute for Strategy, *The Strategic Balance in Northeast Asia*, Seoul 2005, p. 230.
[44] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 20, 64.
[45] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 10.
[46] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 10.
[47] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 20, 24.
[48] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 9.
[49] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, 20-21; David Shambaugh, "China's Military: Real or Paper Tiger?", *The Washington Quarterly 19:2*, 1996, p. 23.
[50] David Shambaugh, "China's Military: Real or Paper Tiger?", *The Washington Quarterly 19:2*, 1996, p. 21.
[51] IISS, *The IISS Military Balance 2006*, Routledge 2006, p. 253.
[52] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 9.
[53] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, p. 21.

[54] Thomas J. Christensen, "China", in: Robert J. Ellings and Aaron L. Friedberg, eds., *Strategic Asia. Power and Purpose 2001-2002*, Seattle 2001, p. 45.
[55] David Shambaugh, "China's Military: Real or Paper Tiger?", *The Washington Quarterly 19:2*, 1996, p. 23.
[56] Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, "A new direction for China's Defense Industry", *RAND Project Air Force*, Santa Monica 2005, p. xvii.
[57] Korea Research Institute for Strategy, *The Strategic Balance in Northeast Asia*, Seoul 2005, p. 237.
[58] Associated Press, *China Highlights Plans for High-Tech Army*, June 26, 2006, available at: http://www.taiwansecurity.org/AP/2006/AP-260506.htm, 14 July, 2006.
[59] Associated Press, *China Highlights Plans for High-Tech Army*, June 26, 2006, available at: http://www.taiwansecurity.org/AP/2006/AP-260506.htm, 14 July, 2006.
[60] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, 22.
[61] Council on Foreign Relations, *Chinese Military Power. Report of an Independent Task Force Sponsored by the Council on Foreign Relations Maurice C. Greenberg Center for Geoeconomic Studies*, New York 2003, p. 61.
[62] Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, "A new direction for China's Defense Industry", *RAND Project Air Force*, Santa Monica 2005, pp. xv –xvi.
[63] Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, "A new direction for China's Defense Industry", *RAND Project Air Force*, Santa Monica 2005, p. xvi.
[64] Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, "A new direction for China's Defense Industry", *RAND Project Air Force*, Santa Monica 2005, pp. 24-26.
[65] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, 7 November 2006, p. 19-20; Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 13, 106.
[66] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, 21.
[67] Mark Cozad, *Statement for the Record Hearing on the FY2006 Report to Congress on Chinese Military Power*, 22 June 2006, p. 2.
[68] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, 21.
[69] Richard F. Grimmett, "Conventional Arms Transfers to Developing Nations", *CRS Report for Congress*, August 29, 2005, p. 12.
[70] Richard F. Grimmett, "Conventional Arms Transfers to Developing Nations", *CRS Report for Congress*, August 29, 2005, p. 12.
[71] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, 2.
[72] Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, "A new direction for China's Defense Industry", *RAND Project Air Force*, Santa Monica 2005, p. 26.
[73] Jane's Sentinel Security Assessment, *China and Northeast Asia, Army*, 10 April 2006, p. 9.
[74] http://www.sinodefence.com/army/orbat/rapidreaction.asp, 27 July, 2006.
[75] James C. Mulvenon, "The PLA ground forces's Struggle for Identity", in: Stephen J. Flanagan/Michael E. Marti, eds., *The People's Liberation Army and China in transition*, p. 114.
[76] James C. Mulvenon, "The PLA ground forces's Struggle for Identity", in: Stephen J. Flanagan/Michael E. Marti, eds., *The People's Liberation Army and China in transition*, pp. 113-114.
[77] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 42.
[78] http://www.sinodefence.com/army/orbat/grouparmy.asp, 9 August, 2006.
[79] Jane's Sentinel Security Assessment, *China and Northeast* Asia, Army, 10 April 2006,10 April 2006, p. 9.
[80] James C. Mulvenon, "The PLA ground forces's Struggle for Identity", in: Stephen J. Flanagan/Michael E. Marti, eds., *The People's Liberation Army and China in transition*, pp. 113-114.
[81] John Hill, "China's military modernization takes shape", *Jane's Intelligence Review*, 1 February 2004.

[82] Council on Foreign Relations, *Chinese Military Power. Report of an Independent Task Force Sponsored by the Council on Foreign Relations Maurice C. Greenberg Center for Geoeconomic Studies*, New York 2003, p. 41.
[83] Korea Research Institute for Strategy, *The Strategic Balance in Northeast Asia*, Seoul 2005, p. 226.
[84] James C. Mulvenon, "The PLA ground forces's Struggle for Identity", in: Stephen J. Flanagan/Michael E. Marti, eds., *The People's Liberation Army and China in transition*, p. 111.
[85] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[86] Jane's Sentinel Security Assessment, *China and Northeast Asia, Army*, 10 April 2006. p. 10.
[87] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, p. 15.
[88] James C. Mulvenon, "The PLA ground forces's Struggle for Identity", in: Stephen J. Flanagan/Michael E. Marti, eds., *The People's Liberation Army and China in transition*, p. 110.
[89] Jane's World Armies, *China*, 30 May, 2006, p. 29; Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2004.
[90] Frank W. Moore, *China's Military Capabilities*, available at http://www.comw.org/cmp/fulltext/iddschina.html, 25 July 2006.
[91] http://www.sinodefence.com/army/tank/type59.asp, 30 July, 2006.
[92] Jane's World Armies, *China*, 30 May, 2006, p. 25.
[93] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 124.
[94] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[95] Jane's World Armies, *China*, 30 May, 2006.
[96] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 3.
[97] IISS, *IISS Military Balance 2006*, London, Routledge, 2006.
[98] Timothy Hu, "Country Briefing China: Ready, steady, go…", *Jane's Defence Weekly*, 13 April, 2005.
[99] Jane's World Armies, *China*, 30 May, 2006, p. 26
[100] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 125.
[101] Jane's Armour and Artillery, *New Chinese CSU 152 MBT*, 2 February, 2006.
[102] Christopher F. Foss, "Upgraded Type 63 light tanks swell PLA ranks", in Jane's Defense Weekly, May 24, 2006.
[103] Christopher F. Foss, "China upgrades WZ501 infantry vehicle", in *Jane's Defense Weekly*, 19 July, 2006, p. 32.
[104] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 127.
[105] IISS, *The IISS Military Balance 2006*, Routledge 2006; Jane's World Armies, *China*, 30 May, 2006, p. 26.
[106] Jane's Sentinel Security Assessment, *China and Northeast Asia*, p. 3.
[107] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 128.
[108] Jane's World Armies, *China*, 30 May, 2006, p. 26.
[109] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 3.
[110] Jane's World Armies, *China*, 30 May, 2006, p. 26.
[111] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 128.
[112] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[113] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[114] Jane's Armour and Artillery, *NORINCO Type 62 light tank*, 16 June, 2006.
[115] Jane's Armour and Artillery, *NORINCO Type 62 light tank*, 16 June, 2006.
[116] Jane's Armour and Artillery, *NORINCO Type 63 light tank*, 16 June, 2006.
[117] Jane's Armour and Artillery, *NORINCO Type 63 light tank*, 16 June, 2006.
[118] IISS, *The IISS Military Balance 2006*, Routledge 2006.

[119] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 134.
[120] IISS, *The IISS Military Balance 2006*, Routledge 2006
[121] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 129.
[122] http://www.sinodefence.com/army/artillery/type60towed_122mm.asp, 24 July, 2006.
[123] http://www.sinodefence.com/army/artillery/type83towed_122mm.asp, 25 July, 2006.
[124] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 129.
[125] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 130.
[126] http://www.sinodefence.com/army/artillery/type59towed_130mm.asp, 24 July, 2006.
[127] http://www.sinodefence.com/army/artillery/pll01towed_155mm.asp, 24 July, 2006.
[128] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[129] http://www.fas.org/man/dod-101/sys/land/row/arty-row.htm, 25July, 2006.
[130] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 130.
[131] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Armed Forces*, 7 November 2005, p. 21.
[132] http://www.sinodefence.com/army/artillery/type66_152mm.asp. 24 July, 2006.
[133] http://sinodefence.com/army/artillery/type89sp_122mm.asp, 24 July, 2006.
[134] http://www.sinodefence.com/army/artillery/type89sp_122mm.asp, 24 July, 2006.
[135] IISS, *The IISS Military Balance 2006*, Routledge 2006;
http://www.sinodefence.com/army/artillery/type89sp_122mm.asp, 24 July 2006.
[136] http://www.sinodefence.com/army/artillery/type83sp_152mm.asp, 24 July 2006.
[137] Jane's World Armies, *China*, 30 May, 2006, p. 27.
[138] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Armed Forces*, 7 November 2005, p. 3.
[139] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[140] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[141] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 132.
[142] http://sinodefence.com/army/mrl/type81_122mm.asp, 24 July, 2006.
[143] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 132.
[144] http://www.sinodefence.com/army/mrl/type82_130mm.asp, 25 July, 2006.
[145] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 132.
[146] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 132; http://www.sinodefence.com/army/mrl/type83_273mm.asp, 25 July, 2006.
[147] Jane's World Armies, *China*, 30 May, 2006, p. 26; IISS, *The IISS Military Balance 2006*, Routledge 2006.
[148] http://www.sinodefence.com/army/mrl/type83_273mm.asp; Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 133.
[149] http://www.sinodefence.com/army/mrl/weishi.asp, 25 July, 2006.
[150] http://www.sinodefence.com/army/mrl/weishi.asp, 25 July, 2006; Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 133.
[151] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 135.
[152] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 135.
[153] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Armed Forces*, 7 November 2005, p. 4; IISS, *The IISS Military Balance 2006*, Routledge 2006.
[154] Jane's World Armies, *China*, 30 May, 2006, p. 27.

[155] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces,* 7 November 2005, p. 4.
[156] Jane's World Armies, *China*, 30 May, 2006, p. 27.
[157] http://www.sinodefence.com/airforce/helicopter/wz10.asp, 25 July, 2006.
[158] Jane's World Armies, *China*, 30 May, 2006, p. 26.
[159] IISS Military Balance, 2006; Jane's World Armies, *China*, 30 May, 2006, p. 26.
[160] Jane's Sentinel Security Assessment, *China and Northeast Asia, Air Force*, 7 November 2005, p. 2.
[161] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[162] Richard D. Fisher, PLA Air Force Equipment Trends, available at http://www.globalsecurity.org/military/library/report/2003/pla-china_transition_12_ch08.htm.
[163] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[164] Jane's World Armies, *China*, 30 May, 2006, p. 28.
[165] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, p. 133.
[166] Dennis J. Blasko, *The Chinese Army today. Tradition and transformation for the 21st century*, Routledge 2006, pp. 138-139.
[167] Jane's Sentinel Security Assessment, *China and Northeast Asia, Army*, 10 April 2006, p. 4.
[168] Jane's Missiles and Rockets, Chinese LACMs enter service, 1 June, 2006, p.
[169] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces,* 7 November 2005, p. 18.
[170] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces,* 7 November 2005, p. 18.
[171] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces,* 7 November 2005, p. 19.
[172] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces,* 7 November 2005, p. 19.
[173] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces,* 7 November 2005, p. 19.
[174] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April, 2006, p. 2.
[175] Bernard D. Cole: "The PLA Navy and "Active Defense", in: Stephen J. Flanagan/Michael E. Marti, eds., *The People's Liberation Army and China in transition*, p. 129.
[176] Bernard D. Cole: "The PLA Navy and "Active Defense", in: Stephen J. Flanagan/Michael E. Marti, eds., *The People's Liberation Army and China in transition*, p. 129.
[177] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, 31; Jane's Sentinel Security Assessment, *China and Northeast* Asia, Navy, 19 April 2006,p. 19.
[178] State Council Information Office, *China's National Defense in 2004*, *available at* http://www.china.org.cn/english/2004/Dec/116032.htm, p.13.
[179] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy, 19 April 2006*, p. 6.
[180] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy, 19 April 2006*, p. 2.
[181] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington, 2006, 11.
[182] Eric A. McVadon, "China's Maturing Navy", in *Naval War College Review*, Spring 2006, vol. 59, no.2, p. 95.
[183] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April 2006,p. 10.
[184] David Shambaugh, "China's Military: Real or Paper Tiger?", *The Washington Quarterly 19:2*, 1996, p. 27.
[185] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[186] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[187] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April 2006, p. 3.
[188] IISS, *The IISS Military Balance 2006*, Routledge 2006; Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April 2006, p. 3.
[189] Eric A. McVadon, "China's Maturing Navy", in *Naval War College Review*, Spring 2006, vol. 59, no.2, p. 97.

[190] Ronald O'Rourke, "China Naval Modernization: Implications for U.S. Navy Capabilities – Background and issues for Congress", *CRS Report for Congress*, 18 November, 2005, p. 8.
[191] Eric A. McVadon, "China's Maturing Navy", in *Naval War College Review*, Spring 2006, vol. 59, no.2, p. 100.
[192] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[193] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[194] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[195] http://www.sinodefence.com/navy/surface/shenyang051c.asp, 27 July, 2006.
[196] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April 2006, p. 4.
[197] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April 2006, p. 4.
[198] IISS, *The IISS Military Balance 1999-2000* to *2006*, Routledge 2006.
[199] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[200] http://www.sinodefence.com/navy/orbat/default.asp, 27 July, 2006.
[201] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[202] IISS, *The IISS Military Balance 2006*, Routledge 2006. Another source reports seven Yuting II-class ships in service: http://www.sinodefence.com/navy/amphibious/yutingii.asp, 30 July, 2006.
[203] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[204] http://www.sinodefence.com/navy/amphibious/yunan.asp, 30 July, 2006.
[205] IISS, Military Balance 2006; http://www.sinodefence.com/navy/orbat/marinecorps.asp, 08 August, 2006.
[206] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April 2006,p. 12.
[207] http://www.sinodefence.com/navy/orbat/marinecorps.asp, 8 August, 2006.
[208] Dennis J. Blasko, "PLA Ground Forces Lessons Learned: Experience and Theory", in: Laurie Burkitt, Andrew Scobell, Larry M. Wortzel, eds., *The Lessons of History: The Chinese People's Liberation Army at 75*, Carlisle, 2003, p. 77.
[209] http://www.sinodefence.com/navy/orbat/marinecorps.asp, 8 August, 2006.
[210] http://www.sinodefence.com/navy/orbat/default.asp, 27 July, 2006.
[211] Korea Research Institute for Strategy, *The Strategic Balance in Northeast Asia*, Seoul 2005, p. 233.
[212] Jane's Sentinel Security Assessment, *China and Northeast Asia, Air Force*, 7 November 2005, p. 5.
[213] Jane's Sentinel Security Assessment, *China and Northeast Asia, Air Force*, 7 November 2005, p. 13.
[214] Jane's Sentinel Security Assessment, *China and Northeast Asia, Air Force*, 7 November 2005, p. 5.
[215] http://www.sinodefence.com/navy/orbat/navalairforce.asp, 27 July, 2006.
[216] http://www.scramble.nl/cn.htm, 27 July, 2006.
[217] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[218] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[219] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April 2006, p. 14.
[220] Evan S. Medeiros, Roger Cliff, Keith Crane, James C. Mulvenon, "A new direction for China's Defense Industry", *RAND Project Air Force*, Santa Monica 2005, p. xxii.
[221] Jane's Sentinel Security Assessment, *China and Northeast Asia, Navy*, 19 April 2006, p. 7.
[222] Korea Research Institute for Strategy, *The Strategic Balance in Northeast Asia*, Seoul 2005, p. 55.
[223] Bernard Cole, quoted in: Wendell Minnick, "Big Ships for Beijing?", in *DefenseNews*, 3 July, 2006, p. 15.
[224] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, 32.
[225] Wendell Minnick, "Big Ships for Beijing?", in *DefenseNews*, 3 July, 2006, p. 15.
[226] Wendell Minnick, "Big Ships for Beijing?", in *DefenseNews*, 3 July, 2006, p. 15.
[227] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[228] Kenneth Allen, *The PLA Air Force: 2006-2010*, p. 5.
[229] Kenneth Allen, *PLA Air Force Mobile Offensive Operations*, p. 10.
[230] Kenneth Allen, *The PLA Air Force: 2006-2010*, p. 13.
[231] Jane's Sentinel Security Assessment, *China and Northeast Asia, Air Force*, 7 November, p. 13.

[232] Council on Foreign Relations, *Chinese Military Power. Report of an Independent Task Force Sponsored by the Council on Foreign Relations Maurice C. Greenberg Center for Geoeconomic Studies*, New York 2003, p. 49.
[233] Kenneth Allen, *The PLA Air Force: 2006-2010*, p. 13.
[234] Kenneth Allen, *The PLA Air Force: 2006-2010*, p. 2-3.
[235] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005, p. 15.
[236] Kenneth Allen, *The PLA Air Force: 2006-2010*, p. 4.
[237] Kenneth Allen, *The PLA Air Force: 2006-2010*, p. 1.
[238] Council on Foreign Relations, *Chinese Military Power. Report of an Independent Task Force Sponsored by the Council on Foreign Relations Maurice C. Greenberg Center for Geoeconomic Studies*, New York 2003, p. 27.
[239] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[240] http://www.sinodefence.com/airforce/groundattack/h6.asp, 28 July, 2006.
[241] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[242] http://www.sinodefence.com/airforce/groundattack/hx.asp, 28 July, 2006.
[243] http://www.sinodefence.com/airforce/fighter/j7e.asp, 28 July, 2006.
[244] IISS, *The IISS Military Balance 2006*, Routledge 2006;
http://www.sinodefence.com/airforce/fighter/j8b.asp, 28 July, 2006.
[245] David Shambaugh, "China's Military: Real or Paper Tiger?", *The Washington Quarterly 19:2*, 1996, p. 26.
[246] David Shambaugh, "China's Military: Real or Paper Tiger?", *The Washington Quarterly 19:2*, 1996, p. 26; http://www.sinodefence.com/airforce/fighter/j10.asp, 30 July, 2006.
[247] http://www.sinodefence.com/airforce/fighter/j10.asp, 28 July, 2006.
[248] http://www.sinodefence.com/airforce/fighter/j10.asp, 28 July, 2006.
[249] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005, p. 5.
[250] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005, p. 5.
[251] John Hill, "China's military modernization takes shape", *Jane's Intelligence Review*, 1 February 2004.
[252] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005,p. 2.
[253] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[254] http://www.sinodefence.com/airforce/specialaircraft/y8aew.asp, 28 July, 2006.
[255] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[256] http://www.sinodefence.com/airforce/airlift/y7.asp, 30 July, 2006.
[257] http://www.sinodefence.com/airforce/airlift/il76.asp, 30 July, 2006.
[258] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[259] http://www.sinodefence.com/airforce/airlift/il78.asp, 30 July, 2006.
[260] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005, p. 8.
[261] Shirley A. Kahn, Christopher Bolkcom, and Ronald O'Rourke, "China's Foreign Conventional Arms Acquisitions: Background and Analysis, *CRS Report for Congress*, October 10, 2000, p. 13.
[262] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005, p. 8.
[263] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005, p. 8.
[264] Department of Defense, *Annual Report to Congress. Military Power of the People's Republic of China*, Washington 2006, 30.
[265] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005, p. 8.
[266] Korea Research Institute for Strategy, *The Strategic Balance in Northeast Asia*, Seoul 2005, p. 235.
[267] Richard Fisher, Jr., "China's New Strategic Cruise Missiles: From the Land, Sea and Air", available at http://www.strategycenter.net/research/pubID.71/pub_detail.asp#, 30 July, 2006.
[268] Richard Fisher, Jr., "China's New Strategic Cruise Missiles: From the Land, Sea and Air", available at http://www.strategycenter.net/research/pubID.71/pub_detail.asp#, 30 July, 2006.
[269] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005, p. 9.
[270] Jane's Sentinel Security Assessment, *China and Northeast Asia*, *Air Force*, 7 November 2005, p. 9.
[271] Kenneth Allen, The PLA Air Force: 2006-2010, p. 14.

[272] Council on Foreign Relations, *Chinese Military Power. Report of an Independent Task Force Sponsored by the Council on Foreign Relations Maurice C. Greenberg Center for Geoeconomic Studies*, New York 2003, p. 49.
[273] Joseph Kahn, "Blow to China's Military", *New York Times*, 6 June, 2006.
[274] IISS, *The IISS Military Balance 2006*, Routledge 2006.
[275] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 12.
[276] Kenneth Allen, *Understanding the PLA's Organizational Structure*, p. 6.
[277] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 12.
[278] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 12.
[279] AFP, *China's Hu Calls for Build Up of Strategic Missile Forces*, 30 June, 2006, available at http://www.taiwansecurity.org/AFP/2006/AFP-300606.htm.
[280] China Post, *Don't abandon Taiwan, Chen urges international community*, 13 May, 2006.
[281] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 14.
[282] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 18.
[283] Council on Foreign Relations, *Chinese Military Power. Report of an Independent Task Force Sponsored by the Council on Foreign Relations Maurice C. Greenberg Center for Geoeconomic Studies*, New York 2003, p. 51.
[284] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 13.
[285] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 13.
[286] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 14.
[287] Wendell Minnick, "China speeds ICBM plans to debut missiles with longer reach in 2007", in *DefenseNews*, 10 July, 2006, p. 1; Caitlin Harrington, "US experts warn on China's ICBM moves", in *Jane's Defense Weekly* 19 July, 2006, p. 19.
[288] Wendell Minnick, "China speeds ICBM plans to debut missiles with longer reach in 2007", in *DefenseNews*, 10 July, 2006, p. 1.
[289] Wendell Minnick, "China speeds ICBM plans to debut missiles with longer reach in 2007", in *DefenseNews*, 10 July, 2006, p. 1.
[290] Caitlin Harrington, "US experts warn on China's ICBM moves", in *Jane's Defense Weekly* 19 July, 2006, p. 19.
[291] Wendell Minnick, "China speeds ICBM plans to debut missiles with longer reach in 2007", in *DefenseNews*, 10 July, 2006, p. 1.
[292] Wendell Minnick, "China speeds ICBM plans to debut missiles with longer reach in 2007", in *DefenseNews*, 10 July, 2006, p. 1.
[293] Wendell Minnick, "China speeds ICBM plans to debut missiles with longer reach in 2007", *DefenseNews*, July 10, 2006.
[294] Caitlin Harrington, "US experts warn on China's ICBM moves", in *Jane's Defense Weekly* 19 July, 2006, p. 19.
[295] Michael D. Swaine with Loren Runyon, "Ballistic Missile Development", in: Robert J. Ellings and Aaron L. Friedberg, eds., *Strategic Asia. Power and Purpose 2001-2002*, Seattle 2001, p. 334.
[296] Michael D. Swaine with Loren Runyon, "Ballistic Missile Development", in: Robert J. Ellings and Aaron L. Friedberg, eds., *Strategic Asia. Power and Purpose 2001-2002*, Seattle 2001, p. 305.
[297] Michael D. Swaine with Loren Runyon, "Ballistic Missile Development", in: Robert J. Ellings and Aaron L. Friedberg, eds., *Strategic Asia. Power and Purpose 2001-2002*, Seattle 2001, p. 333.

[298] Peter W. Rodman, "The Military Power of the People's Republic of China", *Prepared Statement of The Honorable Peter W. Rodman, Assistant Secretary of Defense for International Security Affairs before the House Armed Services Committee, Thursday, June 22, 2006*.

[299] International Defense Review, *Crouching Tiger: How China is quietly evolving its missile systems*, 1 February, 2006.

[300] International Defense Review, *Crouching Tiger: How China is quietly evolving its missile systems*, 1 February, 2006.

[301] International Defense Review, *Crouching Tiger: How China is quietly evolving its missile systems*, 1 February, 2006.

[302] International Defense Review, *Crouching Tiger: How China is quietly evolving its missile systems*, 1 February, 2006.

[303] International Defense Review, *Crouching Tiger: How China is quietly evolving its missile systems*, 1 February, 2006.

[304] Michael D. Swaine with Loren Runyon, "Ballistic Missile Development", in: Robert J. Ellings and Aaron L. Friedberg, eds., *Strategic Asia. Power and Purpose 2001-2002*, Seattle 2001, p. 338.

[305] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 12.

[306] IISS, *Military Balance*, 2006, London, Routledge 2006, p. 247.

[307] IISS, *Military Balance*, 2006, London, Routledge 2006.

[308] http://www.sinodefence.com/strategic/missile/jl1.asp, 9 August, 2006.

[309] Jane's Sentinel Security Assessment, *China and Northeast Asia, Armed Forces*, 7 November 2005, p. 13.