CHINA'S AIR FORCE IN THE COMING DECADES: TRENDS AND IMPLICATIONS

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Most analysis of China's air force focusses on hardware and order-of-battle issues – how many aircraft, of what types, with what capabilities were produced, where they are located, and what systems are under development. While studies and analysis of strategy and doctrine concentrate on the People's Liberation Army (PLA) as a whole, there also lies a certain interest in historical precedence, strategy and doctrine for the aviation forces. The People's Liberation Army Air Force (PLAAF), to ease itself into credible power has to go through a change in situations over the coming decade. There are a number of factors which will decide the above process of transformation which also includes a comprehensive modernisation programme planned for the future.

During its 58-year history, most of the combat took place against the United States forces during the Korean and Vietnam Wars,[1] though it never evolved into a total war with the United States, and during small scale engagements with the Nationalist Air Force during the 1950s and 1960s.[2] Also, though the PLAAF deployed hundreds of aircraft during the 1979 border war with Vietnam, per

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1. Nigel Thomas, Peter Abbott, Mike Chappell, *The Korean War 1950-53* (Oxford: UK: Osprey, 1986), p. 33.
2. Xiaoming Zhang, "Air Combat for the People's Republic: The People's Liberation Army Air Force in Action, 1949-1969" in David Michael Finkelstein, Mark A. Ryan, Michael A. McDevitt, eds., *Chinese Warfighting: The PLA Experience Since 1949* (New York: M.E. Sharpe, Inc, 2003), pp.281-293.

The PLAAF is in the midst of a dramatic transformation aimed at transitioning from a benign defensive force to one that incorporates modern defences and robust offensive strike capabilities.

pilot sortie rate was minimal and there were no attacks across China's borders.[3] This was also the last time the air force was involved in any large scale military operations. Also, China's airborne troops, which belong to the air force,[4] are primarily organised for internal control and have been used only twice, during the Cultural Revolution in Wuhan (1967) and during the Tiananmen crackdown in Beijing (1989).[5] However, the PLAAF is in the midst of a dramatic transformation aimed at transitioning from a benign defensive force to one that incorporates modern defences and robust offensive strike capabilities. In the 1990s, PLAAF embarked on an expansive programme of reforms that targeted doctrine, leadership, force and organisational structure, officer and education enlistment, and training.

STRATEGY AND MISSION EMPHASIS

The air power doctrine has progressed through several steps since 1949 when the PLAAF was established. In the beginning, without much experience in developing aviation doctrine, the PLAAF used the Soviet Air Force as its model.[6] It was not until 1957 that the PLAAF began to develop and teach its own doctrine and make changes to the Soviet doctrine, based on the PLAAF's experience in the Korean War and operations against the Nationalists on the islands around Zhejiang Province.

In 1959, the air force created a Regulation Committee that wrote over 300

3. Kenneth W. Allen, "PLA Air Force, 1949-2002: Overview and Lessons Learned" in Laurie Burkitt, Andrew Scobell, Larry M. Wortzel, eds., *The Lessons of History: The Chinese People's Liberation Army at 75*(Pennsylvania: DIANE, 2003), p.90.

4. Harvey W. Nelsen, *The Chinese Military System: An Organisational Study of the Chinese People's Liberation Army* (Boulder: Westview Press, 1981), p.162.

5. Kenneth W. Allen, Glen Krummel, Jonathan D. Pollack, *China's Air Force Enters the 21st Century* (Santa Monica: RAND, 1995), p. xiv.

6. Xiaoming Zhang, Joseph G. Dawson, *Red Wings Over the Yalu: China, the Soviet Union and the Air War in Korea* (Texas:Texas A&M University Press, 2002), p.27.

regulations, including the first elements of China's air power doctrine, and in 1962, the Committee published the draft PLAAF *Combat Regulations* that laid out the concepts for its air superiority mission.[7] In 1982, the PLAAF provided a written doctrine regarding its ground support role,[8] therefore, during the early years, 70 percent of the aviation force consisted of fighters, leaving the remaining 30 percent to be divided among the other types of aircraft (bombers, ground attack, and transport) and systems for the other branches like Surface-to-Air Missiles (SAMs), Anti-Aircraft Artillery (AAA), airborne forces, radar and communications. It was not until 1988 that the General Staff Department finally published a document (*Science of PLA Air Force Campaigns*) that explained the characteristics of operational/campaign art, the development of operations/campaign theory, and the mission of the PLAAF's corps and regiments, and how these three elements pertain to a unified command organisation.[9] This was the first time that they included the idea of attack. The document also discussed the special characteristics of air power operations in an electronic counter-measures (ECM), nuclear, chemical, and biological combat environment.

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While the PLA has always had an active defence strategy, it was not until the intention to infuse new PLAAF doctrines that the air force formally stressed having a simultaneous offensive and defensive capability.[10] A chronological account of PLAAF doctrinal development commenced in the mid-1980s, starting with campaigns, then tactics, and, finally, strategy.[11]

7. Allen et al., n.5, p. 106.
8. Melvin Gurtov, Byong-Moo Hwang, *China's Security: The New Roles of Military* (Boulder, Colorado: Lynne Rienner Publishers, 1998), p.120.
9. Allen et al, n.5, p109.
10. John Wilson Lewis, Xue Litai, Litai Xue, *Imagined Enemies: China Prepares for Uncertain War* (Stanford: Stanford University Press, 2006), p.228.
11. Kevin M. Lanzit and Kenneth Allen, "Right-Sizing the PLA Air Force: New Operational Concepts Define a Smaller, More Capable Force", in Roy Kamphausen and Andrew Scobell, eds., *Right*

Doctrinal Title	Preliminary Approval	Publication Date
Science of PLA Air Force Campaigns	1984	1988
Science of Air Force Tactics	1989	1994
Science of Air Force Strategy	1992	1995
Introduction to Air Force Military Thought	1998	2006
Science of Integrated Air and Space Operations	2003	2006

The doctrine on PLAAF strategy was published in 1995; however, the culmination of the PLAAF's efforts on behalf of its own strategic doctrine did not truly come to fruition until 2004, when the Central Military Commission (CMC) incorporated the PLAAF component of "Active Defence" strategy into the National Military Strategic Guidelines. However, in 1996, Chinese leaders, including CMC Chairman Jiang Zemin and PLAAF Commander Liu Shunyao, had began to reemphasie publicly, the PLAAF's capability to fight offensive battles.[12] Although China's air force is also responsible for supporting the ground and naval forces, neither the air force nor naval aviation have yet engaged in this mission during combat and even if they can do so, it would be indirectly.

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Writings have also stressed that the most important element of China's air power doctrine is gaining air superiority. In the past, however, this concept pertained primarily to areas around China's airfields and cities since the PLAAF's primary mission has been positional air defence,[13] since their aircraft did not have the reach and their SAM coverage was limited. With new acquisitions and aviation development strategy, they hope to implement this doctrine beyond China's periphery which is evident

Sizing The People's Liberation Army: Exploring The Contours of China's Military (Carlisle: Strategic Studies Institute, US War College, 2007) pp.448-452.

12. Kenneth W. Allen, "PLA Air Force Operations and Modernisation", in Susan M. Puska, *People's Liberation Army After Next* (Pennsylvania: Strategic Studies Institute, 2000), pp.189-193.

13. Kenneth W. Allen, "Logistics Support for PLA Air Force Campaigns", in Andrew Scobell, Larry M. Wortzell, *China's Growing Military Power: Perspective on Security, Ballistic Missiles and Conventional Capabilities* (Pennsylvania: DIANE, 2002), p.252.

in the comment by *Jiefangjun Bao*, a PLA daily, "*If threatened from the air, China must have the ability to carry its defense strike capability to targets outside its own air space.*"[14]

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The rapid-reaction strategy introduced in the early Nineties is based on the premise that China will only be engaged in local wars for the foreseeable future and that it must strike to end the war quickly, meet the political objectives and cater to cost that is a big factor as equipment becomes more expensive to use and replace.[15] With the induction of long range SAMs and the desire to increase airlift capability, the trend in the air power doctrine and strategy has moved away from the myth of direct support for the ground forces.

LEADERSHIP AND PERSONNEL

Several trends in the air force's leadership since the mid-1980s have affected the PLAAF's status. Initially, only 29 of the 5,500 original members had any aviation background[16] and prior to the mid-1980s, all of the PLAAF's leaders were ground force officers who moved into the air force command positions in mid-career. In 1985, Wang Hai became the first aviator to be selected as the commander.[17] As a result of this, though there were reasons for them to not understand the strategic effects of air power during operational engagements in the past, the ongoing evolution of doctrine which stressed high-tech multi-

14. "Calls For Stronger Air Force," *Jiefangjun Bao,* Hong Kong AFP, April 7, 1996 (*FBIS-CHI-96-068*, April 7, 1996) in Kenneth W. Allen, "PLA Air Force Operation and Modernisation" (Pennsylvania: Conference on PLA, 1999).

15. Nan Li, "The PLA's Evolving Warfighting Doctrine, Strategy, and Tactics, 1985-95: A Chinese View," in David S. Shambaugh and Richard H. Yang, eds., *China's Military in Transition* (Oxford: Clarendon Press, 1997).

16. Kenneth W. Allen, "PLA Air Force, 1949-2002: Overview and Lessons Learned" in Burkitt, et. al., eds., n.3.

17. David Shambaugh, *Modernising China's Military, Progress, Problems and Prospects* (New Delhi: Bookmart Publishers, 2004), p.159.

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role platforms capable of greater offensive and defensive roles gained steam, commencing with the leadership of PLAAF Commander Wang Hai.[18] The PLAAF has also made a concerted effort at reducing the age of its leaders. In 1988, Commander Wang Hai, who had already held the position for three years, was 60 years old. The succeeding three commanders took over at ages between 57 and 63(mandatory retirement age being 65).[19] The average age of officers holding the same positions as those in 1988 has been reduced by about 3-5 years (lieutenant generals are about 57 years old and major generals about 52), thus, indicating a move towards a younger force. The PLAAF has also established age limits for its pilots, thereby making the average for fighter and ground attack pilots 28 years.[20]

Other significant changes have taken place in recruiting pilots. In 2000, the PLAAF recruited its pilots from graduates with a four-year bachelor's degree from a PLA academy. In 2003, the PLAAF extended the programme to civilian college graduates, with specific bachelor's degrees. These graduates receive two years of flight training at a PLAAF flight academy and one year of transition training before being assigned to an operational unit.[21] This is indicative of a higher quality of intake from a wider base entering the operational force by 2006. Concerning experience, whereas almost every PLAAF leader in the 1980s had fought in the Korean War, they had all retired by the mid-1990s.[22] This leaves the current set of leaders without relevant combat experience. Although they have been "influenced" by the Gulf War and Kosovo War, the question remains as to whether they can implement the changes necessary to meet

18. You Ji, *The Armed Forces of China* (London: I.B. Tauris, 1999), p.125.
19. Kenneth W. Allen, "China's Aviation Capability", presented at Chinese Military Affairs: A Conference on the State of Field (Washington: National Defence University, 2000) at www.ndu.edu/inss/china_center/CMA_Conf_Oct00/paper1.
20. Allen, n.12, p.205.
21. Kenneth Allen, "Reforms in the PLA Air Force", *China Brief*, vol. V, issue 15, July 5, 2005), p.5..
22. Shambaugh, n.17, p.159.

the challenges of local wars under high technology conditions.

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There are currently both positive and negative leadership trends for the PLAAF. Whereas all of the PLAAF's leaders have now come up through the air force ranks, as compared to the initial commanders who were ground soldiers, they are on the average younger than their predecessors of a decade ago, more mobile, but lacking in serious combat experience. We can expect the PLAAF to continue this trend of promoting younger officers, perhaps reducing the average age by yet another 1-2 years over the next decade. Their lack of combat experience may actually help if they do not prepare for the "last war". This transformation may come about as they have the opportunity to travel more and to learn in the information age. The PLAAF did not enjoy any substantial institutional clout [23] but a growing leadership role emerged when the CMC steadily assigned PLAAF officers to an increasing number of pivotal leadership positions in Beijing and Military Region (MR) Headquarters. In 2002, the first PLAAF general officer was appointed to serve as deputy director of the Nanjing MR Operations Department. In late 2003, the PLAAF began to augment each of the seven MR Headquarters by appointing a major general to serve as a deputy Chief of Staff in the Headquarters Department. In August 2003, Lt Gen Zheng Shenxia was elevated from Chief of Staff of the PLAAF to Commandant of the PLA's Academy of Military Science where he renewed the emphasis on integration of air operations into the PLA strategic doctrine. In 2004, PLAAF Commander Gen Qiao Qingchen was elevated as a member of the CMC, with two more PLAAF generals as deputies in General Departments but surprisingly with no appointment in the General Equipment Department.[24] This, however, represented a significant break with a past in which the army retained a stranglehold on senior leadership positions, enabling them to

23. Burkitt, et. al., eds., n. 3, p.93.

24. Lanzit and Allen, n.11, pp.448-452.

subordinate air force interests and potential contributions. These changes in senior officer appointments reflect a significant change in the PLA culture for notable implementation in future.

OPERATIONAL AND ADMINISTRATION STRUCTURE

The PLAAF is a multi-branch Service that is subordinate to the PLA. Since its founding, the PLAAF's chain-of-command has basically been organised into administrative and operational levels: Headquarters Air Force; Military Region Air Forces (MRAF); air corps, command posts, and bases; and operational units. Depending on the type of unit, operational units are organised into divisions, brigades, and so on. Operational units can be directly subordinate to Headquarters Air Force, the MRAF Headquarters, an air corps, a command post, or a base. The PLAAF over the years simplified its administrative command structure from a high of eleven first-level departments[25] to four.[26] Today, there are seven MRs, five air corps, and six bases that control the PLAAF's operational units. Bases are equal to an air corps, but most of the administrative functions are moved up to the MRAF Headquarters. Visible methods of force reduction have been seen in downgrading the air corps and restructuring the air bases to 12 command posts (two each in six MRs and none in Jinan MR)[27] further restructured to 13 command posts (two in each of five MRs, 3 in Lanzhou and none in Jinan MR).[28] The PLAAF has, thus, been marked by comparatively frequent changes on the administrative side and how well they prove functionality tests in combat scenarios and support operations is yet to be proved. These structural changes were necessary to reshape the PLAAF's operational command structure, but the changes have also adversely affected morale among officers at all levels whose jobs were eliminated or who have been denied an eventual promotion to the next level

25. Xiaobing Li, *A History of Modern Chinese Army* (Lexington: University Press of Kentucky, 2007), p.125.
26. Kenneth W. Allen, "Logistics Support for PLA Air Force Campaigns" in Scobell and Wortzell, n.13.
27. Allen, n.21, p.4.
28. Lanzit and Allen, n.11, p.465.

to secure their retirement benefits. On the basis of a proportional slice, the PLAAF was forced to cut 30,000 officer billets based on the specific goal of force reduction to replace junior officers with Non-Commissioned Officers (NCOs).[29]

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The reduction in force from 50 to 33 air divisions[30] over a period of time is significant in that the PLAAF has been able to retire many of its F-6s, all of which were built more than 20 years ago. This consolidation has saved the PLAAF money on maintenance costs and has allowed it to focus on other reforms, including logistics for a smaller and more mobile force. As the PLAAF acquires new weapons systems (Su-27/J-11, Su-30s, Il-76s, J-10, and S-300 SAMs), there will be further changes in doctrine and the way the PLAAF supports a more mobile force.

The PLAAF also includes the airborne troops. This was one of the PLAAF's most important changes in campaign strategy during 1992, when the air force's 15th Airborne Army changed into a Rapid Reaction Force (RRF).[31] The PLAAF's airborne forces began in the early 1950s as a single brigade and then expanded to become a division. By the mid-1970s, the army had three airborne divisions. Some time after 1984, the three divisions were reduced to brigades, but were again enlarged to divisions in 1993, each with about 10,000 troops. Training continuity with the organisational changes is one aspect and the other defining factor for the airborne force is the amount of additional airlift the PLAAF acquires.

In May 1957, the air defence was merged with the PLAAF. The PLAAF has tried various organisational structures for its AAA and SAM branches. Prior to 1985, they were organised into divisions, with their subordinate regiments. In 1985, the PLAAF began restructuring some of its AAA and SAM regiments

29. Ibid., pp. 464-465.

30. Kenneth W. Allen, "PLA Air Force Mobile Operations" in Mark Edmonds, Michael M. Tsai, *Taiwan's Security and Air Power* (New York: Routledge, 2003), p.77.

31. Allen, n.12, p.198.

With the evolution of radar brigades, the indications are that the number of radar units in each Military Region has grown considerably.

into combined brigades, but by the end of the 1990s, the PLAAF had re-instituted the division level, at least for SAMs, and had apparently raised at least some, if not all, of the combined brigades to a division level. This change probably reflects the PLAAF's acquisition of the S-300s from Russia[32] with an increased number of SAMs overall, plus the view that the combined brigades may not be the best solution to accomplishing the air defence mission. It is apparent that the organisational structures for the SAM and AAA forces were in a flux for some time and may still take a few years to streamline. Much will depend on the number and types of SAMs the PLAAF deploys and where they are located. It will most likely continue to increase the size of its radar force, including a more comprehensive Integrated Air Defence System (IADS) through better radars and communications capabilities. With the evolution of radar brigades, the indications are that the number of radar units in each Military Region has grown considerably. However, the overall trend is for further reductions in the size of the force as older aircraft are retired. The PLAAF could easily be down to 30 divisions, with most having two regiments each, by the end of the decade. This will equate to further savings on operating costs as well and allow the PLAAF to focus on the tactics and mobility aspects of its new aircraft. The administrative structure is not expected to change over the next decade, but certain elements such as the airborne forces, SAMs, and ECM/IW (Information Warfare), including space capability, will continue to receive greater attention.

AVIATION ASSETS: COMMAND, CONTROL AND INTEGRATION WITH SPACE

There is very little information available that specifically identifies command and control for China's air power elements which also include the naval and army aviation assets. The PLAAF and PLA Navy have a total of around

32. M. Taylor Fravel, "China's Search for Military Power," *The Washington Quarterly*, vol. 31, no. 3, Summer 2008, p.133.

2,325 operational combat aircraft, air defence and multi-role fighters, ground attack aircraft, fighter-bombers, and bombers. An additional 470 older fighters and bombers are assigned to PLA flight academies or research and development. The two air arms also possess approximately 450 transports and over 90 surveillance and reconnaissance aircraft with photographic, surface search, and airborne early warning sensors.[33]

Sichuan earthquake relief operations were conducted according to the PLA joint operations doctrine. Xinhua called it "its largest airlift yet" of some 11,420 troops. About 100 military helicopters (nearly one quarter of the Army Aviation inventory) were dispatched from all over the country.

Gen Ma Xiangsheng, the head of the PLA's Army Aviation Department, revealed the current strength of the Army Aviation Corps for the first time on July 4, 2008, during a conference held by the Foreign Affairs Office of the Ministry of National Defence (MND). There are "over 10 units and nearly 500 helicopters" and this is the first time that PLA officially confirmed the size of its helicopter fleet.[34]

The overall increase in the use of fibre optics, satellite communications, and computers indicates that the air power elements are also going to use these means of communication extensively. The changes in leadership demographics and administrative changes noted above will also influence the overall command and control system. This is an area which also needs attention in order to understand future trends. In the past, joint training (to include intra-Service training among the branches) was described as two or more elements training at the same time, but in different areas. This situation is gradually changing as more emphasis is put on real joint training. One of the biggest questions is whether a joint command and control relationship will be established between the PLAAF and naval aviation in time of war. A

33. Annual Report to Congress "The Military Power of The People's Republic of China, 2007" by the Office of the Secretary of Defence, p. 25, available at www.defenselink.mil/pubs/pdfs/070523

34. Available at http://www.sinodefence.com/news/2008/news08-07-04.asp.

The second doctrinal book lays out six steps for China in establishing a model in which the PLAAF is the leading organisation for "integrated air and space" and also the primary force for air and space combat.

plausible option is that they continue to operate as separate entities, but some naval aviation aircraft could be given under PLAAF control to conduct missions. Also, the Sichuan earthquake relief operations have revealed much about joint operational capabilities. Though no weapons were involved, deployment was conducted according to the PLA joint operations doctrine, providing a real-world test bed. Xinhua called it "its largest airlift yet" of some 11,420 troops. About 100 military helicopters (nearly one quarter of the Army Aviation inventory) were dispatched from all over the country. Civilian assets augmented these fleets. The *Liberation Army Daily* noted "the long-distance rapid insertion capability in a state of relative weakness." The *People's Daily* commented, "With this earthquake, we mustered as many helicopters as possible, but overall they were still too few, and their capabilities not yet improved"[35] (China will buy 150 helicopters of three different types, from Poland's PZL Swidnik over 10 years under an agreement signed between the Polish aircraft firm and China's Jiujiang aeronautics plant).[36] The deployment, however, offered an opportunity to evaluate joint performance.

China's 2004 and 2006 Defence White Papers clearly show the growing importance of the PLAAF and its missions. However, neither Paper references integrated air and space. In March 2004, the PLAAF published *Air and Space Battlefield and China's Air Force*, following in August 2006 with *The Science of Integrated Air and Space Operations*. The first doctrinal book does not provide linkage between space and the PLAAF; the second book lays out six steps for China in establishing a model in which the PLAAF is the leading organisation for "integrated air and space" and also the primary force for air and space combat. In 2006, the PLAAF published *An Introduction to Air Force Military*

35. Dennis J. Blasko, "China's Army Still Getting to Know Itself", online edition of *Asia Times*, July 12, 2008, available at http://www.atimes.com/atimes/China/JG12Ad02.html.

36. Available at http://www.defensenews.com/story.php?i=3394355&c=EUR&source=nletter-__AdditionalEmailAttribute1

Thought which professed that the PLAAF should use informationalisation to control the land and sea, and should move toward developing integrated air and space operations.[37] These declarations may be just the beginning of a long turf war over managing and employing China's military space.

TRAINING

A comparison of the two most recent sets of concepts, shown below, clearly demonstrates the shift in training philosophy that occurred between 1987 and 2001. In 1987, "safety" was the watchword; in 2001, every line points to practical, realistic training.[38]

Concepts issued in 1987
Adhere to reform
Enhance effectiveness
Improve steadily
Ensure safety
Concepts issued in 2001
Closely adhere to actual combat situations
Stress training agaist opposing forces
Be strict during training
Apply science and technology during training

The current training fleet comprises about 40 Su-27UBKs, 50 JJ-7s, 150 JJ6s, 100JJ-5s, all jet trainers and 1,000 CJ-5/CJ-6 piston engine primary trainers.[39] The L-15, revealed at the Beijing Air Show in September 2001, boasts of supersonic speed, modern cockpit systems, and the ability to train in counter-air and ground attack missions and would be the ideal modern trainer for the PLAAF, to allow pilots to transition to the Su-30MKK as well as the J-10,

37. Lanzit and Allen, n.11, pp.453-455.

38. Ibid., pp.459-460.

39. David Donald, "China, People's Liberation Army Air Force," *International Air Power Review,* Summer 2001, p.87.

A PLAAF pilot typically trains about 80 hours per year in the air—not enough time to master the complex skills of piloting, let alone grasp the handling of high-tech weaponry used in combat planes.

if the funding is adequate. While the numbers may be adequate to teach basic manoeuvring and air skills, they are woefully inadequate to teach combined air and ground attack with even the Su-27UBKs lacking the modern data-link and ground attack technologies. The FTC-2000 shown in the Zhuhai Air Show in November 2000 could also be preferred if the development period proves to be shorter. The PLAAF and naval aviation have also been involved in several complementary organisational changes that have resulted in more realistic flight training. As a result of certain changes in training, PLAAF pilots have been noted flying in more sophisticated simulated air-to-air combat, training in an ECM environment, flying over the Taiwan Strait and East China Sea, conducting live missile firings beyond the coast, dropping live bombs at ranges, flying at night and under different weather conditions, as well as flying at low altitudes. An ordinary PLAAF pilot typically trains about 80 hours per year in the air—not enough time to master the complex skills of piloting, let alone grasp the handling of high-tech weaponry used in combat planes. The gap between current military doctrine about modern war and the actual practices of the armed forces has resulted in a deficit of experience.[40] To help make up for the limited number of flying hours in tactical training per year, the PLAAF has increased use of flight simulators and reportedly it comprises almost 90 per cent.

They have also practised emergency mobility deployments to permanent and auxiliary airfields within and outside their assigned MRs. All of these changes have been aided by the acquisition of improved navigation equipment. Details about the exact types of training or the level of joint coordination between the air force and navy are not available. The PLAAF did not even begin flying over water until the late 1990s but with the turn of the

40. Anatoly V. Bolyatko, "A View from Moscow: China's Growing Military Power" in Scobell and Wortzell, eds., n.13, p.92.

decade, cruise missiles were reportedly launched over the East China Sea by eight PLAAF bombers.[41] The FC-03 flight data recording and processing system has been fitted to provide a 3-D picture of the flight track and recording of the instrument panel. The PLAAF is also seeking modern Air Combat Manoeuvring Instrumentation (ACMI).[42] Airborne troop training over the past few years appears to have been focussed primarily in western China and the Xingan mountains in northeast China. The PLAAF sent 8 JH-7A fighter-bombers, 6 IL-76MD transport aircraft, and an airborne company from the 15th Airborne Corps, totalling 460 personnel, for a joint exercise ("Peace Mission -2007") with Russia in Vladivostok and east China's Shandong Peninsula and nearby offshore waters.[43] Though it was publicised that such an exercise did not target a third country, there has been increased emphasis on airborne forces and the query remains as to whether the airborne forces are being trained primarily for internal or external use. The biggest question, however, is: how proficient are they, especially in terms of joint operations?

The PLAAF has reconfigured logistics and maintenance systems, which traditionally have not been structured to support mobile, offensive operations.

LOGISTICS AND MAINTENANCE

The PLAAF does not routinely conduct a high number of sorties per pilot in a short period of time,[44] so aircraft maintenance and logistics support are not under strain but as the PLAAF becomes a more mobile force, it has begun to adjust its logistics and maintenance operations to meet new challenges. PLAAF logistics and maintenance units have experienced significant reorganisation and restructuring since the 1990s. The PLAAF has reconfigured logistics

41. Available at www.pladaily.com.cn/gb/pladaily/2002/04/20/20020420001010_TodayNews.html.
42. Report on Zinhua Air Show, 2000 by Richard Fisher Jr, available at www.strategycenter.net/research/pubID
43. Information available at www.sinodefence.com/news/2007/news07-07-28.asp.
44. Michael D. Swaine, Andrew N. D. Yang, Evan S. Medeiros, *Assessing the Threat: The Chinese Military and Taiwan's Security* (Washington: Carnegie Endowment for International Peace, 2007), p166.

and maintenance systems, which traditionally have not been structured to support mobile, offensive operations. Historically, a single airfield has hosted one regiment fitted to a single type of aircraft. The PLAAF's emphasis on achieving new mobility goals aims at small logistics and maintenance teams deploying with the aircraft to any type of airfield. Furthermore, efforts are underway at PLAAF airfields to instruct specialised maintenance teams in the cross-servicing of multiple aircraft types.[45]

There are 21 repair factories employing about 40,000 workers carrying out major overhauls of aircraft and engines.[46] Aviation units also have repair factories which are equipped to conduct intermediate and minor repairs. Changes have included computerising and networking operations, establishing small rapid reaction teams capable of accompanying aircraft deployments, adjusting the logistics structure, acquisition, storage, and distribution of spare parts. While moving towards the above process for a leaner force, they have diversified the logistics and maintenance pattern of "guarantee" systems of six categories, providing from emergency guarantee to partial and independent guarantee to airfields, areas and departments concerned.[47] The PLAAF logistics forces have also been working on refuelling aircraft and techniques, which comprise one of its weakest links,[48] together with support of multiple types of aircraft at a single base. The PLAAF has also begun building hardened shelters for some of its aircraft. Although the clear trends are for more joint logistics, especially in common areas such as hospitals, fuels, quartermaster supplies and transportation, the more difficult areas will be spare parts for aviation and air defence equipment. One of the biggest challenges will be supplying the force with spare parts for all of the sophisticated weapons systems acquired from abroad and for domestically-produced systems composed of foreign parts. The logistics and maintenance

45. Lanzit and Allen, n.11, p. 466.

46. James C. Mulvenon, Richard H. Yang, *The People's Liberation Army in the Information Age* (Santa Monica: RAND, 1999), p 82.

47. Ibid., pp. 87-90.

48. Allen, n.3, p.137.

of Su-27s is a good example of this predicament. Although some of the aircraft are assembled in China, only about 10 per cent of current production is of domestic content; airframes, engines and avionics are produced in Russia. Even the J-7s and J-8s with Chinese engines have Russian avionics.[49]

FOREIGN RELATIONS

The PLAAF began sending delegations abroad as early as August 1949, when the air force's first Commander, Liu Yalou, led a delegation to Russia to purchase aircraft and equipment which gained momentum only after 1979.[50] Most importantly, analysis shows that each of the PLAAF delegations is led by the commander or political commissar and includes directors from key headquarters departments, regional commanders, and/or personnel from air force research institutes and academies. In addition, most of the PLAAF deputy commanders and deputy political commissars have been part of delegations led by senior PLAAF officers. However, there could be limitations to the future growth of the PLAAF's foreign relations programme. The first limitation is that the PLAAF's Foreign Affairs Division officers must plan the itinerary for, and escort, all foreign and PLAAF delegations. Growth and size of this division have to be commensurate and over the years there has been no confirmative indication. Second, each commander is authorised one visit abroad under ordinary circumstances and the number of foreign air force leaders accepted for visits to China is guided by the overall PLA's visitors plan. Besides meeting with foreign commanders, the PLAAF also hosts or sends out an average of five to ten functional exchange delegations per year which brings in the overriding time/schedule factor. Third, the PLAAF must pay for all in-country expenses for visiting delegations and all international travel expenses for PLAAF delegations which factors in budgetary constraints. Fourth, the PLAAF has permanent military attachés posted in three locations–Washington, London, and Moscow–and there is

49. Harold Brown, Joseph W. Prueher, Adam Segal, *Chinese Military Power* (New York: Council on Foreign Relations, 2003), p.50.

50. Allen, n.3, p.98.

The PLAAF's future aircraft are beginning to enter the force, although the total number and precise mix of foreign and domestic aircraft remain unknown.

a handful of countries with air force attachés assigned to Beijing. This would tend to limit frequent interaction between the PLAAF and foreign air forces.

NEW WEAPON SYSTEMS AND MODERNISATION

The PLAAF is looking to enhance operational capabilities through upgrading existing and acquiring new equipment. The transition is between a limited force consisting mainly of the obsolete capabilities that it fielded in the 1980s, and the more advanced force that it intends to field in the coming decades. Modernisation will also include larger numbers of more advanced air transports, Airborne Early Warning (AEW)/Airborne Warning and Control Systems (AWACS), aerial refuelling tankers, intelligence collection, and signal jamming aircraft which will enhance the effectiveness of PLAAF airborne forces for both internal security and external missions.

The J-6 fighters that once made up most of the fighter fleet have almost retired.[51] The PLAAF's future aircraft are beginning to enter the force, although the total number and precise mix of foreign and domestic aircraft remain unknown. An estimate given to the Congress by the Department of Defence of the United States in 2007 was 1,550 fighter aircraft, 775 bombers and 450 transport aircraft. The PLAAF now has 15 years of experience with the Su-27 (first regiment inducted in 1992)[52] fighters as well as with Su-30s from 2000, and J-10s. The J-10 is China's first domestically produced fourth-generation aircraft and will likely make up a large portion of the future force. It is a highly capable, multi-role fighter, strongly influenced by, and has benefited from, the Israeli Lavi project,[53] which was in turn influenced by the F-16. Serial

51. Harold Brown, Joseph W. Prueher, Adam Segal, *Chinese Military Power* (New York: Council on Foreign Relations, 2003), p.48.

52. Ibid., p.48.

53. Robert Hewson, "Chinese J-10 Benefited from Israeli Lavi Project," *Jane's Defence Weekly*, vol. 45, issue 21, May 21, 2008, p.5.

production has commenced and some 60 aircraft (enough to equip about three Chinese aircraft regiments) are reportedly deployed. The Su-27s and Su-30s, including the Su-30MKKs, are being complemented with the J-11 numbering around 300. The J-11 is the Chinese-assembled version of the Russian Su-27SK. Initial 'co-production' involved Chinese assembly of aircraft kits provided by the Russians, but the Shenyang Aircraft Corporation plans to increase the proportion of domestically produced components for the J-11s gradually and have also delivered around 95 J-11Bs reportedly assembled by mid-2007.[54] Development on a fifth generation fighter aircraft has also reportedly commenced by the Shenyang Aviation Corporation and Chengdu Aircraft Industrial Group but potential dates are speculative.[55]

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The PLAAF may also field the Xiaolong/FC–1, an indigenously developed fighter that is the product of a Chinese-Pakistani joint venture. The Xiaolong/FC–1 would provide a less expensive alternative to fourth-generation aircraft. Serial production of the aircraft was scheduled by January 2006 but there seems to be uncertain enthusiasm by the PLAAF.[56]

Along with fighters, the PLAAF continues to modernise its ground-attack and bomber forces. China's efforts to improve its ground-attack capabilities include development of the JH-7/FB-7 Flying Leopard. Although the JH-7 is a multi-role aircraft, its limited capabilities against modern fighters suggest that it will be used mainly for ground attack and anti-ship missions. About 20 JH-7s are currently deployed with the PLAAF 28th Air Division in Hangzhou.[57] The air force is reportedly unenthusiastic about the JH-7 and would probably

54. Brief on "China's Military Modernisation: Part One" in *Jane's Defence Weekly*, vol 45, issue 30, 23 July 2008, p.28.

55. Ibid.

56. Information available at www.globalsecurity.org/military/world/china/fc-1.htm.

57. Richard Fisher Jr, "PLAAF Equipment Trends," in Stephen J. Flanagan and Michael E. Marti, eds., *The People's Liberation Army in Transition* (Washington: National Defence University Press, 2003), pp.149-150.

The PLAAF is also set to develop and deploy force multipliers that will enhance the capabilities of its combat aircraft.

prefer to acquire more advanced multi-role fighters. It is uncertain whether China will decide to build or acquire new bombers, but production of the H-6/Badger has resumed with emphasis on a new variant capable of carrying anti-ship and land-attack cruise missiles.[58] The deployment of advanced cruise missiles should allow existing bombers to contribute more effectively to a variety of missions, including anti-ship and ground attack tasking. It is also unclear if the Chinese intend to upgrade the bomber fleet with the Russian Tu-22 and Tu-95 bombers. One of the reasons why the PLAAF would want to acquire new strategic bombers would be the deterrent factor and such acquisition will also mark a significant shift in the balance of power in Asia.

The PLAAF is also set to develop and deploy force multipliers that will enhance the capabilities of its combat aircraft. These systems will include tankers, AEW aircraft, Electronic Warfare (EW), intelligence collection aircraft, and transports that will support a rapid-response capability for internal and external contingencies. The Su-30s can be refuelled by the IL-78/Midas tankers, with four already ordered from Russia although not yet delivered because of a production problem. The J–10s can be refuelled by the HY–6 tankers, a modified H–6 platform. Expansion of the tanker force and delivery of the IL-76 will extend the range and endurance of the PLAAF refuellable combat aircraft. China had the basic capability since 1994 but with the order of IL-78 Midas tankers from Russia, it has indicated a growing ambition to project power off shore.[59] However, at present, even if China takes delivery of the IL-78 Midas tankers, they would be able to support at most a squadron of Su-30s in combat operations.[60]

China has made several efforts to acquire or develop AWACS capabilities, but current information suggests that only limited progress

58. Richard Fisher,Jr, "China's 'New' Bomber," International Assessment and Strategy Center, February 7, 2007, available at <www.strategycenter.net/research/pubID.146/pub_detail.asp#>.

59. n.54, p28.

60. Fravel, n.32, p.135.

has been made. Some Chinese sources take the position that the AEW would be more beneficial to the PLAAF than the AWACS since it would require fewer changes in current operational practices. Present capability used the IL-76 as a platform for the KJ–2000, equipped with the indigenously designed phased-array radar. Research and development on this system had reportedly made significant progress, but the programme received a setback by the crash of a prototype in June 2006 that killed some 40 technicians.[61] A second domestic AEW programme, the KJ-2, is based on the Chinese Y–8X transport aircraft. Of course, the PLA already has an AWACS built around the Russian Beriev A-50, equipped with Chinese-made phased-array radar and has a data link capability; a data processing system, identification Friend-or-Foe(IFF) system and a Command, Control, Communication and Intelligence (C^3I) capability. It can exchange data with other aircraft and other platforms equipped with compatible data links. The aircraft loiter time on station, however, is only about 90 minutes. China's own Y-8, a four-engine turboprop, will be equipped with an Ericsson ERIEYE AWACS system, increasing China's airborne early warning and command and control capabilities.[62]

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The PLAAF is also making efforts to modernise its transport fleet, focussing primarily on the IL-76/Candid, the Chinese Y-8 and Y-9, and the Soviet Antonov An-12. If no additional Il-76s were being purchased, it would have indicated a greater internal role, but China had placed an order for 38 IL-76 transport planes and IL-78 tankers which Russia failed to honour. Therefore, presently it is handicapped with insufficient airlift. However, airlift would

61. Joseph Kahn, "Crash of Chinese Surveillance Plane Hurts Effort On Warning System," *New York Times*, June 7, 2006, available at http://www.airliners.net/aviation-forums/military/read.main/47572/.

62. Larry M. Wortzel, "PLA Command, Control, and Targeting Architectures: Theory, Doctrine, and Warfighting Applications" in Kamphausen and Scobell, eds., n.11, p.214.

also include efforts from China's Large Civil Aircraft (LCA)[63] fleet comprising Western-built aircraft. As of July 2007, a total of 1,171 western-built LCA were registered in China, while regional jets accounted for 57 additional aircraft. It should also be noted that China's share of world order of LCA in 2006 accounted for 14 per cent and delivery during the same period was 12 per cent.[64]

INFLUENCES AND TRENDS

A number of influences and competing sets of perspectives have shaped what the air force looks like notwithstanding the modernisation programme under way, with aircraft and systems that will constitute the future PLAAF, projected capability and strategic intentions.

- The first perspective focussed on China's immediate external security environment, the military missions derived from potential threats, air force capabilities and force structure necessary to carry out these missions and Beijing's sense towards being a regional power also accelerated this process. Initially, the threat from Taiwan led the PLAAF to build near-term combat capabilities which implied greater emphasis on air bases and air defence assets along China's land and maritime borders and a relative neglect of long-range strike capabilities but gradually, through purchase and co-production of Russian multi-role fighters and assets such as tankers and strategic bombers, the emphasis shifted to a strategic air force.
- Most of the aircraft acquisitions and development programmes shaping today's PLAAF were initiated, including the acquisition of Russian Su-27/Flanker fighters and the J–10 fighter development programme, with the influence of the 1991 Gulf War, invasion of Iraq and furtherance of strategic capabilities of the Indian Air Force which indicated a sense of vulnerability and prompted intensified efforts to build a more advanced and capable PLAAF. This scenario had the air force focussing on power

63. An LCA is one with a capacity of 100 seats or more.

64. Peder Anderson, *China's Growing Market for Large Civil Aircraft* (Washington: Office of Industries, US International Trade Commission, 2008), pp.2-4.

projection not only into the East China and South China Seas to ensure a PLAAF capability to protect vital Chinese sea lines of communication but also ingress from the western mainland. It not only involved greater attention to potential threats from India but also a scenario of an eastern ingress which is also a demanding scenario for the PLAAF. Redeployment of assets in order to increase capabilities to strike India may become a compulsion because lack of adequate air bases close to the Indian border constrains the contributions that tactical aviation assets (such as multi-role fighters) can make to the scenarios. This increases the requirement of aerial refuelling capabilities over land and water, long-duration maritime patrol and intelligence collection, and strategic bombing capabilities. It also implicates greater stress on training operations in conjunction with relocation and mobility with equipment. Air refuelling can help extend the operational range of tactical aircraft but is an imperfect substitute without supporting bases for large scale operations.

- The 2006 Defence White Paper calls for "coordinated development of national defence and the economy" which has a bearing on future capability development for the PLAAF and Beijing's modernisation, giving options to look at the potential military requirements and China's growing international interests. However, continued economic growth and global integration have increased dependence on foreign sources of energy (especially oil and gas). Therefore, the Defence White Paper raises concerns about resources and transportation links when it raises "security issues related to energy, resources and finance." In 2003, China became the world's second largest consumer and third largest importer of oil. China imports over 40 percent of its oil (about 2.5 million barrels per day as per 2005 estimates). By 2025, this figure could rise to 80 percent (9.5 – 15 million barrels per day). China began filling a strategic petroleum reserve in 2006. By 2015, Beijing plans to build reserves according to the International Energy Agency standard of 90 days supply.[65] For the PLAAF,

65. Annual Report to Congress "The Military Power Of the People's Republic of China, 2007" by the Office of the Secretary of Defence, p.8, available at www.defenselink.mil/pubs/pdfs/070523.

The PLAAF's primary mission has long been air defence, with support for ground troops an important secondary mission.

it will not only depend on how Chinese leaders decide to pursue interests relative to the value of military instruments, especially air power but also tackle matters of operational logistics. With the present state of logistics and transportation networks, there is an element of inadequacy with regard to mobility of the strategic reserves of oil through definite time-frames.

- The PLAAF's primary mission has long been air defence, with support for ground troops an important secondary mission. The air defence mission requires close coordination of both aircraft and ground-based air defences such as SAMs and AAA. Despite the longstanding secondary mission of supporting ground troops, the PLAAF has seldom been able to perform close air support missions for ground forces and has had only limited capability to perform bombing and interdiction missions in support of ground operations. The 2006 Defence White Paper then stressed PLAAF efforts to speed up "its transition from territorial air defence to both offensive and defensive operations" and to increase "its capabilities in the areas of air strike, air and missile defence, early warning and reconnaissance, and strategic projection." The air defence mission is now conceived as a responsibility that incorporates both offensive and defensive actions. The emphasis is on offensive operations, air strikes, and strategic mobility (coupled with the wide emphasis on joint operations and joint campaigns) implying a higher level of cooperation for operations that support ground forces.
- An approach for sizing the capability of the PLAAF would focus on the priorities of civilian leaders, which encompass a range of strategic, developmental and political objectives. From this perspective, the future size of the force should be a function of the leadership's estimate of the return on investments in air force capabilities relative to other uses of the resources. China's defence budget for 2007 officially, was Yuan 350.92

billion (US$45 billion), an increase of 17.8 per cent ($6.8 billion) over the previous year[66] but analysis of budget data and International Monetary Fund (IMF) Gross Domestic Product (GDP) data for the period 1996 to 2006 shows average annual defence budget growth of 11.8 percent compared with average annual GDP growth of 9.2 percent.[67] Therefore, though civilian leaders should clearly be concerned with the need to keep defence expenditures in proper proportion to economic development, we can expect variations when it comes to achieving hardline goals. Defence and civilian industries can have positive synergies and so leaders might support some additional military expenditure (especially in research and development) due to the benefits for the civilian economy. The domestic aviation programme can be viewed in this light.

China's defence budget data for the period 1996 to 2006 shows average annual defence budget growth of 11.8 percent compared with average annual GDP growth of 9.2 percent.

- Another approach would have emphasised building the PLAAF into a modern air force capable of engaging and defeating other air forces. The benchmark would be the ability to engage and defeat modern Asian air forces such as those of India and Japan in the near future. This implied development of advanced fighters and force multipliers such as tankers and AWACS aircraft. In terms of force structure, such an approach emphasised additional procurement of Russian aircraft, and efforts to acquire advanced Western technology for Chinese platforms, like the attempt to procure AWACS from Israel which was cancelled due to intervention by the United States.

The above outlines different ways of thinking that the PLAAF would have designed for its future capability. Each suggests a different view about the

66. Brig Gurmeet Kanwal, "China's Rising Defence Expenditure: Implication for India", *IPCS Issue Brief*, no 65, April 2008, p2, available at ipcs.org/ipcs-Issue Brief-No65 pdf.

67. n.65.

role the air force might play and, therefore, incorporates the structure and capability that would be appropriate. There have been indications of 'looks' beyond the region which articulate the rationale for building a military capable of global operations in defence of China and expansion in global interests. The PLA recognises that both its new defence strategy and its capability to project military power beyond China's borders depend largely upon enhancing the air force.[68] Barring an economic collapse, air force budgets should increase even if China's real defence spending slows. Nevertheless, budget limitations will still force leaders to make difficult choices about air force modernisation.

FINDING THE ANSWER

In addition to the above perspectives, PLAAF capability will be shaped by narrower decisions about the division of labour on air defence and conventional strike missions, proper trade-offs between foreign and domestic production, high-tech versus lower-cost systems and relative emphasis on support aircraft. The most likely path for PLAAF capability building will be to maintain present efforts to build the air force using a variety of means, including ongoing procurement of advanced aircraft from Russia, continued domestic efforts to design and produce advanced aircraft, and incorporation of imported engines, avionics and munitions into Chinese aircraft designs. The preference is to gradually shift away from foreign procurement and use of foreign components as the domestic aviation industry's capabilities to produce advanced aircraft and components improve.

The PLAAF's ability to absorb and employ additional aircraft of the new generation would be constrained by its capacity to train pilots and maintenance personnel and the time needed to upgrade units to operate more advanced aircraft. A heavy reliance on simulators will never be a substitute for active flying or combat experience.

The PLAAF would resist efforts to replace foreign engines and avionics with Chinese-produced equivalents that do not deliver the same performance or reliability. This could entail an inherent contradiction of goals toward a

68. Denny Roy, *China's Foreign Relations* (Lanham: Rowman & Littlefield Publishers, 1998), p.111.

more capable force with matching domestic technological advancement. In theory, the defence reorganisation of 1998 that established the General Armaments Department should give air force requirements greater weight in procurement decisions, but this may not be true in practice, given the hierarchical status of the PLA. The capability of conducting and supporting joint operations would rely heavily on networking and to employ air power effectively, therefore, the development capability and pace on this front will dictate the empowerment of the air force from acquisition to importance. The PLAAF enjoys at least one bureaucratic advantage: both the ground forces and the navy have realised that they need a powerful air force to fulfill their own organisational aspirations, and thus will be inclined to devote significant funds and, consequently, efforts, to its modernisation.[69]

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CONCLUSION

The PLAAF has made impressive progress towards comprehensive force modernisation, but it may require an additional 10-15 years before the process is complete. Several obstacles stand in the way. The most visible impediments are hardware deficiencies and significant shortfalls in key weapon systems essential in offensive air operations. The PLAAF has a large inventory that contributes little to capabilities and will require substantial additional effort, time and resources to maintain till replaced. Modernisation has also been hampered by lengthy delays in fielding command and control and air surveillance aircraft, essential for the air force to extend its reach beyond the shoreline. Development of new operational concepts and doctrine is faced with the PLAAF's lack of recent combat experience though significant changes are underway in the training programmes. The PLAAF began building the overall

69. Ibid., p.112.

foundation during the 9th Five-Year Plan (1996-2000) for an air force capable of conducting simultaneous offensive and defensive mobile operations and has made reasonable progress on all fronts during the 10th Five-Year Plan (2001-2005). It is already clear that the future People's Liberation Army Air Force is marching towards a more modernised force and build-up rate during 11th Five-Year Plan (2006-2010). Key indicators for capability enhancement will rest not only on leadership perceptions but also the success rate of indigenous production and foreign procurement outcomes. The element of uncertainty will rest between accepting a lesser capable air force with a mix of equipment and personnel with varying degrees of deliverance capability or a significantly smaller but more capable air force.