

UC San Diego

SITC Research Briefs

Title

The People's Liberation Army Air Force and the Chinese Aviation Industry

Permalink

<https://escholarship.org/uc/item/1pf1d360>

Journal

SITC Research Briefs, 2013(Research Brief 2013-12)

Authors

SAUNDERS, Phillip C.
WISEMAN, Joshua

Publication Date

2013



Research Brief 2013-12

January 2013

The People's Liberation Army Air Force and the Chinese Aviation Industry

Phillip C. SAUNDERS

Joshua WISEMAN

Summary

Over the past 20 years, the People's Liberation Army Air Force (PLAAF) has engaged in a major modernization campaign to replace obsolete aircraft derived from 1950s Soviet designs with modern fourth-generation fighters. One track is based on imports of advanced aircraft and production technology from Russia; the other is based on improving the ability of China's aviation industry to design and produce its own advanced aircraft, with significant contributions from foreign technology, foreign design assistance, and reverse engineering. In our study of the PLAAF's role as an end user of the products of China's defense industry, we find that defense industry and military reforms have improved the PLAAF's ability to define its requirements according to doctrinal and mission needs and increased its leverage in forcing the Chinese aviation industry to develop systems that can satisfy those needs.

The Study of Innovation and Technology in China (SITC) is a project of the University of California Institute on Global Conflict and Cooperation. SITC Research Briefs provide analysis and recommendations based on the work of project participants. This material is based upon work supported by, or in part by, the U.S. Army Research Laboratory and the U.S. Army Research Office through the Minerva Initiative under grant #W911NF-09-1-0081. Any opinions, findings, and conclusions or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the views of the U.S. Army Research Laboratory or the U.S. Army Research Office.

PLAAF ORGANIZATION AND THE DEFENSE RDA SYSTEM

The pre-1998 Chinese defense S&T system focused more on defense industry technological capabilities and bureaucratic preferences than on military operational requirements. Reforms that began in 1998 were intended to give military needs and requirements greater weight in the research, development, and acquisition (RDA) process. These reforms relegated the civilian Commission on Science, Technology, and Industry for National Defense (COSTIND) to the role of managing the Chinese defense industry and formed the PLA General Armament Department (GAD) to represent PLA interests in the RDA process.

Parallel organizational changes gave the PLAAF Equipment Department (空军装备部) primary responsibility for Air Force weapons and equipment development and maintenance, including managing the Air Force Equipment Research Academy (空军装备研究院) and Air Force military representatives at aviation industry factories and research facilities. This change consolidated PLAAF RDA efforts and allowed the PLAAF to interact with the GAD and other parts of the defense establishment on a more even footing.

The reforms appear to give the PLAAF the ability to recommend whether or not to proceed with aircraft development programs, although the GAD likely reviews this decision and the Central Military Commission (CMC) must approve each major development program. This can now involve competitive development of prototypes by different factories, with the PLAAF choosing which proposal to accept.

The reforms also give PLAAF technical experts channels for participation in military and national level science and technology (S&T) development programs to ensure that technologies with importance for Air Force systems have a high enough priority. Much of this work takes place through the participation of PLAAF experts in GAD-supervised expert committees focused on particular technology areas.

PLAAF DOCTRINAL SHIFTS

Four strategic and doctrinal developments over the last twenty years have reshaped PLAAF pri-

orities and altered its demands on the Chinese aviation industry. The first is the heightened threat of Taiwan independence and the potential for U.S. military intervention in a Taiwan contingency. The need to prepare for a potential conflict against the United States increased the urgency of air force modernization and raised the bar for what types of capabilities the PLAAF would need.

The second development is a PLAAF doctrinal shift away from a focus on territorial defense toward an increased emphasis on offensive missions and trying to seize and maintain the initiative in combat. The third is Hu Jintao's 2004 articulation of the "New Historic Missions," which potentially expand both the types of operations the PLAAF may be called upon to carry out and the distances over which it must be prepared to operate. The role of PLAAF Il-76 aircraft in the evacuation of Chinese citizens from Libya illustrates these new demands.

The final development is the PLA-wide emphasis on "informationization," which favors investments in C4ISR (command, control, communications, computers, intelligence, surveillance, and reconnaissance), advanced sensors, and electronic warfare capabilities.

ACQUISITION AND DEVELOPMENT PRIORITIES

The heightened priority of preparing for a Taiwan contingency and the doctrinal shift toward "simultaneous preparation for offensive and defensive operations" support the PLAAF's top priority: development and acquisition of advanced multi-role aircraft that can hold their own against U.S. systems and perform strike missions using precision-guided munitions. Informationization and the "new historic missions" imply somewhat different priorities, with the former emphasizing advanced sensors and communications systems and the latter focusing on longer-range operations and strategic airlift.

These objectives are reflected in PLAAF efforts to acquire or develop support aircraft such as transports, airborne early warning aircraft, and tankers. The PLAAF has resisted pressure to procure less capable systems produced by the Chinese aviation industry such as the JH-7 fighter-bomber and the JF-17/FC-1 fighter, a

MiG-21 derivative equipped with modern avionics and an upgraded engine.

The J-10 is an indigenous fourth-generation fighter developed by the Chengdu Aircraft Industry Group with Israeli technology and design assistance. The J-10 and the improved J-10B give the PLAAF an aircraft roughly equivalent in performance to Western fourth-generation fighters (Lockheed Martin F-16, Dassault Rafale, Eurofighter Typhoon). The PLAAF appears to be reasonably satisfied with the aircraft's performance and believes it can match the capabilities of other fourth-generation fighters it might encounter in a combat scenario.

China's first fourth-generation fighters were Su-27 Flanker fighters purchased from Russia in the early 1990s. The Shenyang Aircraft Corporation (SAC) subsequently entered into a 1996 co-production agreement to manufacture 200 Su-27s as the J-11. After mastering co-production, SAC reverse-engineered Su-27 subsystems and eventually abrogated the coproduction contract in favor of producing the indigenized J-11B. This demonstrates the Chinese aviation industry's ability to absorb foreign technologies, ultimately mastering production of a capable fourth-generation fighter (although Chinese Su-27s and J-11s continue to use Russian AL-31F turbofan engines). The fact that the PLAAF has not adopted the WS-10A Taihang turbofan engine built by the Shenyang Liming Motor Corporation due to performance and lifespan concerns indicates that the air force has been able to use strict performance standards, operational testing requirements, and its budget authority to resist pressure to adopt an inferior Chinese-built engine.

Developed by the Chengdu Aircraft Industry Group, the J-20 represents China's first indigenously developed stealth aircraft. The prototype first flew in January 2011 and is expected to enter into service with the PLAAF between 2018 and 2020. Subsequent revelation of a Shenyang J-31 stealth fighter prototype and its initial flight test in late October 2012 suggests that competition between the two competing designs may not be resolved yet. (An alternative explanation is that the PLAAF will procure both stealth aircraft for dif-

ferent missions.) The J-31 is smaller, which may help reduce its radar cross section compared to the J-20. The J-20 and J-31 demonstrate the Chinese aviation industry's ability to produce stealth fighter prototypes, but it is too early to judge their performance relative to advanced U.S. or Russian designs.

Recent press reports suggest that the sale of Russian Su-35 fighters to China is nearing final approval. The Su-35 is a fourth-generation "plus" fighter that incorporates elements of fifth-generation fighter aircraft technology such as stealth, integrated avionics systems, thrust vectoring, and helmet-mounted sights. Interest in Russian Su-35s may reflect PLAAF doubts about J-20 and J-31 performance and production timelines, a near-term PLAAF requirement for an advanced fighter capability, or the need for hands-on access and technical documentation to help Chinese aviation industry with its own advanced fighter development efforts.

The PLAAF is also acquiring long-range transports, airborne early warning aircraft, and tankers to support its fighters and expand its capabilities. Xi'an Aircraft Industry Company, which develops many of China's large and medium-sized aircraft, is reportedly developing the Y-20, a four-engine heavy transport aircraft that would greatly expand PLAAF airlift capacity. Reports speculate that the Y-20 is being developed with assistance from Ukraine (presumably from Antonov), will have a 50–60 ton carrying capacity, and will make its maiden flight sometime in 2012 or 2013.

After abortive efforts to purchase the Israeli Phalcon airborne early warning and control system in the late 1990s, China has pursued its own domestic development programs, encountering numerous difficulties along the way. China has now produced the KJ-200, based on the Soviet Yak-8 transport, and the KJ-2000, based on the Russian Il-76 airframe.

China's primary indigenous in-flight refueling platform, the H-6U tanker, has significant limitations. The PLAAF has sought to acquire Il-78/MIDAS tankers to extend the range of its Russian fighters, but the deal has been stalled due to the shutdown of the Il-76 and Il-78 production line.

CONCLUSION: THE PLAAF AS A CUSTOMER

The 1998 Chinese defense industry reforms appear to have significantly improved the PLAAF's bargaining position with respect to the Chinese aviation industry. The key developments were the elevation of the GAD (and in parallel the PLAAF Equipment Department) to the position of defining requirements, working closely with contractors through the Air Force military representative system, assessing competitively developed proposals, conducting acceptance testing of prototypes and initial production batches, and, especially, the PLAAF ability to decide which systems to buy (or more importantly, which systems not to buy).

These changes have increased the PLAAF's ability to define its requirements according to doctrinal and mission needs, work with the aviation industry to develop new systems, and accept or reject the results rather than simply taking whatever aircraft the aviation industry was able to produce. Another important factor has been increased defense budgets and the priority that the CMC has placed on air force modernization. This has provided the PLAAF with increased resources and reduced the need to work with civilian ministries and the defense industry to build a political coalition in support of particular aircraft programs.

A variety of evidence supports this assessment of increased PLAAF leverage vis-à-vis the aviation industry. One piece of evidence is continued PLAAF reliance on Russian turbofan engines to power its J-10 and J-11B aircraft due to PLAAF concerns about the performance and service life of the Chinese-built WS-10 Taihang engine. A second example is the PLAAF ability to resist aviation industry pressure to acquire the low-performing JF-17 fighter, which did not fit the PLAAF desire to upgrade the quality of its equipment. A third example is the reported use of competing proposals for the stealth fighter program. A fourth example is PLAAF exploration of the potential acquisition of 48 Su-35 fighters from

Russia, possibly to hedge against delays or performance problems with stealth fighter development. All four of these decisions work against the bureaucratic and financial interests of parts of the Chinese aviation industry and the civilian ministry that oversees it.

This highlights the critical question of the Chinese aviation and defense industry's ability to satisfy future PLAAF requirements. The considerable progress made over the last fifteen years has greatly improved the ability of Chinese companies to supply the PLAAF with modern aircraft comparable to the bulk of those flown by other advanced air forces. However, future progress will depend heavily on Chinese industry's ability to develop and master new aviation-relevant technologies on its own, to successfully adapt these technologies into military aircraft and weapon systems, and to do so at an acceptable level of quality, system performance, and cost. As China's aviation industry moves toward the technology frontier and its ability to learn and acquire technologies from foreign sources declines, the effectiveness of China's defense S&T system and the aviation industry's indigenous innovation capability will become much more important factors in the industry's ability to satisfy future PLAAF requirements.

Phillip C. SAUNDERS is director of the Center for the Study of Chinese Military Affairs and a Distinguished Research Fellow at the Center for Strategic Research, part of National Defense University's Institute for National Strategic Studies.

Joshua WISEMAN was a research analyst at the Center for the Study of Chinese Military Affairs when this research was performed. He currently works as an independent consultant in the IT field.

The views expressed are those of the authors and do not reflect the official policy or position of the National Defense University, the Department of Defense, or the U.S. government.