Modernization of the Chinese Air Force in the Late Maoist Period (1959-1976): Initiatives under the Sino-Soviet Conflict and Mao Zedong's Role*

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Abstract

This study examines how modernization efforts surrounding the Chinese People's Liberation Army Air Force (PLAAF) were conducted from 1959, when the "Sino Soviet Defense New Technology Agreement" was abrogated, to 1976, the year of Mao Zedong's death. During the period of Sino-Soviet split, it is generally understood that the modernization of the PLAAF stalled due to the loss of technical assistance from the Soviet Union. However, a close examination of Mao's influence on the PLAAF under the circumstances of the abrogation of the "Sino-Soviet Defense New Technology Agreement", the Great Leap Forward, the Vietnam War, the Nuclear Tests, the Great Proletarian Cultural Revolution, and the Lin Biao incident reveals a steady effort to modernize the PLAAF in both software and hardware aspects.

Introduction

After the founding of the People's Republic of China (China) in October 1949, Chairman Mao Zedong, who had established a favorable relationship with the Soviet leader Iosif Stalin, proceeded to build all aspects of society while securing Soviet support. Similarly, in military affairs, Mao modernized the People's Liberation Army (PLA) while receiving the dispatch of numerous Soviet military advisory groups. China, which had virtually no air power, received the provision of operational aircraft and the dispatch of many military advisory groups from the Soviet Union, and built the PLA Air Force (PLAAF) by following Soviet air force doctrine and unit organization.[1] Such modernization with Soviet support continued after the armistice of the Korean War.[2] By 1953, the PLAAF had rapidly grown into a massive military service possessing approximately 3,000 operational aircraft. In the latter half of the 1950s, it began to engage in fierce aerial combat

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1 Hattori Takayuki [服部隆行], The Korean War and China: Research on China's Military Strategy and Security Issues in the Early Years of the Founding [朝鮮戦争と中国―建国初期中国の軍事戦略と安全保障問題の研究―] (Tokyo: Keisuisha, Publisher [渓水社], 2007), pp. 52–53.

2 Anami Yusuke [阿南友亮], *The Reasons behind China's Military Expansion* [中国はなぜ軍拡を続けるのか] (Tokyo: Shinchosha, Publisher [新潮選書], 2017), pp. 311–319.

with the Republic of China (ROC) Air Force, which was supported by the U.S. military.[3]

However, when Stalin died in 1953 and his successor, Nikita Khrushchev, launched criticism of Stalin in 1956. Mao reacted furiously, causing Sino-Soviet relations to deteriorate, and technical assistance from the Soviet Union gradually began to stagnate.[4] At that time China's aviation industry had a low technological level, and during periods of chaos such as the Great Proletarian Cultural Revolution (hereafter, the Cultural Revolution), many factories were closed.[5] As a result, it has been pointed out that the PLAAF, whose modernization had been delayed, could not even provide air cover for the PLA ground forces during the 1979 Sino-Vietnamese War.[6]

On the other hand, as recalled by Nie Rongzhen, who was director of China's Commission of Science, Technology and Industry for National Defense, after 1959 when the Soviet Union ceased technical cooperation, Mao led China down the path of self-reliance while strongly promoting the development of atomic bombs and missiles, achieving success in nuclear testing in 1964.[7] Additionally, Mori Kazuko, who focused on the Sino-Soviet Defense New Technology Agreement, pointed out that even during the period of Sino-Soviet conflict Mao continued to have national defense technology developed while exercising his own political leadership,[8] suggesting that the PLA was being modernized to some extent.

The role played by political leaders in implementing policies when a nation faces difficult circumstances is an important research subject. In that respect, how was the PLAAF modernized from 1959 when Soviet technical assistance was cut off, until 1976 when Mao died? The PLAAF during this period has not been deeply discussed, leaving room for reexamination.

There is a wealth of accumulated prior research dealing with Sino-Soviet relations.[9] Among discussions focusing on the period after 1957, when the Sino-Soviet split began, Shen Zhihua, who made abundant use of Chinese primary sources, comprehensively traced the historical process from Sino-Soviet confrontation to normalization. He pointed out that the policy line conflict between Mao and Khrushchev gradually spread to ideology, military affairs, and politics.[10] Moreover, according to Lorenz M. Lüthi, whose conducted research included communist party materials from Eastern European countries, the controversy over Marxist-Leninist ideology between the two

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3 Kenneth W. Allen, "PLA Air Force, 1949-2002: Overview and Lessons Learned," in *The Lessons of History: The Chinese People's Liberation Army at 75*, eds. Laurie Burkitt, Larry M. Wortzel, and Andrew Scobell (Pennsylvania: US Army War College Press, 2003), pp. 89–101.

4 Niu Jun [牛军], *Research on Chinese Foreign Policy Decision-Making* [中国外交政策決定研究], trans. Masui Yasuki [真水康樹], (Tokyo: Chikura Shobo, Publisher [千倉書房], 2021), pp. 267–269; Andrew J. Nathan and Andrew Scobell, *China's Search for Security* [中国安全保障史], trans. Kono Junji [河野純治] (Tokyo: Misuzu Shobo, Publisher [みすず書房], 2016), pp. 260–262.

5 Kenneth W. Allen, Glenn Krumel, and Jonathan D. Pollack, *China's Air Force Enters the 21st Century* (Santa Monica: RAND Corporation, 1995), pp. 18–22.

6 James B. Linder and A. Gregor James, "The Chinese Communist Air Force in the 'Punitive' War Against Vietnam," *Air University Review*, vol. 32, no. 6 (September-October 1981), pp. 67–77.

7 Nie Rongzhen [聂荣臻], *Memoirs of Marshal Nie* [聂荣臻回忆录(下)], vol. 3 (Beijing: People's Liberation Army. Publishing House [解放军出版社], 1984), pp. 810–814.

8 Mori Kazuko [毛里和子], *China and the Soviet Union* [中国とソ連] (Tokyo: Iwanami Shoten, Publisher [岩波新書], 1989), pp. 55–64.

9 Shimotomai Nobuo[下斗米信夫], *A History of the Asian Cold War* [アジア冷戦史] (Tokyo: Chuokoron Shinsha, Publisher [中公新書], 2004).

10 Shen Zhihua [沈志华], *A Network History of Sino-Soviet Relations: A Reexamination of Some Issues in Sino-Soviet Relations, 1917–1991* [中苏关系史纲:1917-1991年中苏关系若干问题再探讨] (Beijing: Social Sciences Academic Press [社会科学院文献出版社], 2011).

leaders was identified as the origin of the Sino-Soviet split.[11]

In research on the PLA during this period of Sino-Soviet conflict, most of the discussion has been focused on the PLA ground forces. For example, how Defense Minister Peng Dehuai tried to pursue PLA modernization in anticipation of future warfare but was driven to downfall by Mao,[12] or how the PLA intervened in politics during the chaos of the Cultural Revolution and became a political mediator.[13] As such, the PLAAF's existence has been buried within the overwhelmingly larger PLA ground force's, and has rarely been the subject of academic research.[14]

So what kind of initiatives were there regarding the modernization of the PLAAF? What role did Mao play in this regard? Researchers including Kenneth W. Allen have pointed out that the modernization of the PLAAF stagnated because technical assistance from the Soviet Union was interrupted.[15] If that were the case, then how did such a PLAAF begin to shoot down U-2 high-altitude reconnaissance aircraft flying from Taiwan time and again? Related to this question is the research of Xiaoming Zhang. According to Zhang, who had a father who served in the PLAAF and later immigrated to the United States, the PLAAF, since its establishment, had been built with its way of fighting tied to revolutionary traditions and outdated doctrine,[16] and under an extremely defensive ideology.[17] Zhang's research carefully reads through materials from within the PLA and successfully captures the role of the PLAAF from a macro perspective. However, it does not adequately explain how modernization efforts regarding the PLAAF were conducted during the period when Soviet technology was cut off. In this regard, David Shambaugh's argument, which understood "modernization" as an update encompassing both hardware and software aspects, is more instructive. Shambaugh researched from the perspective of how hardware updates (such as new weapons) introduced into the PLA could be effectively integrated with software updates such as the PLA doctrine and training.[18]

Therefore, this study examines how modernization efforts regarding the PLAAF in both hardware and software aspects were conducted through various events. Section 1 examines what

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11 Lorenz M. Lüthi, *The Sino-Soviet Split: Cold War in the Communist World* (New Jersey: Princeton University Press, 2008).

12 Yamaguchi Shinji [山口信治], *Mao Zedong's Strategy for Building a Strong Nation: 1949–1976* [毛沢東の強国化戦略―1949–1976―] (Tokyo: Keio University Pres [慶應義塾大学出版会], 2021), p. 411; Hiramatsu Shigeo [平松茂雄], *Military Leaders of Contemporary China* [現代中国の軍事指導者] (Tokyo: Keiso Shobo, Publisher [勁草書房], 2002), pp. 44–63.

13 Lim Jaehwan [林載桓], *The People's Liberation Army and Chinese Politics: From the Cultural Revolution to Deng Xiaoping* [人民解放軍と中国政治―文化大革命から鄧小平へ―] (Nagoya: Nagoya University Press [名古屋大学出版会], 2014), pp. 4–19.

14 Tang Renchun [唐仁俊], "An Exploration of the Development History of the Chinese Communist Air Force (1949–1990)" [中共空軍発展史之探討(1949~1990 年)], *Air Force Officer Bimonthly* [空军军官], no. 157 (April 2011), pp. 29–45; Xie Maosong [谢茂松], *History of Air Force Photographic Reconnaissance Aircraft Units* [空軍照相偵察機部隊史] (Chinese Military History and Literature Association [中华战史文献学会], 2015).

15 Allen, Krumel, and Pollack, China's Air Force Enters the 21st Century, pp. 18–22; John Wilson Lewis and Xue Litai, "China's Search for a Modern Air Force," *International Security*, vol. 24, no. 1 (Summer 1999), p. 74.

16 Xiaoming Zhang, *Red Wings over the Yalu: China, the Soviet Union, and the Air War in Korea* (Texas: Texas A & M University Press, 2002).

17 Xiaoming Zhang, "The PLAAF's Evolving Influence within the PLA and upon National Policy," Richard P. Hallion, Roger Cliff, and Phillip C. Saunders, eds., *The Chinese Air Force: Evolving Concepts, Roles, and Capabilities* (Washington, DC: National Defense University Press, 2012), pp.71–73.

18 David Shambaugh, *Modernizing China's Military: Progress, Problems, and Prospects* (Berkeley: University of California Press, 2002).

influence Mao exerted on the PLAAF through the abrogation of the Sino-Soviet Defense New Technology Agreement and the Great Leap Forward. Section 2 examines what influence Mao exerted on the PLAAF through the Vietnam War and nuclear tests. Section 3 examines what influence Mao exerted on the PLAAF through the Cultural Revolution and the Lin Biao Incident. To do so, while primarily examining Chinese materials that compile the history of the PLAAF, analysis will be supplemented by Western discussion as well. Additionally, I paid close attention to reading between the lines of the circumstances at the time through memoirs of political and military leaders.

1. Mao's Influence through the Abrogation of the Sino-Soviet Defense New Technology Agreement and the Great Leap Forward

(1) Attempts to Formulate Doctrine and Mao's Presence

Sino-Soviet relations in 1959 began to deteriorate rapidly, triggered by the Second Taiwan Strait Crisis. Immediately after Khrushchev concluded a summit meeting in China and returned to the Soviet Union in August 1958, Mao ordered the PLA to begin shelling Kinmen Island, provoking Khrushchev's anger.[19] For Mao, the Middle East crisis that occurred in July 1958 became an ideal opportunity, as the U.S. military had no capacity to turn its attention to the Far East region. Taking advantage of this situation, he conducted military attacks, aiming to force the ROC forces commanded by Chiang Kai-shek to withdraw from Kinmen and the Matsu Islands.[20] Around this time in China, the Great Leap Forward instigated by Mao was spreading throughout the country. In local areas large amounts of labor were mobilized for the "Great Steel-Making Campaign." This, however, brought about an even more serious food shortage, and many people suffered from starvation.[21] During this period, ROC military aircraft repeatedly entered China's coastal cities and inland areas, dropping large quantities of leaflets denouncing "communism" in attempt to incite the people. Mao strongly detested these Western instigation efforts, and wanted to shoot down ROC Air Force aircraft by any means possible.[22] However, the Chinese aviation industry at that time had a low technological level. In the PLAAF, which was equipped with many already obsolete Soviet-made MiG-15 fighters, it was believed that preserving combat power was an important operational principle, and they had no choice but to patiently ambush ROC Air Force aircraft flying from Taiwan as they entered the coast of mainland China.[23] To reverse the disadvantage, Mao requested that China's aviation industry license production of the Soviet-made MiG-19 fighter, and in 1958, the Jian-6A (J-6A) fighter successfully completed its first flight. However, the J-6A failed to meet

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19 Shen Zhihua [沈志华], *The History of Sino-Soviet Relations: 1917–1960* [中ソ関係史:1917–1960], vol. 1, trans. Kumakura Jun[熊倉潤], (Tokyo: University of Tokyo Press [東京大学出版会], 2024), pp. 306–311.

20 Ibid., pp. 304–305.

21 Kenneth G. Lieberthal, "The 'Fragmented Authoritarianism' Model and Its Limitations," in *Bureaucracy, Politics, and Decision Making in Post-Mao China*, eds. Kenneth G. Lieberthal and David M. Lampton (Berkeley: University of California Press, 1992), pp. 7–8, http://ark.cdlib.org/ark:/13030/ft0k40035t/.

22 "The Air Force Must Make Every Effort to Annihilate the Invading Enemy (December 18, 1957)" [空军要全力以赴务歼入侵之敌(一九五七年十二月十八日)], in *Mao Zedong's Military Manuscripts since the Founding of the PRC* [建国以来毛泽东军事文稿 中卷], vol. 2 (Beijing: Military Science Publishing House [军事科学出版社], 2010), p. 370.

23 He Weirong [何为荣], "The Chinese People's Liberation Army's Air Force Military Thought" [中国人民解放军的空军军事思想], in *Encyclopedia of the Chinese Air Force* [中国空军百科全書 上卷], vol. 1 (Beijing: Aviation Industry Press [航空工业出版社], 2005), pp. 3–5.

required performance specifications, and the quality was so poor that the PLAAF had no choice but to refuse to accept it.[24] In this way, for the Chinese aviation industry which possessed only low technical capabilities, even licensed production could not be adequately conducted, and hardware modernization had no choice but to continue to rely on Soviet technical capabilities.

Meanwhile, attempts were also being made at software modernization. In May 1958, Mao instructed that "we will formulate our own combat regulations," and in the same year, Marshal Ye Jianying stated at an enlarged meeting of the Military Commission that "within one or two years, we should create regulations and training manuals suited to the situation and requirements of our military.[25]" At that time, Mao was also trying to break Chinese society away from the Soviet model, and all services of the PLA were required to formulate internal regulations and operational provisions.[26] Thereafter, the PLA began to review existing regulations concerning military discipline, training, and political work. It also began to formulate its own "operational provisions", which were the first attempt to establish specific methods for matters where it was advisable to stipulate in advance when conducting unit operations.[27]

In November 1958 the compilation of regulations, training manuals, and other materials unique to the PLAAF began.[28] Immediately after the PLAAF had engaged in fierce aerial combat with the ROC Air Force,[29] the "Air Force Combat Regulations" based on these combat experiences and lessons was about to be formulated. However, PLAAF Commander Liu Yalou instructed that Mao Zedong's ideology should be regarded instead as the primary consideration, and instructed that regulations and training manuals be created based on Soviet and other countries' doctrines. Liu regarded this compilation work as a "plan for a hundred years," summoning as many as 1,112 experts to extensively translate materials from all times and places.[30] Then, in May 1959, more than 100 officers analyzed these materials from various countries and proceeded to compile various training manuals.[31]

(2) Mao's Influence Further Strengthening the Role as a "Homeland Air Defense" Type Air Force

The year 1959 was a period when, within the U.S.-Soviet Cold War structure, ideological, national interest, and foreign policy differences and contradictions between China and the Soviet Union gradually escalated into confrontation. Most symbolic was when Khrushchev, at the same time as beginning U.S.-Soviet negotiations on nuclear test bans, stopped handing over atomic bomb

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24 Yefim Gordon and Dmitry Komissarov, *Chinese Aircraft* (Manchester: Hikoki Publications, 2008), pp. 32–33.

25 Sun Weitao [孙维韬], *Air Force Commander Liu Yalou* [空军司令刘亚楼] (Beijing: China Fortune Press [中国财富出版社], 2015), p. 124.

26 Xiaoming Zhang, "Chinese Air Power," in *Global Air Power*, ed. John A. Olsen (Washington, DC: Potomac Books, 2011), p. 273.

27 Ibid.

28 Sun, *Air Force Commander Liu Yalou*, p. 125.

29 Wang Yongliang [王永亮], Sun Zhenhua [孙振华], and Liu Chengkui [刘成奎], "Grasping the Basic Characteristics of the Center of Gravity in Operations" [把握作戦重心基本特点], *PLA Daily* [解放军报], August 15, 2024.

30 Sun, *Air Force Commander Liu Yalou*, pp. 126–127.

31 However, it was not until the 1980s that the PLAAF was able to publish doctrinal manuals such as *Air Force Tactics* [空军战术学] and *Air Force Tactics Textbook* [空军战术学教程] (Shi Keru [施克如], "Air Force Tactics" [空军战术学], *Encyclopedia of the Chinese Air Force* [中国空軍百科全書], vol. 1 (Beijing: Aviation Industry Press [航空工业出版社], 2005), pp. 108–110).

prototypes to China. Mao was enraged by this choice of Khrushchev's and escalated his criticism of the Soviet Union.[32] Then, on June 20, the situation developed to the point where the Soviet Union unilaterally abrogated the Sino-Soviet Defense New Technology Agreement that had been signed only two years prior.[33] With this abrogation of the agreement the Soviet Union continued to reduce technical assistance,[34] and exchanges between China and the Soviet Union were greatly curtailed.[35]

Immediately afterward, in August 1959, a major shift occurred on the domestic political stage as well. Peng Dehuai, who had been loudly calling for PLA modernization, was criticized at a meeting held at Mount Lu in Jiangxi Province and dismissed as Defense Minister.[36] Peng had long been critical of the chaos caused by Mao's Great Leap Forward and held skeptical views toward Mao's "People's War" theory.[37] Although Mao's power had relatively declined due to the failure of the Great Leap Forward, his constant control of the PLA ultimately brought about a favorable outcome for him in the power struggle with Peng.[38] With Peng's downfall, the movement to advance modernization while enhancing military professionalism gradually weakened.

Having won the power struggle and strengthened his personality cult, Mao increasingly gained the devotion of the PLAAF. The words Mao uttered in 1950, "eliminate enemy remnants and strengthen national defense," were recorded as a strategic mission in the PLAAF's official newspaper *Kongjun Bao*.[39] Additionally, based on Mao's statement that "air power should be used cautiously," made after being forced into a hard fight in air battle against U.S. military aircraft during the Korean War, the history documents of the PLA Air Force summarize it as "accumulating combat strength and employing air power in a timely and concentrated manner."[40] Mao's statement to "go out with full force to annihilate the invading enemies" led the PLAAF to recognizing

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32 David Wolff, "One Finger's Worth of Historical Events," *New Russian and Chinese Evidence on the Sino-Soviet Alliance and Split, 1948-1959* (CWIHP Working paper, August 2000), pp. 10–17, https://www.wilsoncenter.org/sites/default/files/media/documents/publication/ACFB14.pdf.

33 Zhang Baichun [张柏春], Zhang Jiuchun [张久春], and Yao Fang [姚芳], "On Technology Transfer in Sino-Soviet Scientific and Technological Cooperation" [中苏科学技术合作中的技术转移关], *Contemporary China History Studies* [当代中国史研究], vol. 12, no. 2 (March 2005), p. 85.

34 Gazette of the State Council of the People's Republic of China [中華人民共和国国務院公報], State Council of the People's Republic of China, no. 14 (General no. 278) (August 17, 1963), pp. 260–261.

35 Zhang, Zhang, and Yao, "On Technology Transfer in Sino-Soviet Scientific and Technological Cooperation," pp. 85–86; Lüthi, *The Sino-Soviet Split*, pp. 103–104.

36 Deng Liqun [邓力群], Ma Hong [马洪], and Wu Heng [武衡], *Biography of Peng Dehuai* [彭德怀传] (Beijing: Contemporary China Publishing House [当代中国出版社], 1993), pp. 628–630.

37 David A. Charles, "The Dismissal of Peng Dehuai," in *China under Mao: Politics Takes Command*, ed. Roderick MacFarquhar (Cambridge, Massachusetts: The MIT Press, 1966), p. 22.

38 Anami Yusuke [阿南友亮], "The Formation Process of the Chinese People's Liberation Army and a Reassessment of the "Chinese Revolution" [中国人民解放軍の形成過程と「中国革命」の再評価], *Journal of Contemporary China Studies* [現代中国研究], vol. 42 (February 2019), pp. 20–22.

39 Min Zengfu [閔増富], ed., *An Outline of Air Force Military Thought* [空軍軍事思想概論] (Beijing: People's Liberation Army. Publishing House [解放军出版社], 2006), p. 69.

40 Wang Dinglie [王定烈], *Contemporary Chinese Air Force* [当代中国空军] (Beijing: China Social Sciences Press [中国社会科学出版社], 1989), p. 129.

its role as a "homeland air defense" type air force even more strongly.[41] As a result, there was no scientifically researched or accumulated theory, and only the statements of political leaders became the basis for air force doctrine.[42] When the "Air Force Combat Regulations" were created for the first time, Mao's political leadership was adopted as a theoretical guideline.[43] Similar to air forces of other countries, securing air superiority was regarded as a primary mission, and it was stated that "during the struggle for air superiority, the air force should conduct surveillance of key airspace and acquire air superiority at critical moments over specific regions."[44] However, the greatest difference from other countries was that, as Mao stated, "the air force must defend, but must not go out to sea,[45]" so the area for acquiring air superiority was limited to airspace over the homeland.[46]

(2) Self-Reliance and Reverse Engineering: Hardware Modernization

On October 7, 1959, an ROC Air Force RB-57D reconnaissance aircraft entering at high altitude over the mainland was shot down by the PLAAF for the first time.[47] This shootdown incident also became the world's first case of shooting down an enemy aircraft with a surface-to-air missile.[48] In response, the damaged ROC Air Force began to make extensive use of self-defense electronic jamming equipment with U.S. military technical support. From then on, a technical and tactical tug-of-war unfolded between the intruding ROC Air Force and the intercepting PLAAF.[49]

In domestic politics at that time, Mao had begun to call for self-reliance due to the interruption of technology from the Soviet Union. In December, the State Council Commission of Science, Technology and Industry for National Defense began to consider establishing seven research institutes related to aircraft design, engine design, materials, technology, flight testing, measurement, aerodynamics, and fields related to naval vessels and electronics.[50] In January 1960 the Party Military Commission proposed the establishment of three research institutes, which were

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41 "The Air Force Must Go All Out to Annihilate Invading Enemies" [空军要全力以赴务歼入侵之敌], in *Selected Military Manuscripts of Mao Zedong Since the Founding of the People's Republic* [建国以来毛泽东军事文稿 中卷], vol.2, p. 370; The PLA explains that, reflecting on its own experiences in the Korean War and aerial combat over Kinmen Island, the experience that the PLAAF had practiced itself became China's air force thought (He, "The Chinese People's Liberation Army's Air Force Military Thought", pp. 3–5).

42 He, "The Chinese People's Liberation Army's Air Force Military Thought", pp. 3–5

43 Zhang, "Chinese Air Power," pp. 276–277.

44 Hua Renjie [华人杰], Cao Yifeng [曹毅风], and Chen Huixiu [陈惠秀], *History of Air Force Academic Thought* [空军学术思想史] (Beijing: People's Liberation Army. Publishing House [解放军出版社], 2008), p. 359.

45 "The Air Force Must Go All Out to Annihilate Invading Enemies," p. 370.

46 "Temporarily Suspending Shelling of Kinmen and Matsu Islands" [暂停炮击金门马祖两岛], *Mao Zedong's Military Manuscripts since the Founding of the State* [建国以来毛泽东军事文稿 中卷], vol. 2, p. 434.

47 Kang Huaihai [康怀海], "The Excellent Qualities Forged by "Top Secret 543" [《绝密543》凝煉的优良品质], *China Air Force* [中国空军], no. 294 (January 2024), pp. 43–47.

48 Publicity Bureau of the Political Work Department of the Central Military Commission, ed [中央軍委政治工作部宣伝局組編]., Chinese *People's Liberation Army Air Force Education Reader (1st ed.)* [中国人民解放军空军教育读本(第1版)] (Beijing: People's Liberation Army. Publishing House [解放军出版社], 2021), p. 46.

49 Lin Hu [林虎], *Combat to Defend the Motherland's Airspace: A Review of 20 Years of Homeland Air Defense Operations in New China* [保卫祖国领空的战斗:新中国20年国土防空作战回顾] (Beijing: People's Liberation Army. Publishing House [解放军出版社], 2001), p. 223.

50 "Commemorating the 60th Anniversary of the Founding of the China Aviation Research Institute" [纪念中国航空研究院创建60周年], *Aviation Industry Net* [航空产业网], May 3, 2022, https://www.chinaerospace.com/article/show/00f9032a417e9f8ad6cf382fced57beb.

approved by the Party Central Committee in December of the same year.[51]

On July 16, 1960, the Soviet Union notified China of the withdrawal of Soviet advisory groups. In the following month, 1,390 experts returned to the Soviet Union, resulting in the complete cessation of technical cooperation on aircraft.[52] Having had the Sino-Soviet Defense New Technology Agreement abrogated, Mao established the Aviation Research Institute on June 29, 1961, to acquire the capability for independent design.[53] This Aviation Research Institute consisted of multiple research institutes responsible for materials research, engineering research, measurement and automation research, and flight research, as well as aircraft design, engine design, radar, missiles, and other areas.[54]

There was also a period in February 1962, however, when the deteriorating Sino-Soviet relations temporarily eased. At that point China was able to obtain the blueprints for a state-of-the-art Soviet-made MiG-21 fighter.[55] Khrushchev had sent a letter to Mao suggesting that he would provide the MiG-21 to China. In response, Mao urgently dispatched PLAAF Commander Liu and others to Moscow to conclude a contract for licensed production of the MiG-21 and jet engine (R-11F-300).[56]

However, when Sino-Soviet confrontation intensified again, only a few contracted MiG-21s were delivered. Moreover, deficiencies were frequently found in manuals, such as in the MiG-21's technical directives.[57] Therefore, the Shenyang Aircraft Industry (Group) Corporation Ltd., which was supposed to be responsible for licensing their production, had no choice but to parse everything from documents and blueprints. Therefore, Tang Yanjie (PLA Lieutenant General), who became the first director of the Sixth Academy of the Aviation Research Institute, and Political Commissar Wang Zhenqian (PLA Major General) formulated the "Ten-Year Development Plan Outline for Aviation Scientific Research (1963-1972)" in February of the same period. They proposed to reverse engineer and fully absorb the technological skill of the Soviet-made MiG-21, and disseminate the knowledge throughout the aviation industry.[58] The proposal was approved by party political leaders.[59] Meanwhile the Soviet Union, as the Sino-Soviet conflict deepened, shifted exports of the MiG-21 to India.[60]

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51 Ibid.

52 Zhang, Zhang, and Yao, "On Technology Transfer in Sino-Soviet Scientific and Technological Cooperation," p. 85.

53 The Sixth Research Institute of the Ministry of National Defense, which became the basis for this Aviation Research Institute, was also called "Unit 4847" and was operated under the Ministry of National Defense and under the guidance of the Commission of Science, Technology and Industry for National Defense, but was reborn as a research institute under the PLA ("Commemorating the 60th Anniversary of the Founding of the China Aviation Research Institute").

54 Ibid.

55 Peter Wood and Robert Stewart, "China's Aviation Industry: Lumbering Forward," *Monograph* (China Aerospace Studies Institute, Montgomery, Alabama: Air University, 2019), p. 23.

56 "Chengdu J-7," *Jane's All the World's Aircraft in Service 2018-2019* (Jane's Group UK Limited, 2018), p. 194.

57 Ibid.

58 "Commemorating the 60th Anniversary of the Founding of the China Aviation Research Institute,"; Gordon and Komissarov, Chinese Aircraft, pp. 75–77.

59 Niu Chenfei [牛晨斐], "A Tour of Famous Chinese Fighter Manufacturers: J-7 Sharp Sword Unsheathed, Export Champion" [中国战机制造商名机巡礼：歼-7 利剑出鞘, 出口冠军], *PLA Daily* [解放军报], March 26, 2015.

60 Shri Ram Sharma, *India-USSR Relations, 1947–1971: From Ambivalence to Steadfastness* (New Delhi: Discovery, 1999), pp. 52–59.

(4) Ingenuity of Air Defense Missile Units and Formulation of Air Force Doctrine: Software Modernization

Indeed, on October 6, 1958, China obtained some Soviet-made SA-2 surface-to-air missiles from the Soviet Union.[61] However, after the Sino-Soviet Defense New Technology Agreement was abrogated, the PLAAF's inventory of SA-2 surface-to-air missiles was insufficient. These surface-to-air missile units, which had become "treasured possessions," were treated secretly as "Unit 543"[62] and ambushed intruding aircraft while moving from place to place throughout China.[63]

Then, on March 28, 1963, a U-2 entered mainland China from Taiwan, flying via Baotou to Dingxin in Gansu Province. The United States, which was closely watching China's nuclear development, had provided high-performance U-2s to the ROC. The PLAAF's surface-to-air missile units ambushing in this region detected the U-2 on radar at a distance of 115 km, but could not intercept it because the U-2 immediately changed course and flew away from the missiles' positions. When the surface-to-air missile units shut off radar illumination, the ROC Air Force's U-2 returned to its original course and continued reconnaissance. Faced with such a failed interception situation, PLA headquarters and technicians instructed to not illuminate with radar early, but draw the aircraft in as much as possible before using radar illumination. This guidance from upper levels was in accordance with Soviet military manuals. However, field units were no longer interested in adhering to Soviet operational regulations and were instead obsessed with devising effective means to shootdown U-2s.[64] Based on past failures, field units attempted to intercept by boldly breaking Soviet operational protocol and making modifications themselves to compress the radar aperture distance.[65] Aiming for technical surprise in electronic warfare, they analyzed in detail images and waveforms of responsive jamming obtained from ROC Air Force aircraft.[66] While identifying characteristics in the waveform of jamming radio waves emitted from the U-2, field units discovered the enemy's weakness. While the U.S.-made electronic jamming system could transmit jamming signals, it could not completely eliminate real signals either.[67] From this result, surface-to-air missile units devised a method to track the U-2 by manual operation, and with the cooperation of technicians, modified the guidance radar of surface-to-air missiles and changed their antenna tracking method, thereby developing tactics that would not activate U.S.-

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61 Publicity Bureau of the Political Work Department of the Central Military Commission, ed [中央軍委政治工作部宣伝局組編]., *Chinese People's Liberation Army Air Force Education Reader (1st ed.)* [中国人民解放軍空軍教育読本(第 1 版)], p. 28.

62 Kang, "The Excellent Qualities Forged by "Top Secret 543," pp. 43–47.

63 "How the PLA's Surface-to-Air Missile Units Pioneered Night Shootdown of U-2s in 1965" [1965年解放军地空导弹部队如何开创夜歼 U-2的先河], *China Defense Net* [中国国防网], January 22, 2022, http://www.news.cn/mil/2022-01/21/c_1211537499.htm.

64 Yang Shiying [杨世瑛], "Electromagnetic Confrontation in Ambushing U-2 Aircraft" [伏击U-2 飞机中的电磁绞量], *China Air Force* [中国空军], no. 9 (2021), pp. 55–56.

65 "How the PLA's Surface-to-Air Missile Units Pioneered Night Shootdown of U-2s in 1965".

66 Lin, *Combat to Defend the Motherland's Airspace*, pp. 202–205.

67 Because the Soviet-made SA-2 surface-to-air missile of that time operated with a low pulse repetition frequency (PRF) of 1–3 GHz, it is possible that the electronic warfare jamming conducted by the U.S.-made U-2 was either a method to make it difficult to distinguish correct signals by receiving jamming signals (power-type noise jamming) or a method to interfere with normal signal processing by mixing in replicated signals (repeater-type jamming).

made electronic warning systems.[68] Because of these rapid responses by technical personnel, on November 11 of the same year, the PLAAF succeeded in shooting down a U-2 over Guangfeng County in Jiangxi Province.[69]

Through these means the PLAAF became able to shoot down more than 20 manned and unmanned aircraft throughout the 1960s.[70] This was also partly due to the background that in 1957 the Air Defense Force was incorporated into the PLAAF,[71] and flight units, control and guidance units, anti-aircraft artillery units, and radar units gradually began to cooperate organically.[72] Such intrusion incidents by the ROC Air Force occurred while China's domestic politics were rising with Mao's fervent political leadership and political radicalism. The increasing shootdown results were thus recounted as political victories rather than military victories.[73]

Furthermore, the PLAAF had completed the creation of 306 air force regulation textbooks over five years. From national aviation law, basic flight regulations, air force combat regulations, and flight training manuals to training manuals at the field level including operational regulations for weapons and equipment and technical directives, a complete doctrine system was completed.[74] At that time, because Sino-Soviet confrontation was intensifying, it could not realistically be expected that relevant knowledge would be provided from the Soviet Union, so self-reliance was required even in doctrine formulation. In the formulation process, Liu asserted that "knowing the enemy and knowing oneself is the only method to win a hundred battles," repeatedly emphasizing the importance of translating air force doctrines of various countries. He argued that the only way to defeat foreign militaries was to discern their strengths and weaknesses, and that it was necessary to create our own unique approach to surpass them.[75] These training manuals imitated air force doctrines of Western countries, but only incorporated methodology of air power in various situations of war. In these training manuals, the PLAAF's primary mission was stipulated as "conducting long-term air defense operations to exhaust the enemy while the enemy is conducting a strategic offensive."[76] Principles such as "air units must counterattack and take the initiative to secure air superiority" and "air units must fight courageously and tenaciously and must perfectly master combat techniques to defeat the enemy"[77] were incorporated. However, these operational principles were, so to speak, closer to "spiritual theories," and there were no specific considerations

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68 It is considered that the PLAAF changed the electronic signal specifications emitted by SA-2 surface-to-air missiles so that the U-2's radar warning receiver (RWR) would not react. Such techniques were also used when the Serbian military shot down a NATO fighter in the 1999 Kosovo conflict.

69 Air Force Equipment Department, ed [空軍装備部編]., *Forging for Air and Space: A Record of the People's Air Force's Rise and Equipment Development* [空天铸剑:人民空军腾飞和装备发展实录] (Beijing: Lantian Press [蓝天出版社], 2011), p. 101.

70 Wang, *Contemporary Chinese Air Force*, pp. 385–386.

71 "A Tour of 60 Years of Construction and Development Achievements of the Chinese People's Liberation Army Air Force" [中国人民解放军空军成立60年建设发展成就巡礼], XinhuaNet [新华网], October 31, 2009, https://www.gov.cn/jrzg/2009-10/31/content_1453363.htm.

72 Publicity Bureau of the Political Work Department of the Central Military Commission, ed., *Chinese People's Liberation Army Air Force Education Reader (1st ed.)*, p. 46.

73 Lin, *Combat to Defend the Motherland's Airspace*, p. 272; Wu Faxian [吴法宪], *Difficult Years: Memoirs of Wu Faxian* [岁月艰难:吴法宪回忆录] (Hong Kong: North Star Publishing House [北星出版社], 2006), pp. 510–511.

74 Sun, *Air Force Commander Liu Yalou*, pp. 126–127.

75 Ibid., pp. 147–149.

76 Zhang, "Chinese Air Power," pp. 275–276.

77 Ibid.

such as "under what conditions should air power be committed" when committing air power. They did not establish specific procedures for conducting unit operations as stipulated by militaries of Western countries, but merely incorporated the "attitudes" with which to face battle.

2. Mao's Influence through the Vietnam War and Chinese Nuclear Tests

(1) Support for Vietnam and Mao's Third Front Construction

In August 1964, the Gulf of Tonkin incident occurred. Taking this as an opportunity, the United States began full-scale military intervention in Vietnam. When the Vietnam War began in earnest, China supported North Vietnam despite its severe economic circumstances. To support the North Vietnamese forces in resisting U.S. air raids, PLA anti-aircraft artillery units were secretly dispatched to Vietnam.[78] However, the PLAAF fighter units had not yet engaged in such combat as they had been restricted to intercept only within Chinese airspace. Therefore, the "Air Force Combat Regulations" that had been formulated slowly became a dead letter without having been verified in actual combat.[79] As a result, many training manuals that had been formulated toward the PLA modernization that Peng had aimed for, were incinerated.[80]

China also secretly provided refueling and ammunition supply support to North Vietnamese Air Force aircraft fighting the U.S. military.[81] However, this dedicated support simultaneously led to a reduction in PLAAF pilots' flight hours, and the significant decrease in flight training would also hinder software modernization. Moreover, cases where some U.S. military aircraft participating in operations in the Vietnam War were crossing the Sino-Vietnamese border and entering Chinese territory occurred frequently, making the shortage of surface-to-air missiles an issue in China.[82]

Mao, who was wary of the expansion of the Vietnam War, was also attentive to surrounding situations such as the intensification of Sino-Soviet confrontation and the Sino-Indian border conflict. In particular, to prepare for invasion by superpowers such as the United States and Soviet Union, he was obsessed with developing a domestic system that avoided concentration of industry and population. The "Third Front" construction program,[83] which called coastal regions the first front, central regions the second front, and inland rear areas the third front, was promoted as a project to relocate industry to inland China. It was based on the assumed range of U.S. military

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78 Zhu Jianrong [朱建栄], *Mao's Vietnam War: China's Great Foreign Policy Shift and the Origin of the Cultural Revolution* [毛沢東のベトナム戦争] (Tokyo: University of Tokyo Press [東京大学出版会], 2001), pp. 377–380.

79 Xiaoming Zhang, "The Vietnam War, 1964–1969: A Chinese Perspective," *The Journal of Military History*, vol. 60, no. 4 (October 1996), pp. 739–746.

80 Zhang, "Chinese Air Power," pp. 279–280.

81 During the Vietnam War, which lasted from 1965 to 1973, the PLAAF and the North Vietnamese Air Force had a close cooperative relationship. To support North Vietnamese military aircraft, the PLAAF provided them with fighters and ground support equipment free of charge. Multiple airfields in Guangxi Zhuang Autonomous Region and Yunnan Province also became emergency airfields for North Vietnamese Air Force aircraft, where support such as refueling, repairs, and maintenance was provided, and sometimes parts from PLAAF aircraft were replaced on North Vietnamese Air Force aircraft ("Warmly Celebrate the Major Victory in the Self-Defense Counterattack Operations" [热烈祝贺自卫反击作战的重大胜利], *PLA Daily* [解放军报], March 20, 1979).

82 Zhu, *Mao's Vietnam War:*, pp. 228–297.

83 Kokubun Ryosei[国分良成], *Politics and Bureaucracy in Modern China* [現代中国の政治と官僚制] (Tokyo: Keio University Press [慶應義塾大学出版会], 2004), p. 131.

bombers and ground invasion by the United States and Soviet Union.[84] In this project promoted by Mao, various militarizations of the economy were also planned to prepare for military confrontation with the Soviet Union.[85] These were also treated as countermeasures taking into account concerns about preemptive strikes on Chinese nuclear facilities by the United States and Soviet Union.[86]

(2) Increasing ROC Aircraft Intrusions Accompanying Nuclear Tests and Countermeasures

As the situation in the Vietnam War intensified further, China began to feel the need for interceptors capable of countering U.S. military aircraft. Around this time, the Aviation Research Institute's reverse engineering of the MiG-21 was undergoing trial and error but the quality of the new fighter, designated as Jian-7 (J-7), remained poor. To produce the J-7 completely domestically, it was necessary to not only assemble the airframe, but also to produce all its various parts and systems, including the turbojet engine.[87] However, contrary to these concerns of the aviation industry, political leaders' interest in the fighter was high. Deng Xiaoping, after inspecting the Shenyang Aircraft Industry (Group) Corporation Ltd., continued to instruct that imitation of the MiG-21 be made as soon as possible.[88]

However, it gradually began to be recognized among those involved that the J-7 under development had limitations in long-range flight performance and high-altitude flight performance for intercepting enemy aircraft flying at high altitudes.[89] Therefore, the Aviation Research Institute held a countermeasure meeting in October 1964 and discussed developing a new high-performance fighter at the 601st Research Institute based in Shenyang. The J-7 under development was equipped with only one turbojet engine, and that engine's thrust was insufficient to fly at high altitudes. Therefore, a plan emerged to enlarge the airframe of the J-7 under development and equip it with two engines to obtain sufficient thrust. The development of this new fighter, later named Jian-8 (J-8), was an application of the J-7 under development, and therefore had low technical risk. It was evaluated as being capable of being completed quickly, and came to be handled with higher

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84 On the other hand, this Third Front Construction also had inherent negative aspects. In the enterprise of constructing the unique national defense economic system called the Third Front Construction, the defense industry's own claims regarding budget, technology, and human resources were recognized, and various materials and energy were preferentially supplied, so it did not become an enterprise pursuing efficiency. Therefore, these defense industries continued to produce outdated weapons and equipment while receiving large subsidies from the central government without technological innovation. Furthermore, no one in the party political leadership raised objections to this vested interest of the PLA, and as a result, the PLA became lazy and bloated, and fell into a state where cadres were particularly lacking. Because the PLA continued to be rewarded as a servant in successive national crises, it continued to acquire large-scale forces and budgets (Jonathan D. Pollack, "Structure and Process in the Chinese Military System," in *Bureaucracy, Politics, and Decision Making in Post-Mao China*, eds. Kenneth G. Lieberthal and David M. Lampton (Berkeley: University of California Press, 1992), pp. 154–155).

85 Mori Kazuko [毛里和子], *New Edition: Politics in Modern China* [新版 現代中国政治] (Nagoya: Nagoya University Press [名古屋大学出版会], 2004), pp. 178–179.

86 Mao pursued strategic deployment considering the possibility of receiving nuclear attacks from other nuclear powers when China became a nuclear power (Kokubun, *Politics and Bureaucracy in Modern China*, p. 131).

87 Mass production did not occur until the 1980s. Many models of the J-7 were developed, with improvements made in areas such as armament, avionics, and wing design (Evan S. Medeiros, Roger Cliff, Keith Crane, and James C. Mulvenon, *A New Direction for China's Defense Industry* (Santa Monica, CA: RAND Corporation, 2004), pp. 160–161).

88 "Deng Xiaoping and the Chinese Air Force" [邓小平与中国空军], *Guang'an Daily* [广安日报], January 4, 2018, http://cpc.people.com.cn/n1/2018/0104/c69113-29745847.html.

89 Gordon and Komissarov, *Chinese Aircraft*, p. 75.

priority.[90] Before China's first nuclear test in 1964, because of U.S.-made U-2s frequently entering over the mainland, the development concept of the J-8, which was considered capable of flying for long periods at an altitude of 19,000 m (62,340 ft), was regarded as important from an early stage, and many political leaders including Mao and Defense Minister Nie came to pay close attention to it.[91] Unlike what happened in the aerial combat with the ROC Air Force over Kinmen Island in 1958, in China, intercepting reconnaissance aircraft entering at high altitudes over the mainland became regarded as the most important issue.

On October 7, 1964, China succeeded in its first atomic bomb test. However, even after that, ROC Air Force U-2s with U.S. support frequently repeated their intrusions as far as inland areas.[92] To intercept these reconnaissance aircraft, the introduction of surface-to-air missiles was also pressing.[93] As a result of the PLAAF also advancing software modernization to counter U-2 jamming techniques, it shot down a total of five ROC Air Force U-2s,[94] steadily improving its capabilities even after Soviet technology was cut off.[95] In particular, units that shot down multiple U-2s received enthusiastic commendation from Mao for practicing with ingenuity the "close-range decisive battle method[96]"they had devised by learning from combat experience.[97]

3. Mao's Influence through the Cultural Revolution and the Lin Biao Incident

(1) Impact of the Cultural Revolution and Decline of Professionalism

By 1961, in the domestic political arena where power struggles continued, Mao, who continued to control the PLA, was attempting to regain power by launching the Cultural Revolution. At the same time, the PLA began political intervention by teaching Mao's political themes to the masses.[98] Although PLA modernization was significantly behind the pace of modernization of

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90 The required performance specifications for the J-8 were set as: maximum speed Mach 2.2, maximum altitude 20,000 m (65,620 ft), maximum rate of climb 200 m/sec (39,360 ft/min), basic range 1,500 km (931 NM), maximum range 2,000 km (1,240 NM), and it was required to fly for long periods at an altitude of at least 19,000 m (62,340 ft) ("A Tour of 60 Years of Construction and Development Achievements of the Chinese People's Liberation Army Air Force").

91 Lin, *Combat to Defend the Motherland's Airspace*, p. 208.

92 Ibid., pp. 210–272.

93 Allen, Krumel, and Pollack, *China's Air Force Enters the 21st Century*, pp. 37–38; Hiramatsu Shigeo, *Chugoku Kaku Taikoku eno Michi* [China's Path to Nuclear Power Status] (Tokyo: Keiso Shobo [Keiso Shobo, Publisher], 1986), pp. 73–74.

94 It is recounted that the surface-to-air missile units repeatedly conducted mobile deployments while adhering to the spirit of "finding a needle in a haystack" ("Mao Zedong and the Construction of the People's Air Force" [毛泽东与人民空军建设], *Study Times* [学习时报], November 11, 2019, http://www.dangjian.com/djw2016sy/djw2016dsgs/201911/t20191111_5313953.shtml).

95 A total of nine reconnaissance aircrafts such as U.S.-made RB-57Ds and U-2s flying into Jiangxi Province, Fujian Province, Zhejiang Province, and Guangxi Province were shot down (Air Force Equipment Department, ed., *Forging Swords for Air and Space*, p. 100).

96 In the 1960s, to deal with U-2s equipped with RWRs, the relative distance to activate radar was shortened from 120 km to less than 40 km, and combat actions that originally required 8 minutes from antenna activation to missile launch were shortened to 8 seconds. This method won the highest award at the 1978 National Science and Technology Conference of China and remains one of the basic methods of air defense combat today (Publicity Bureau of the Political Work Department of the Central Military Commission, ed., *Chinese People's Liberation Army Air Force Education Reader (1st ed.)*, p. 46).

97 Ibid.

98 Anami, "The Formation Process of the Chinese People's Liberation Army and a Reassessment of the "Chinese Revolution," pp. 20–22.

major nations' militaries, among political leaders including Mao, it was believed that the revival of strong and universal political work would compensate for the lack of equipment.[99]

On November 11, 1965, a defection incident occurred in which a PLAAF Il-28 bomber took off from Hangzhou and landed at the ROC's Taoyuan Air Base in Taiwan. The pilot in command, Li Xianbin, had long been in conflict with PLAAF superior officers over his own promotion issues, and furthermore, was outraged at the Communist Party after several relatives died in the famine accompanying the Great Leap Forward.[100] Such defection incidents occurred frequently during the period of the Cultural Revolution, and each time, the PLAAF's political work was strengthened.

As the Cultural Revolution intensified, Mao tried to protect the nuclear weapons development program from this social chaos, but research and development of conventional weapons had to be almost completely halted. Development programs for conventional weapons such as aircraft could not receive priority treatment equivalent to development programs for atomic bombs and missile delivery systems.[101] Therefore, from the latter half of the 1960s onward, most schools that provided education and training for various occupational duties such as maintenance, supply, and control in the PLAAF were closed for nearly six years. Even flight education came to be restricted except for actual alert duties. As a result, the acquisition of technology related to aircraft avionics and engines fell significantly behind compared to Western air forces.[102]

Around this time in the PLAAF, development of ground attack aircraft were being considered to secure ground attack capability, which was also a lesson from the Korean War. Therefore, attempts were also made to modify the obsolete MiG-15 into an attack aircraft. However, the service lives of Soviet-made jet engines in possession were short, and many operational aircraft were in such poor condition that they were unsuitable for modification work into attack aircraft.[103] China's financial situation at that time was severe, and it was also a harsh period when alcohol was used in substitute of aircraft fuel.[104] Therefore, fuel and spare parts were lacking, and most operational aircraft could not fly and remained parked. As a result, PLAAF pilots could not conduct sufficient

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99 Editorial Department of the Encyclopedia of China Publishing House, ed., *Encyclopedia of Chinese Military Affairs* [中国军事百科全书], vol. 3 (Beijing: Military Science Publishing House [军事科学出版社], 1997), pp. 545–546.

100 Lian Baosheng, who was on board, refused to go to Taiwan and committed suicide in the aircraft, but another passenger, Li Caiwang received a large reward from the Kuomintang together with pilot Li Xianbin and escaped from Communist-controlled China to obtain a free life. Between 1960 and 1989, approximately 12 successful defections from the PLAAF and PLA Naval Aviation to what the Kuomintang at that time called "defection to freedom" from China occurred, but on the other hand, several cases of defection from the Republic of China to mainland China also occurred, which the Chinese Communist Party praised as "revolutionary return." When cross-strait tensions eased in 1988, both sides discontinued their reward policies (Han Cheung, "Defection to Freedom: People's Liberation Army Pilot Li Xianbin Became a Hero When He Fled to Taiwan in 1965, but Met a Tragic End Decades Later While Visiting His Homeland," *Taipei Times*, last updated November 8, 2015, https://www.taipeitimes.com/News/feat/archives/2015/11/08/2003631950).

101 John W. Lewis and Xue Litai, *China Builds the Bomb* (California: Stanford University Press, 1988), pp. 72–73.

102 Allen, Krumel, and Pollack, *China's Air Force Enters the 21st Century*, pp. 18–22.

103 "Revealing the Secret of the Q-5 Dropping Nuclear Bombs: Pilot Returns with Bomb Threatening the Lives of 10,000 People (1) [揭秘强5投放气弹: 飞行员带弹返回威胁1万人生命 (1)"], *China Net Forum* [中华网论坛], January 15, 2010, https://web.archive.org/web/20100119033848/http://military.china.com/zh_cn/history4/62/20100115/15777971.html.

104 Air Force Equipment Department, ed., *Forging Swords for Air and Space*, p. 100.

flight training, and their piloting skills remained poor.[105] The impact of the Cultural Revolution on the PLAAF was severe, with budget, fuel, and materials all depleted. Even in flight training, where the world standard annual average flight hours for fighter pilots was 122.25 hours, PLAAF pilots could only fly an annual average of 55 hours.[106]

For at least 14 years from 1966, when the Cultural Revolution began, political work was given the highest priority for the PLA. Except for the Sino-Soviet border conflict in March 1969, and the military operation to seize the Paracel Islands from South Vietnam in January 1974, the PLA was mostly engaged in political work. The same was true for the PLAAF, as the decline in professionalism naturally led to a decline in individual skills, and it continued to advance toward becoming an increasingly outdated air force.

(2) Development Efforts of the Aviation Industry and Overseas Exports

In 1967, the pros and cons of developing the Qiang-5 (Q-5) as a candidate for their lacking attack aircraft were deliberated in Beijing. This Q-5 was an attack aircraft on which the Nanchang Aircraft Manufacturing Company was devoting all its efforts, based on significantly modifying the J-6 for use as an attack aircraft. Despite the severe production situation in the aviation industry due to the Cultural Revolution, the Party Central Committee decided to produce 250 Q-5 aircraft. Furthermore, Zhou Enlai, who sensed the possibility that the Q-5 under development could be used as the first hydrogen bomb-carrying attack aircraft, requested that the Q-5 be prioritized for air-dropping nuclear bombs in nuclear tests rather than deployed to frontline units.[107] As a result, in nuclear tests from 1965 to 1979, at least 12 nuclear bombs were air-dropped from PLAAF aircraft, including from the Q-5,[108] and the PLAAF had no choice but to prioritize offering Q-5s in optimal condition for nuclear tests to nuclear bomb air-drop experiments.[109] In this way, the PLAAF was tossed about by the initiative of political leaders who gave top priority to nuclear development.

Moreover, the development of the J-7, which was already undergoing reverse engineering, was conducted at the beginning of the Cultural Revolution,[110] so its development and production base was moved to the 132nd Aircraft Factory in Chengdu. Similarly, the chaos of the Cultural Revolution inevitably affected the J-8 program as well.[111] Development became prolonged, and the J-8 design was fundamentally reviewed and redesigned as the J-8 II, with the nose air intake changed to both sides of the fuselage and a radome installed on the nose to add a fire control radar. However, the technical level of the aviation industry still remained low, so manufactured J-8 II could not meet required performance specifications, and the design for mass production aircraft

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105 Even pilots who dropped hydrogen bombs with Q-5 attack aircraft could not fly 40 hours per year. Naturally, new recruitment of pilot candidates also had to be halted for several years ("Revealing the Secret of the Q-5 Dropping Nuclear Bombs").

106 Zhang, "Chinese Air Power," p. 279.

107 "Revealing the Secret of the Q-5 Dropping Nuclear Bombs".

108 Hans M. Kristensen, Matt Korda, and Eliana Reynolds, "Chinese Nuclear Weapons, 2023," *Bulletin of the Atomic Scientists*, vol. 79, no. 2 (March 2023), p. 127, https://thebulletin.org/premium/2023-03/nuclear-notebook-chinese-nuclear-weapons-2023/#post-heading.

109 Robert S. Norris, *Nuclear Weapons Databook, vol. 5: British, French, and Chinese Nuclear Weapons* (New York: Routledge, 1994), pp. 400–420.

110 "Commemorating the 60th Anniversary of the Founding of the China Aviation Research Institute".

111 Ibid.

could not be finalized for a long period.[112]

Around this time, like China, there was a country in the communist bloc in Eastern Europe that had its support from the Soviet Union cut off as a result of deepening confrontation with the Soviet Union. That country, Albania, gradually deepened its relationship with China, and Mao's China also deepened its relationship with Albania and came to support it in all aspects. As part of this, China exported as many as 34 J-6s to Albania starting in 1964 for the first time,[113] with the total number reaching 71 aircraft.[114] China's aviation industry was severely affected by the Cultural Revolution, however, it also began weapons exports due to Mao's political initiative, and gradually expanded its overseas markets.

(3) The Lin Biao Incident and the Arrival of an "Unfortunate Era" for the PLAAF

The flow of "modernization" that Peng, who commanded overall in the Korean War, had tried to pursue had completely disappeared.[115] Moreover, Mao, who had based his authority on his track record of leading the "People's War," was concerned that modernizing the PLA under foreign influence might undermine the Communist Party's traditions.[116] In other words, Mao thought that the more the PLA devoted itself to military affairs, the weaker its interest in communist ideology would become. As a result, the strengthened movement of personality cult for Mao hindered the PLAAF from formulating air force doctrine through the accumulation of scientific examination. A trend came to dominate that viewed the content Mao taught as an important component of air force doctrine, and when examining air force doctrine, the "People's War" theory was always on the table for discussion.[117]

Under such circumstances, on September 13, 1971, an event occurred that sent shockwaves through the PLAAF. Lin Biao, who was regarded as Mao's successor, attempted a coup d'état, and after failing, died in a crash while fleeing abroad in a Trident aircraft.[118] This "Lin Biao Incident" led to a decline in trust of the Party's political leadership, including Mao Zedong, toward the upper echelons of the PLA. In particular, because Lin Biao's son, Lin Liguo, was deputy director of the PLAAF Operations Department, suspicion was held that the PLAAF had participated in the coup. Many PLA generals who were close associates of Lin Biao were purged by Mao. Wu

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112 The operational deployment of the J-8 had to wait until the era of Deng Xiaoping in the late 1980s (Gordon and Komissarov, *Chinese Aircraft*, pp. 75–77).

113 *Export Sales and Deliveries of Chinese Aircraft to Third World Countries, 1965-1984(s)* (November 2010, Central Intelligence Agency), https://www.cia.gov/readingroom/docs/CIA-RDP85T00840R000100210001-4.pdf.

114 Albania General Survey: *National Intelligence Survey 20* (August 1971, Central Intelligence Agency), p. 18, https://www.cia.gov/readingroom/docs/CIA-RDP01-00707R000200110034-6.pdf.

115 Yamaguchi, *Mao Zedong's Strategy for Building a Strong Nation*, p. 411; Hiramatsu, *Military Leaders of Contemporary China*, pp. 44–63.

116 Anami, *The Reasons behind China's Military Expansion*, p. 117.

117 Zhang, "Chinese Air Power," p. 280.

118 Hiramatsu, *Gendai Chugoku no Gunji Shidosha*, pp. 153–154.

Faxian, who was the second PLAAF Commander, was also removed from his post.[119] As a result, for approximately two years from that September, the unusual personnel situation of the PLAAF Commander position remaining vacant continued, and most modernization efforts stagnated.[120] Then in May 1973, Ma Ning from the ground forces finally assumed the vacant PLAAF Commander position as the third commander.[121] Having ended the humiliating period of approximately two years without a leader, the PLAAF would resume stagnant research and development under the new military leader. The aviation industry, which had been strongly requested by Mao to reverse engineer the MiG-21 since 1962, finally succeeded in the first flight of the J-7 in June 1976. However, because the domestic aviation industry had been devastated by the Cultural Revolution, the production efficiency of the J-7 was poor,[122] and its capabilities themselves were inferior compared to the Soviet military's MiG-21.[123] However, on September 9, 1976, China faced the death of Mao Zedong. The country was shaken by the sudden death of the political leader who had ruled China with power and personality cult, and the PLAAF was also unsettled. Then, on the domestic political stage, power struggles would begin again, and the PLAAF would continue to be tossed about by domestic politics.

Conclusion

This study has revealed that, contrary to the conventional wisdom that PLAAF modernization stagnated due to the Sino-Soviet conflict, the PLAAF was steadily modernized even during harsh periods for China. First, regarding software modernization, the PLAAF reached the point of constructing its own air force doctrine system while referring to Western air force doctrines. However, Mao, who feared that the more modernization proceeded in a foreign manner, the more the Chinese Communist Party's traditions would be lost. This hindered the PLAAF from formulating air force doctrine through the accumulation of scientific examination, and always made the "People's War" theory a central element of discussion. On the other hand, ingenuity was exercised within field units to shoot down ROC Air Force aircraft intruding from Taiwan, and, to that end, modernization through ingenuity at the PLAAF field unit level was also observed. This included modifying Soviet-made SA-2 surface-to-air missiles and devising unique tactics.

Next, regarding hardware modernization, Mao, who called for self-reliance, established the Aviation Research Institute and built new aircraft development bases to support the PLAAF. Then, while conducting reverse engineering based on the limited MiG-21s obtained from the

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119 Lin Biao controlled the PLAAF through Wu Faxian, and controlled the PLA Navy through Li Zuopeng, who was political commissar and basically managed the navy. After Lin Biao died in a crash over Mongolia in September 1971, Wu Faxian and Li Zuopeng were put on trial together with the Gang of Four, and Wu received a sentence of 17 years in prison and Li 20 years (Wang, *Contemporary Chinese Air Force*, p. 481; Seto Hiroshi [瀬戸宏], "Mao Zedong as Seen from the Memoirs of Lin Biao Faction Generals: Focusing on Wu Faxian's 'Difficult Years: Memoirs of Wu Faxian'" [林彪派将軍回想録からみた毛沢東―呉法憲『歳月艱難呉法憲回憶録』を中心に―], *Humanistic Research on Mao Zedong* [毛沢東に関する人文学的研究] (Center for Contemporary Chinese Studies, Institute for Research in Humanities, Kyoto University, February 2020), p. 361).

120 Allen, Krumel, and Pollack, *China's Air Force Enters the 21st Century*, pp. 37–38.

121 Ibid.

122 Ibid., pp. 37–38, 222.

123 The J-7, which China domestically produced for the first time, was equipped with only two 30 mm cannons like the Soviet-made MiG-21F and could not operate air-to-air missiles (Niu, "A Tour of Famous Chinese Fighter Manufacturers: J-7 Sharp Sword Unsheathed, Export Champion").

Soviet Union, China pressed forward with the development of the J-7. Thereafter, to intercept reconnaissance aircraft flying at high altitude over mainland China, the J-8, which expanded the J-7 airframe and was equipped with two engines, also came to be developed simultaneously. These modernization efforts were the result of Mao's political leadership regarding the security environment surrounding China. Moreover, these steady efforts also contributed to the training of personnel engaged in aircraft development and the accumulation of related knowledge.

In this way, even during the harsh era when support from the Soviet Union was cut off due to the Sino-Soviet conflict, the PLAAF was steadily modernized under Mao's influence.

As an implication derived from this examination, the cooperative relationship between Albania and China, which strengthened diplomatic relations under the influence of the Sino-Soviet conflict, can be cited. Mao, who developed the aviation industry, was the first to exported fighter planes to Albania, and further expanding political cooperation thereafter. This unique Chinese approach eventually led to the so-called "Albanian Resolution" (United Nations General Assembly Resolution 2758 adopted in 1971), playing an important role in the issue of China's representation at the United Nations, and became one factor leading to China's acquisition of the status of a permanent member of the Security Council.

On the other hand, it was not until witnessing the modernized U.S. military aircraft perform effectively during the 1991 Gulf War that future Chinese political leaders would finally commit to modernizing the PLA Air Force, staking the nation's fate on the endeavor.