CHINA AEROSPACE STUDIES INSTITUTE

旅化

"Brigadization" of the PLA Air Force

Lawrence "Sid" Trevethan

Printed in the United States of America
by the China Aerospace Studies Institute

ISBN-13: 978-1718721159
ISBN-10: 1718721153

To request additional copies, please direct inquiries to
Director, China Aerospace Studies Institute,
Air University, 55 Lemay Plaza, Montgomery, AL 36112

Design and art provided by: Heisey-Grove Design

E-mail: Director@CASI-Research.ORG
Web: http://www.airuniversity.af.mil/CASI
https://twitter.com/CASI_Research @CASI_Research
https://www.facebook.com/CASI.Research.Org
https://www.linkedin.com/company/11049011

CASI would like to acknowledge the work and effort of Mr. Ken Allen, who contributed to the analysis of data, research, writing, and editing of this volume.

China Aerospace Studies Institute

CASI's mission is to advance understanding of the capabilities, development, operating concepts, strategy, doctrine, personnel, organization, and limitations of China's aerospace forces, which include: the PLA Air Force (PLAAF); PLA Naval Aviation (PLAN Aviation); PLA Rocket Force (PLARF); PLA Army (PLAA) Aviation, the Strategic Support Force (PLASSF), primarily space and cyber; and the civilian and commercial infrastructure that supports the above.

CASI supports the Secretary, Chief of Staff, and other senior leaders of the U.S. Air Force. CASI provides expert research and analysis supporting decision and policy makers in the Department of Defense and across the U.S. government. CASI can support the full range of units and organizations across the USAF and the DoD. CASI accomplishes its mission through conducting the following activities:

• CASI primarily conducts open-source native-language research supporting its five main topic areas.

• CASI conducts conferences, workshops, roundtables, subject matter expert panels, and senior leader discussions to further its mission. CASI personnel attend such events, government, academic, and public, in support of its research and outreach efforts.

• CASI publishes research findings and papers, journal articles, monographs, and edited volumes for both public and government-only distribution as appropriate.

• CASI establishes and maintains institutional relationships with organizations and institutions in the PLA, the PRC writ large, and with partners and allies involved in the region.

• CASI maintains the ability to support senior leaders and policy decision makers across the full spectrum of topics and projects at all levels, related to Chinese aerospace.

CASI supports the U.S. Defense Department and the China research community writ-large by providing high quality, unclassified research on Chinese aerospace developments in the context of U.S. strategic imperatives in the Asia-Pacific region. Primarily focused on China's Military Air, Space, and Missile Forces, CASI capitalizes on publicly available native language resources to gain insights as to how the Chinese speak to and among one another on these topics.

Preface

The current round of reforms initiated by Xi Jinping in 2016 continue to have significant effects on today's People's Liberation Army, in its missions, organizations, and its people. One of the most evident of these changes is the increased shift toward a Brigade system. While organizationally modeled on the ground force, aka "Army", the PLAAF had take a 'pause' in its moves to shift to a brigade system throughout the PLAAF. Apparently, the 2016 reforms put an end to that pause. Over the course of the last two years, the PLAAF has rapidly pursued a program of shifting from the traditional Division-Regiment organization, to a new Base-Brigade structure. We see evidence of this across the PLAAF, with the notable exception (as of this writing) of the bomber and special mission aircraft organizations.

This report is an attempt to describe the changes that have taken place in the organizational structure of the PLAAF and to begin to analyze some of the impact and implications associated with the changes. These changes also take place while the PLA shifted from seven inwardly focused Military Region commands to five outwardly focused Theater Commands, while the Chinese Communist Party's Central Military Commission underwent a significant restructuring and change of personnel, and while the PLA attempted to decrease its overall active force by 300,000 people, although many have simply changed into the PLA equivalent of DoD civilians (a topic for a future CASI paper).

Understanding the fundamental organization, the command and control relationships, and the structures, lower level organizations, and the personnel that fill those billets, is the base upon which any detailed analysis must start. This volume helps lay that foundation for the PLAAF.

Dr. Brendan S. Mulvaney
Director, China Aerospace Studies Institute

Introduction

In 2016, China's People's Liberation Army (PLA) began to implement its 11th large-scale reorganization, including a 300,000-man force reduction. One key component of the reorganization was the PLA Air Force's (PLAAF) shift away from its traditional Division-Regiment system to a Base-Brigade structure for its fighter and ground attack aircraft. This transition originally began in 2011 but implementation was apparently delayed soon after it began and did not restart until 2017. This paper discusses the evolution of the PLAAF's fighter and ground attack combat aircraft units and flight colleges to a brigade structure. It is divided into the following eight sections:

Section 1: Key Findings
Section 2: Understanding the PLAAF's Organizational Structure
Section 3: An Overview of the PLAAF's Organizational Reforms
Section 4: Aviation Branch Brigades
Section 5: Flight College Aviation Brigades
Section 6: Flight Transition Training Bases
Section 7: Creation of Air Brigades since 2011
Section 8: The PLAAF's Development, Production, and Rebuild Process

While the majority of the information contained in this report has been gleaned from multiple authoritative sources, it is necessary to emphasize that the reorganization is still ongoing, and the PLA is less than forthcoming in specific details. As such, where necessary or appropriate, estimates and logical deductions have been made. These judgements can be identified by phrases such as, 'it is likely', "probably", etc.

Section 1: Key Findings

- In late 2011, the PLAAF began to restructure its seven flight colleges into three flight colleges and one Flight Instructor Training Base.
- In 2011, the PLAAF began to restructure its operational fighter and ground attack air divisions and subordinate regiments into a brigade structure. Each of the newly created 14 operational air brigades were re-subordinated under four newly reconfigured corps deputy leader-grade Bases. These Bases were previously corps deputy leader-grade or division leader-grade command posts that were, in turn, created in 2004[i]; however, after the initial restructuring in 2011-2012, no further changes to any fighter and ground attack units or operational Bases were made until 2017.
- In early 2016, as part of the "above the neck reforms" (this is the term that the PLA uses to refer to units above the corps level), the PLAAF Headquarters completely reorganized its administrative and functional departments, and the PLAAF merged its seven Military Region Air Force (MRAF) Headquarters into five Theater Command Air Force (TCAF) Headquarters to align with the overall PLA transition from a Military Region structure to a Theater Command structure.
- The 19th Party Congress, in late 2017, reorganized the PLA's Central Military Commission (CMC). Post reorganization, the service commanders were no longer included in the CMC. The Navy, Air Force, and Rocket

i It is important to note that the use of the word "Base" here is in the Chinese context of an organizational unit at the Corps Deputy Leader grade, not in the American sense of a physical location. We have used the capitalized form of the word to denote the Base organization, and not merely a location.

Force (former Second Artillery Corps) commanders had served on the CMC, starting in 2004.[ii]

- In 2017, as part of the "below the neck reforms" (i.e., corps and below), the PLAAF completed its reorganization of all remaining combat fighter and ground attack divisions and regiments into brigades and placed them all under several newly configured Bases from previous command posts.
- As of yet, the PLAAF has not reorganized its existing three bomber divisions, three transport divisions, or its three specialized air divisions into a brigade structure. Given that these units are either directly subordinate to PLAAF HQ or to a TCAF HQ, and not a Base, it is not clear if this restructuring will happen in the future.
- The PLAAF has created six Transport and Search and Rescue (SAR) Air Brigades. The newest of which was likely to be upgraded to a brigade in early 2018.
- The PLAAF has also organized other types of organizations into a brigade structure. These include unmanned aerial vehicle (UAV) brigades, Flight Test and Training Base Air Brigades, and Transition Training Base Air Regiments and Brigades. The few Bases which retain training regiments are, however, likely to keep them.
- The PLAAF Airborne Corps, which was formerly known as the "15th Airborne Corps" has transitioned from having subordinate divisions and regiments to having only subordinate brigades. These include a special operations brigade and support brigade. It also has a newly-created Aviation (transport) Brigade. It is not clear if the former helicopter regiment has

ii The commanders were included for three iterations of the CMC: 2003, 2008, and 2013.

remained as a regiment, been upgraded to a brigade, or been incorporated into the aviation brigade as multiple flight groups.

- The PLAAF has created several unmanned aerial vehicle (UAV) brigades and is likely to add more units in the near future.[1]
- The current reorganization of the PLAAF is ongoing, as of March 2018, many of the details are still developing and are simply unknowable at this time.

Section 2: Understanding the PLAAF's Organizational Structure

Before addressing the PLAAF's air brigade structure, it is important to understand how every organization fits into the PLA's 15-grade structure, which forms the base for the PLAAF's command and control (C2) and coordination structure. The U.S. Air Force National Air and Space Intelligence Center's (NASIC) People's Liberation Army Air Force 2010 provides a solid background for understanding the grade structure.[2] Unlike the U.S., military officer grades in the PLA are not assigned a number.[iii] Additionally, in the PLA, not only are personnel assigned a grade, but all billets and organizations themselves are assigned a grade. Table 1, below, provides an overview of where each PLAAF operational aviation-relevant organization fits into the grade structure. It provides a comparison of the former structure of seven Military Regions (MR) and their subordinate MRAF HQs, and the current structure that consists of five Theater Commands (TC) and their subordinate TCAFs. Within this system, the only significant name change was the renaming of the Military Region leader and deputy leader grades to Theater Command leader and deputy leader grades.

iii With the exception of special technical officers, who have numbers assigned to their Special Technical Officer Grade.

Table 1: PLA 15-Grade Structure and PLAAF Aviation-Relevant Organizations

Previous MR Grade	Current TC Grade	Previous PLAAF-specific Organization	Current PLAAF-specific Organization
Central Military Commission Vice Chairman 中央军委副主席	No change	None	None
Central Military Commission Member 中央军委委员	No change	None	None
Military Region Leader 正大军区职	Theater Command Leader 正大战区职	PLA Air Force HQ_空军	PLA Air Force HQ_空军
Military Region Deputy Leader 副大军区职	Theater Command Deputy Leader 副大战区职	Military Region Air Force HQ_军区空军	Theater Command Air Force HQ_战区空军
Corps Leader 正军职	No change	None	None
Corps Deputy Leader 副军职	No change	None	Bases 基地; Command Posts 指挥所
Division Leader 正师职	No Change	Air Divisions 航空兵师; Command Posts 指挥所	None
Division Deputy Leader 副师职	Brigade Leader	None	Air Brigades 航空兵旅
Regiment Leader 政团职	Brigade Deputy Leader	Air Regiments 航空兵团	None
Regiment Deputy Leader 副团职	No Change	None	None
Battalion Leader 正营职	No Change	Flight Groups[iv] 飞行大队	Flight Groups 飞行大队
Battalion Deputy Leader 副营职	No Change	None	None
Company Leader 正连职	No Change	Flight Squadrons[iv] 飞行中队	Flight Squadrons 飞行中队
Company Deputy Leader 副连职	No Change	None	None
Platoon 排职	No Change	None	None

iv A PLAAF Flight Squadron consists of two to four aircraft. A Flight Group consists of eight to ten aircraft.

Section 3: Overview of the PLAAF's Organizational Reforms

"In December 2011, the PLAAF revealed that it had begun creating air brigades (航空兵旅) in its combat aircraft units by upgrading 14 existing air regiment headquarters (航空兵团) and abolishing at least four air division headquarters (航空兵师)."[3] In addition, the brigades were all subordinated to one of the four corps deputy leader-grade Bases (基地) that were created from two existing division leader-grade and two corps deputy leader-grade command posts (指挥所) under the Shenyang, Lanzhou, Nanjing, and Guangzhou Military Region Air Force (MRAF) HQs. As such, the command structure for its fighter aircraft (歼击机) and ground attack aircraft (强击机) began changing from a 7-tiered structure (PLAAF HQ –MRAF HQ – command post – air division – air regiment – flight group – flight squadron) that was created in 2004[v], to a 6-tiered structure (PLAAF HQ – MRAF HQ – Base – air brigade – flight group – flight squadron); such that no combat fighter or ground attack brigades are subordinate to a division, and no air regiments are subordinate to a brigade. Meanwhile, its bomber, transport, and special mission aircraft air divisions remained directly subordinate to either PLAAF HQ or a MRAF HQ.

Starting in 2011, the PLAAF also merged six of its seven existing flight colleges into three flight colleges (Harbin, Shijiazhuang, and Xi'an), each of which was upgraded from division leader grade to corps deputy leader grade organization. At the same time, the PLAAF created 14 subordinate training brigades from the former training regiments.[4] Each flight college was also resubordinated from their relevant MRAF HQ to the PLAAF HQ.[5] The seventh flight college was converted into a flight instructor training base

v Some fighter and ground attack divisions that were located in the same province as the MRAF HQ were directly subordinate to the MRAF HQ rather than to a command post that was located in a different province.

subordinate to the Air Force Aviation University but remained as a division leader-grade organization with subordinate training regiments.[6]

After a five-year hiatus that did not include any new fighter or ground attack brigades or reconfigured command posts into Bases, a much larger reorganization program for fighter and ground attack regiments to brigades began in early 2017, such that there are now approximately 59 fighter, armed fighter-reconnaissance and ground attack brigades attached to Bases with operational commands. In addition, another 35 brigades not subordinate to Bases were also formed. This reorganization included abolishing 23 air division headquarters and either upgrading their regiments to brigades; merging certain regiments into brigades and eliminating older airframes; or abolishing the entire regiment. As such, as of early 2018, no fighter or ground attack air divisions or regiments remain. This change was clearly linked to the 2016 reforms.[7]

So far, the shift to air brigades has focused on fighter and ground attack units. The three bomber air divisions, three transport aircraft air divisions, and three specialized[vi] aircraft air divisions, have apparently been retained as air divisions, directly subordinate to PLAAF HQ or a TCAF HQ. However, in 2017, four of the five new TCAF HQs (Eastern, Southern, Northern, and Central) that were created in early 2016 gained a subordinate Transport & SAR Brigade, while the Western TCAF had a Transport & SAR Regiment which was converted to a brigade, likely in early 2018.[8] The PLAAF HQ also gained a subordinate Transport & SAR Brigade in 2017. Given that the bomber, transport, and special mission aircraft divisions have not been subordinate to command posts, there is a strong possibility that they will not be abolished, which means their subordinate regiments most likely will not be upgraded to brigades, nor subordinated to Bases.

In April 2017, the PLAAF's Airborne Corps (空降兵军), formerly known as the 15th Airborne Corps (空降兵15军), abolished its three airborne divisions' (43rd, 44th, and 45th) headquarters and upgraded all of their subordinate regiments into brigades (空降兵旅). They also created a special operation brigade (特战旅).[9] By June 2017, it had also created a transport aircraft Aviation Brigade (空降兵运输航空兵旅) that consists of several Harbin Y-12 small transports shown at the right.[10] Although the Airborne Corps has had one subordinate helicopter regiment for a few years, it is not clear if it has been upgraded to a brigade or if its subordinate flight groups

vi A specialized air division flies aircraft fitted with specialized sensors or electronic-warfare (EW) equipment or other non-combat missions. It can include transport aircraft.

have been directly resubordinated to the Aviation Brigade.[11] In addition, the PLAAF has created several unmanned aerial vehicle (UAV) brigades, and has various air brigades at the Dingxin and Cangzhou Test and Training Bases.

Harbin Y-12 small transports

Section 4: Aviation Branch Brigades

The first two air units the PLAAF created in 1950 were brigades – the 4th Combined Brigade at Nanjing and the 3rd Pursuit Brigade in Shenyang, each of which had subordinate regiments.[12] In the early 1990s, the PLAAF abolished its air brigades and created its first air divisions with subordinate regiments.

Over the years, the PLAAF has adjusted the size of its total aviation force in terms of numbers of divisions and numbers of regiments per division to incorporate new weapon systems, retire older systems, and meet mission requirements.[13] From October 1950 to early 1954, it deployed a total of 3,000 aircraft in 28 air divisions, composed of 70 regiments, plus five independent regiments[vii] consisting of special mission reconnaissance fighter aircraft, three reconnaissance, one bomber, and one transport. The air divisions consisted of fighters, bombers, transports, ground attack, and reconnaissance aircraft.[14] As a general rule, each air division consisted of three regiments, including two operational regiments and one training regiment.

From January 1954 to 1971, the PLAAF created an additional 22 air divisions, for a total of 50 air divisions. The introduction of new aircraft such as the A-5 ground attack aircraft and the B-5 and B-6 bombers also influenced the formation of new combat units. While some units merely upgraded to the new aircraft, other units were formed using the new aircraft as their basis. Many of the early divisions relocated several times as the PLAAF expanded to meet operational needs, especially during the late 1950s opposite Taiwan and the 1960s during the Vietnam War.[15]

vii Independent regiments are not subordinate to a Division, or Brigade for that matter, but rather fall under PLAAF HQ directly, or a former Military Region Air Force, and perhaps under a current Theater Command Air Force.

Starting in the 1950s, the standard table of organization and equipment (TOE) for a fighter division has been 72 aircraft (plus up to eight trainers) and 120 pilots, for a plane to pilot ratio of 1:1.5. Each fighter or ground attack regiment had 24 aircraft, typically with up to six spare aircraft, and 40 pilots.[16]

The TOE for a bomber division is 54 aircraft and 90 crews, a 1:1.7 ratio. Each bomber regiment had 18 aircraft, plus probably two spares, and 30 crews.

When the PLAAF began forming its first air divisions, most divisions had two regiments, but a few divisions had three regiments, stationed at one or two airfields. By 1953, it began expanding all of its divisions to include three regiments. Each regiment had three to four subordinate flight groups (大队/dadui), which, in turn, are divided into three to four flight squadrons (中队/ zhongdui).[viii] One confusing event which occurred between 1964 and 1970, was that the PLAAF changed the name of each regiment to a group without changing the organizational structure or the organizational grade. Thus, the 24th air division's 70th air regiment in 1963 was renamed the 70th group in 1964, but without any change in its grade. In 1970, the regiment name was re-instituted.

According to a 1999 Department of Defense report, the PLAAF's combat aircraft at that time, were organized into some 30 air divisions, plus about 150 transport aircraft organized in two air divisions.[17] A 14 June 2000 Jane's Defence Weekly report stated that the PLAAF currently consists of 33 divisions, including 27 fighter, four bomber, and two transport divisions.[18]

According to a map in the 2010 Department of Defense report, the PLAAF had 28 air divisions, including 20 fighter, three bomber, three attack, and two transport divisions.[19]

According to the map in the 2017 Department of Defense report, shown below, the PLAAF had 32 air divisions, including 25 fighter and attack, three bomber, and three transport divisions.[20] Unfortunately, the report did not provide any information about the creation of fighter and ground attack air brigades which started in 2012. These brigades replaced several existing divisions and their subordinate regiments, which actually reduced the number of existing air divisions shown on the map.

viii Groups are battalion grade-equivalent organizations, and squadrons are company grade-equivalent organizations.

Figure 1: Major Air Units 2012

According to reports, historically the PLAAF has had a five-tiered vertical command structure for its aviation troops. However, beginning in late 2003, it reduced the number of tiers from five to four.[21] The change occurred when the PLAAF abolished the corps leader-grade air corps (空军军) level for command headquarters, which, in some cases, were called Bases; created several corps deputy leader-grade (副军职) and division leader-grade (正师职) command posts (CPs / 指挥所); and consolidated the operational chain of command for aviation troops under the seven MRAF Headquarters. In conjunction with establishing new air brigades, which began in early 2011, the PLAAF has begun creating four corps deputy leader-grade Bases (基地) from existing Command Posts. A comparison of the three periods is shown in Table 2.

Table 2: Aviation and Air Defense Command Structure

Pre-2003	2004-2011	2012-Current
PLAAF HQ	PLAAF HQ	PLAAF HQ
MRAF HQ	MRAF HQ	MRAF/TCAF HQ
Air Corps and Bases	Command Posts	Bases and Command Posts
Units	Units	Units
Subunits	Subunits	Subunits

According to PLAAF Structure, the last two tiers consist of units (部队) at the corps, division, brigade, and regiment levels and subunits (分队) at the battalion, company, and platoon levels.

Prior to the 2003-2004 force reduction of 200,000 personnel (85% of whom were officers), the PLAAF had 11 corps leader-grade organizations, including: the 15th Airborne Corps, five air corps, and five Bases. Excluding the 15th Airborne Corps, the other air corps and Bases were subordinate to their respective MRAF headquarters and were responsible for directly commanding the PLAAF combat units (aviation, air defense, radar, etc.) in their area of responsibility (AOR). The PLAAF also had two division-level CPs that served the same function. However, some fighter and ground attack air divisions that were located in the same province as the MRAF Headquarters were directly subordinate to the MRAF Headquarters instead of a CP.

As a result of the 2003 force restructuring, the PLAAF reduced the grade of the remaining air corps and corps-level Bases to either corps deputy leader- or division leader-grade organizations, re-designated them as CPs, and consolidated leadership for all aviation and air defense organizations in each MRAF directly under the respective MRAF headquarters.[ix] As a result, from 2004 to 2012, the PLAAF had 13 CPs, which acted on behalf of the MRAF Headquarters to command the organizations in their AOR.

In January 2012, the PLAAF began creating four corps deputy leader-grade Bases from existing command posts in Nanning, Urumqi (Wulumuqi), Shanghai, and Dalian. Each Base is responsible for C2 of the air brigades, SAM, AAA, and radar units in their AOR. They also coordinate with Army and Navy units in their AOR for joint training.

Following an almost five-year delay, in early 2017, the PLAAF reinvigorated its reorganization efforts, with the creation of at least six new corps deputy leader-grade Bases from former division leader- and corps deputy leader-grade

ix *PLAAF Structure* states that, from 2003 to 2012, the only corps leader-grade combat organization was the 15th Airborne Corps, which is directly subordinate to PLAAF Headquarters.

command posts as well as from the former Lanzhou MRAF HQ and Jinan MRAF HQ shown in Table 3.[22] The table is organized according to the current TCAF protocol order – Eastern, Southern, Western, Northern, and Central. Each Base commands all subordinate aviation and air defense (SAM, AAA, and radar) units in its area of responsibility. As such, it appears that no fighter and ground attack air units are directly subordinate to a TCAF Headquarters.

Table 3: PLAAF Bases Created from 2012-2018

Location (City, Province/AR)	Former MRAF	Current TCAF	Former Grade
Fuzhou, Fujian	Nanjing	Eastern	Corps Deputy Leader
Shanghai	Nanjing	Eastern	Division Leader
Kunming, Yunnan	Chengdu	Southern	Corps Deputy Leader
Nanning, Guangxi	Guangzhou	Southern	Division Leader
Urumqi, Xinjiang	Lanzhou	Western	Corps Deputy Leader
Lanzhou, Gansu	Lanzhou	Western	MR Deputy Leader
Lhasa, Tibet	Chengdu	Western	Division Leader
Dalian, Liaoning	Shenyang	Northern	Corps Deputy Leader
Jinan, Shandong	Jinan	Northern	MR Deputy Leader
Unknown, Inner Mongolia	Unknown	Northern	Unknown
Datong, Shanxi	Beijing	Central	Corps Deputy Leader
Wuhan, Hunan	Guangzhou	Central	Corps Deputy Leader

As noted in Table 3, it appears that the PLAAF has created a new Base in the Northern TCAF's Inner Mongolia.[23] There are no indications that this Base was a previous command post, and it is not clear what units are subordinate to the Base. As of early 2018, it appears that the only remaining command posts are shown in Table 4 below. It does not appear that any air brigades are subordinate to them. However, other PLAAF units (radar brigades, SAM brigades, various facilities) in their "area of responsibility" are likely under command. If major military operations, e.g. a response to an earthquake or civil unrest, or invasion, were required in their area, air brigades could be subordinated to them.

Table 4: Remaining PLAAF Command Posts

TCAF	Division Leader CPs
Western	Hetian, Xinjiang
Northern	Changchun, Jilin

Section 5: Flight College Aviation Brigades

Starting in August 2011, the PLAAF created three corps deputy leader-grade flight colleges by consolidating six of the previous seven division leader-grade flight colleges and subordinated them to their respective MRAF HQ.[24] When the five TCAFs were created in 2016, the three flight colleges were resubordinated from under their respective MRAF HQ to their respective TCAF HQ.[25] The PLAAF also created a division leader-grade Flight Instructor Training Base (飞行教官训练基地) from the previous 13th Flight College and subordinated it to the corps deputy leader-grade Air Force Aviation University.[26] By 2017, it also had created a Basic Flight Training Base (飞行基础训练基地), also under the Air Force Aviation University.

In May 2004, the PLAAF created the corps deputy leader-grade Air Force Aviation University in Changchun, Jilin Province, from the former division leader-grade 7th Flight College. The university has a subordinate division leader-grade Flight Basic Training Base and a Flight Training Base.[27]

According to two articles in late December 2011 from Hong Kong's Wen Wei Po Online, the PLAAF had already consolidated its seven flight colleges shown in Table 5, in which resources were relatively decentralized and there was an overlap of their functions and designs, with four of its original seven MRAF flight transition training Bases.[28] Each of the flight colleges and transition training Bases were division leader-grade organizations and were organized like an operational air division with a Headquarters Department, Political Department, Logistics Department, and Equipment Department. Each flight college also has a 5-digit military unit cover designator (MUCD). However, unlike all other academic institutions, none of the flight colleges have a 5-digit Ministry of Education (MOE) code.

Table 5: Pre-2012 PLAAF Flight Colleges[29]

Academic Institution	City, Province (MRAF)	Mission
1st Flight College	Harbin, Heilongjiang (Shenyang)	Transport, bomber, and tanker crew
2nd Flight College	Huxian, Shaanxi (Lanzhou) and Jiajiang, Sichuan (Chengdu)	
3rd Flight College	Jinzhou, Liaoning (Shenyang)	Fighter and ground attack pilots
4th Flight College	Shijiazhuang, Hebei (Beijing)	
5th Flight College	Wuwei, Gansu (Lanzhou)	
6th Flight College	Zhuozhou, Hebei (Beijing)	
13th Flight College	Bengbu, Anhui (Nanjing)	

Since the initial article, Chinese military websites and PLA Air Force News have carried several articles and profiles stating that the PLAAF had consolidated six of the existing flight colleges into three newly formed flight colleges in Harbin, Shijiazhuang, and Xi'an. Each of these new flight colleges are corps deputy leader-grade organizations.[30] In addition, the former 13th Flight College has been transformed into a Flight Instructor Training Base subordinate to the Air Force Aviation University.

It appears that each new flight college was created by merging the headquarters from two previous flight colleges, but the airfields and their training units still exist. The key is that each of the subordinate regiments was upgraded to a brigade.

Table 6 provides an update overview of the three flight colleges, including their name, headquarters location, subordination, numbered brigades, aircraft tail numbers, and types of airframes. All 13 training air regiments at the Harbin Flight College (哈尔滨飞行学院), Shijiazhuang Flight College (石家庄飞行学院), and Xi'an Flight College (西安庄飞行学院) were upgraded to training air brigades beginning in late 2011. Most training air brigades are organized similar to combat air brigades, with flight groups consisting of JL-8 trainers.[31] However, a few are unique, operating old CJ-6 basic trainers, bombers and bomber trainers, transports or helicopters, and/or JJ-7 or JL-9 jet trainers. A typical example is the 3rd training brigade of the Xi'an Flight College (西安飞行学院) based at Wuwei (武威), Gansu Province. It operates three flight groups of JL-8.

Table 6: Current Flight Colleges

Flight College	Headquarters Location (City & Province)	Subordination	Training Brigades	Aircraft Tail Numbers	Airframes
Harbin	Harbin, Heilongjiang	Northern TCAF	1st 2nd 3rd 4th 5th	1x1x 1x2x 1x3x 1x4x 1x5x	CJ-6, Y-5D H-6H, HYJ-6&7 JL-9 JL-8 JL-8
Shijiazhuang	Shijiazhuang, Hebei	Central TCAF	1st 2nd 3rd 4th	2x1x 2x2x 2x3x 2x4x	JL-8 JL-8 JL-8 JL-8
Xi'an	Huxian, Shaanxi	Western TCAF	1st 2nd 3rd 4th 5th	3x1x 3x2x 3x3x 3x4x 3x5x	HC-120, Z-9 JL-8, JJ-7. J-7II JL-8 JL-8 Y-7&8, HYJ7

Section 6:
Flight Transition Training Bases

From 1986 to 1988, the PLAAF converted one air division in each MRAF to a division leader-grade transition training Base, where new flight college graduates received one year of transition training before they are assigned to an operational unit. As a result, most, if not all, of the training regiments in operational air divisions were abolished and their aircraft and missions were transferred to the transition training Bases.[32]

According to two articles in late December 2011 from Hong Kong's Wen Wei Po Online, the PLAAF had already consolidated its seven flight colleges with four of its original seven MRAF flight transition training Bases.[33] In addition, at least one of the two Shenyang MRAF operational brigades had incorporated aircraft from one of the flight transition Bases into the brigade's flight training group. Based on the aircraft numbers on the aircraft shown below,[34] at the Shenyang MRAF operational air brigade, the two-seat JJ-6 and JJ-7 trainers were brought in from other units. Specifically, the JJ-7 with number 60001 is from the Shenyang MRAF's transition training Base, which was previously the 50th air division. It is not clear where the JJ-6 with number xxx25 came from. (e.g., 1st, 11th, 21st, 31st, or 41st air division), however its presence at the Shenyang MRAF brigade indicates it was reassigned to a brigade flight group.

It is not yet clear if all of the former seven transition training Bases have been abolished, merged with flight colleges, and/or merged with operational air brigades. It does appear that the PLAAF has a few specialized transition training Bases (空军飞行训练基地 / 空军飞训基地) that are responsible for transitioning experienced pilots from older generation aircraft into newer generation aircraft before the pilots are reassigned to a new unit. For example, these transition training Bases likely train pilots assigned to a unit with obsolete aircraft types (e.g. J-7 or Q-5) become familiar with daylight operations and learn night navigation skills. It is not clear what their grades are; however, at least one of them is a division leader-grade organization with at least three subordinate numbered training regiments (1st, 2nd, and 3rd regiments).[35] One Base may have been upgraded to corps deputy leader grade, such that it has two subordinate training brigades, i.e. the 95th and 132nd Air Brigades. It is also not clear to whom they are subordinate, but the Bases are either directly subordinate to PLAAF HQ or their respective TCAF HQ.

An example of a possible transition training brigade is the 132nd Training Brigade at Xiangyun, Yunnan Province in the Southern TCAF. The 132nd has a significant number of old JJ-7 trainers as well as a flight group of obsolescent J-7II fighters. If this is the function of this unit, similar transition training brigades may have been, or might yet be, formed in each TCAF operating area. In this instance, the 132nd traded some of its J-7IIs for JJ-7s.[36]

132nd Brigade JJ-7 during a night navigation exercise in 2018.

Section 7: Creation of Air Brigades since 2011

In late 2011, the PLAAF initiated the restructuring of 14 fighter and ground attack air regiments by upgrading them to brigades, which included abolishing four air division headquarters. As discussed earlier, in 2012 it also created four corps deputy leader-grade Bases from previous corps deputy leader-grade and division leader-grade command posts. The shift to air brigades and the creation of new Bases were put on hold at the end of 2012 but were re-instituted in early 2017. It is not clear why there was a near five-year delay.

The important immediate difference between an air brigade and an air regiment is that an air brigade is a division deputy leader grade organization, while a regiment is a regiment leader grade organization, i.e. one grade lower. As such, each key staff officer billet[x] requires an officer that is one grade higher than a corresponding air regiment. This does not mean, however, that every officer gets and automatic grade promotion. Interestingly, all leadership billets in the air division headquarters were abolished. This led to some officers being downgraded and assigned to certain brigade billets, or they were transferred to a Base headquarters in order to be able to remain on active duty until their mandatory retirement age based on their grade. For most of the newly upgraded air brigades in 2017, this appears to be the only immediate change. However, in the future, it may require an increase of the maintenance assets and supporting structure in order to manage a greater number of aircraft, or a greater variety of aircraft assigned.

Another result of changing from a regiment to a brigade is a change in command relationships. As a general rule, air brigades are not subordinate to air divisions; rather, brigades report to a corps deputy leader-grade Base (基地).

x These officers would include the commander, political commissar, deputy commanders, deputy political commissar(s), chief of staff, and the other three first-level department directors and deputy directors, i.e. Political, Logistics, and Equipment; as well as all second-level department leaders and deputy leaders.

Each Base commands all subordinate aviation and air defense (SAM, AAA, and radar) units in its area of responsibility. In addition, a few previous air divisions which were directly subordinate to an MRAF or TCAF HQ have apparently been resubordinated to the nearest Base.

A typical combat air brigade, which can be either a fighter brigade or a ground attack brigade, has 24 aircraft (excluding trainers) organized in three battalion leader-grade flight groups. "Each brigade has from three to five subordinate flight groups. The goal was to have each flight group equipped with a different type of aircraft, including trainers, ground attack and fighters, such that the brigade is multi-functional."[37] However, by 2018, it appears that this early approach was generally abandoned in favor of having only one or two closely related types of multi-function aircraft. This may be an attempt to increase operational efficiency, and may be due to concerns regarding insufficient qualified maintenance personnel for each type of airframe. While current combat aircraft brigades may still have three to five flight groups, virtually all of the newly upgraded brigades have only the three inherited from the former air regiment from which they were upgraded.

As for the aircraft assigned to these brigades, most combat fighter and ground attack brigades have six additional aircraft as spares, even if they are new aircraft, in the repair shop. In general, aircraft are manufactured and issued to flight groups in batches of ten, but nominally only eight are considered to be available for operations. Usually brigades with foreign aircraft (e.g. Su-27, Su-30, or Su-35) have no spares.

Of note, previously, three air brigades had only 18 Su-30MKK combat aircraft. However, this appears to have changed in February 2018 when one of them upgraded to the Su-35S, thus making more Su-30MKKs available for the other two.

It should be noted that Training and other specialized air brigades may have entirely different organizations from combat air brigades.

As summarized in Table 7, in 2011, the PLAAF began creating the following 14 fighter and ground attack air brigades. Interestingly, these brigades were only created in four of the seven MRAFs – Shenyang, Lanzhou, Nanjing, and Guangzhou. The first report concerning the new air brigades occurred on 27 December 2011 when China Military Online carried this photo of a J-11BS two-seat trainer

with the following caption: "Recently, a certain air brigade in Xinjiang [Lanzhou MRAF] organized flight training that went from day into night, which ensured the combat effectiveness of the new equipment and new personnel."[38]

Table 7, organized by former MRAF protocol order, shows the former MRAF where they were located, their current subordination Base, former air division to which they were subordinate, the brigade number, location, and the type of aircraft.[39] The seven MRAF HQs were reorganized into five TCAF HQs in early 2016.

Table 7: Air Brigades Created in 2011-2012

MRAF (TCAF)	Base	Former Division	Brigade	Location (City & Province)	Airframes 2012 - 2018
Nanjing (Eastern)	Shanghai	29th (abolished) 29th (abolished) 14th (abolished) 26th (still active)	78th 85th 86th 93rd	Shanghai Quzhou, Zhejiang Rugao, Jiangsu Suzhou, Jiangsu	J-8, JJ-7 Su-30 J-7, JJ-7 JZ-8, JJ-7
Guangzhou (Southern)	Nanning	42nd (abolished) 42nd (abolished) 42nd (abolished)	124th 125th 126th	Baise, Tianyang, Guangxi Nanning, Guangxi Liuzhou, Guangxi	J-7 > J-10 J-7 > J-8H J-7 > JH-7A
Lanzhou (Western)	Urumqi	37th (abolished) 16th (still active) and MRAF TTB (abolished) 37th (abolished)	109th 110th 111th	Changji, Xinjiang Urumqi South, Xinjiang Korla, Xinjiang	J-8H, JJ-7A J-7, JJ-7 > JH-7A J-11B
Shenyang (Northern)	Dalian	30th (abolished) 30th (abolished) 11th (abolished) MRAF TTB (abolished)	88th 89th 90th[xi] 91st	Dandong, Liaoning Pulandian, Dalian, Liaoning Wafangdian, Dalian, Liaoning Liuhe, Tonghua, Jilin	J-7E, JJ-7A J-11B, Su-27U Q-5D, Q-5J J-7 > J-11B & Su-27U

Although there was a five-year hiatus in creating new air brigades, the PLAAF reinstituted the program in 2017 and created an additional 80 air brigades, for a total of 94 identified air brigades in PLAAF as of March, 2018. Of these brigades, 59 are fighter, fighter-reconnaissance, or ground attack air brigades subordinate to command Bases with an operational area of responsibility. A further 35 air brigades are made of up several different types, all of which are subordinate to TCAF HQ, to PLAAF HQ, to various flight colleges, or to Test and Training Bases and Transition Training Bases. Table 7 above lists the 14 fighter and ground attack air brigades reorganized in 2011-2012. Table 8, in Appendix 2, lists the 47 fighter, fighter-reconnaissance and ground attack air brigades reorganized between late 2016 and early 2018. Table 9, also in Appendix 2, lists the 20 air

xi Unconfirmed, but a reasonable judgement.

brigades subordinate to various HQ. As discussed in the previous section, Table 6 lists the 14 air brigades subordinate to Flight Colleges. In addition to air brigades, as of February 2018, PLAAF flight organizations also include 42 air regiments and 4 UAV battalions, the latter subordinate to a new UAV air division.[40]

The introduction of multi-role aircraft has blurred the distinction between fighter and ground attack air organizations. As well, the capabilities of these brigades vary greatly. A significant number, 15 fighter and 2 ground attack, have obsolescent equipment, while the majority (43) have more modern aircraft types. There are 35 other air brigades, including several new kinds of air brigades and air brigades equipped with modern combat aircraft which have specialized, non-combat functions, including R&D, tactics development, opposition force training, transport and search and rescue, and dedicated tanker support. It appears that a total of 23 air division headquarters, including 19 fighter, 3 ground attack and 1 "bomber" which had become another ground attack division, have been abolished since late 2016 and that their subordinate air regiments were upgraded to air brigades, merged into new air brigades, or were disbanded; all of which have been subordinated to Bases. No fighter or ground attack air division headquarters still exist. In addition, no existing bomber, transport, or specialized air divisions were abolished, nor their regiments converted to air brigades, as of yet. As well, some independent air regiments became air brigades.

A total of 16 combat air brigades operate two-seat multi-role aircraft, which include J-11BS, J-16, JH-7A and Su-30MKK aircraft. These units do not appear to have a company leader-grade flight squadron of 2-4 trainers, as do other similar units. China's current production rate of two seat combat aircraft is enough to outfit approximately six air brigades by 2021 (three each of J-11BS and J-16). This would permit a slight expansion of the number of two seat multi-role air brigades reporting to Bases with operational areas of responsibility. The 31st Air Brigade provides an example of a typical unit. The 31st was upgraded from the 31st Air Regiment sometime around July of 2017. They operate the JH-7A, and are based at Siping (四平), Jilin Province, and therefore is assigned to the Northern TCAF. It probably is in the Dalian Base area of responsibility.[41]

31st Air Brigade JH-7A

Approximately 42 combat air brigades operate single-seat fighter, fighter-reconnaissance or ground attack aircraft. Eleven of these operate wholly obsolete J-7H, J-7D, J-7IIM, or Q-5 aircraft types. An additional 12 operate obsolescent J-7E, J-7G or J-8 aircraft types. The remaining 19 air brigades operate modern, generally multi-role J-10, J-11 (except J-11BS), J-20, Su-27SK and Su-35 aircraft as their main type. These 19 air brigades operating modern aircraft types are the most important air defense assets of PLAAF. They are further supplemented by 16 other air brigades which operate modern two seat aircraft types, by the 23 air brigades operating older single seat aircraft types, and by the PLAAF's SAM branch. The 19 air brigades with modern multi-role aircraft also have a powerful strike capability widely deployed in all five TAFs. All air brigades with single seat primary aircraft also have a have a company leader-grade flight squadron of 2-4 two-seat trainer aircraft. One possible reason so many air brigades still operate old aircraft types is perhaps to preserve these organizations because the PLAAF does not intend to continue to shrink its manned combat aircraft force any further. One indication of this is the creation of several transition training brigades. Two of them train former day fighter pilots in "night" (all weather) navigation, and the third trains former day pilots to operate aircraft with modern displays and weapons. In the near term, it is likely that most of the air brigades operating obsolete or obsolescent aircraft types will upgrade to more modern types.

China is producing enough aircraft to allow six of these single seat combat air brigades to convert to two seat combat air brigades by 2021. The remaining 17 air brigades operating older aircraft types are likely to upgrade to J- 10B, J-10C, J-11D or J-20 modern single seat aircraft types. China might another 24 Su-35s by then, as required by their contract with Russia, but it also might export a batch of 24 J-10As to Pakistan. Regardless of details, it is likely the force of air brigades

with single-seat multi-role aircraft will decline to 36 mainly because six of them will convert to two-seat aircraft. The total force of about 60 air brigades assigned to command bases with operational areas of responsibility is likely to remain about that size in the next few years. A typical single-seat unit is the 140th Air Brigade, which operates the J-10A and JJ-7A and J-10SY. This unite was upgraded from the 130th Air Regiment around July 2017. It is based at Mengzi (蒙自), Yunnan Province, and is assigned to the Southern TCAF. It is in the Kunming Base area of responsibility.

130th Air Brigade J-10A

In addition to the combat air brigades, there several other types of brigades. These include:

- 16 non-combat aircraft brigades that are part of training Bases or flight colleges.
- 6 Transport & Search and Rescue (SAR) brigades (交通运输和搜救旅) – one is assigned to each of the five TCAF Headquarters and one to the PLAAF Headquarters.[42] The Western TCAF had a Transport & SAR brigade, which was a regiment until early 2018 when it was likely upgraded to a brigade.[43]
- 1 support brigade consisting of reconnaissance JZ-8s
- 7 brigades associated with R&D or tactical opposition training
- 3 UAV brigades and one "Attack Brigade" of unmanned supersonic J-6W drones.

There are also two probable transition training brigades attached to TCAF HQ. It is possible up to three more will be converted from single-seat fighter or ground attack brigades, such that each TCAF would have one.

An example of one of these brigades is the Eastern TCAF Transport & SAR Brigade. Based at Lukou, Nanjing City, Jiangsu Province (南京市/禄口市), it operates Z-8K, Mi-171v7 Salon, Y-5C (STOL), Y-7G and Z-9B fixed-wing aircraft and helicopters. It reports directly to the Eastern TCAF HQ.[44]

Z-8K of Eastern Theater Command Transport & SAR Brigade

Mi-Mi-171 of Eastern Theater Command Transport & SAR Brigade

UAV brigades are poorly understood. They rarely, if ever, parade on an open runway as a unit. There appears to be one unidentified unit at Xingtai, Hebei, which is reported to be under direct PLAAF HQ command. Additionally, there are two other brigades, the 151st and the 178th, which may fall under a TCAF command, but may be directly subordinate to PLAAF HQ. It seems possible that there are, or soon will be, similar units under all five TCAF HQs.

An illustrative example is the 151st. Its main Base seems to be at Cangzhou/Cangxian (沧州/沧县) in Hebei Province.[45] It appears to operate a variety of UAVs, including the BZK-007 and the new EA-01.[46] Apparently there is a forward detachment of the latter at Shuangliao, /Jilin (双辽/吉林). It may also operate the GJ-1/WD-1/WJ-1 family of UAVs.

151st Brigade Main Base at Cangzhou/Cangxian 沧州/沧县

151st Brigade Forward Operating Base at Shuangliao/Jilin 双辽/吉林

There is also a unique Transportation Aviation Brigade (空降兵运输航空兵旅) dedicated to supporting the PLAAF Airborne Corps, which was formerly called the PLAAF 15th Airborne Corps (中国人民解放军空降15兵军) until the reorganization announced on 28 April 2017. It appears that the use of "15th" has been abolished.[xii] This force has been entirely reorganized as brigades, similar to a PLA Ground Force Group Army. It has six air-mobile or air-transportable combined-arms brigades, a special operations brigade, a strategic support brigade, and the Transportation Aviation Brigade with both fixed wing and rotary wing aircraft.[47] The Transportation Aviation Brigade was apparently created in April 2017.[48] Although the brigade was created in April, there were still references to a separate Helicopter Regiment (直升机团) as late as October 2017.[49] Since then, there have been no references to a regiment or to possible helicopter flight groups subordinate to the Transport Aviation Brigade. As a result, it is not clear what the current organizational structure status is for the helicopters. Specifically, it is unclear if it has remained as a separate regiment, been upgraded to a brigade, or had its subordinate flight groups been subordinated to the Transport Aviation Brigade.

The Aviation Brigade permits the Airborne Corps to engage in continuous training for all kinds of operations: airborne, air-mobile and air-transportable. The Aviation Brigade is too small to support the entire Airborne Corps in a single operation. Major operations requiring more aircraft would require augmentation by other air transport units. PLAAF has three air transport divisions and six Transport & SAR brigades. Additionally, the CAAC (Civil Aviation Authority of China) can provide civilian air transport assets without meaningful limit. The Airborne Corps also has a regime preservation mission, a mission it performed in 1989 when a division was sent to Tiananmen Square. Common analysis that the Airborne Corps could only deploy one former division is likely incorrect. It is unlikely that more than four airborne brigades augmented by elements of the Special Operations Brigade and the Support Brigade would participate in a single operation because of the requirement to have brigades available to defend the regime.

xii Unlike the U.S. military, the PLA's Airborne Corps have always been subordinate to the Air Force rather than the Army. In July 1950, the CMC established an Air Force Marine (空军陆战) brigade in Shanghai, but the headquarters was moved to Kaifeng, Henan Province, the following month. Thereafter, the unit's designation changed several times, becoming the Air Force Marine First Division, the Paratroops Division, and the Airborne Division. In 1961, the name was finally changed to the 15th Airborne Corps and had its headquarters in Xiaogan, Hubei Province. By the mid-1970s, the airborne corps had three airborne divisions. During the Cultural Revolution (1966-1976), the Airborne Corps was used to intervene in domestic unrest during the Wuhan Incident of 1967. In the mid-1980s, the three divisions were reduced to brigades, but were again upgraded to divisions in 1993, each with about 10,000 troops. *PLAAF 2010 Handbook*, Chapter 11.

Section 8: The PLAAF Development, Production, and Rebuild Process

The PLAAF partners with the Aviation Industry Corporation of China (AVIC / 中国航空工业总公司) and Commercial Aircraft Corporation of China (COMAC / 中国商用飞机有限公司) as well as various aviation companies and academic institutions with aviation departments to design, develop, build, and rebuild aircraft for the PLAAF and other military services. The typical military aircraft design may be of PLAAF, e.g. J-20, or company, e.g. FC-31, origin. At least three airframes are normally built first: a non-flying static test airframe which never leaves the primary manufacturer's factory, and two prototype aircraft. These will initially be flown by civilian test pilots or PLAAF test pilots at the factory to insure basic flight characteristics are understood. Those test flights may lead to redesign and to the building of one or more additional prototypes. Very complex aircraft, e.g. AEW or EW types, may also have an electromagnetic test airframe built. This is similar to a static test airframe outfitted with the electronic systems which need to be tested; this may or may not be a flying prototype. Such a prototype, if flying, will usually end up in storage at the China Flight Test Establishment (CFTE) at Xi'an Yanliang discussed later.

The PLAAF has three primary flight test and training organizations.

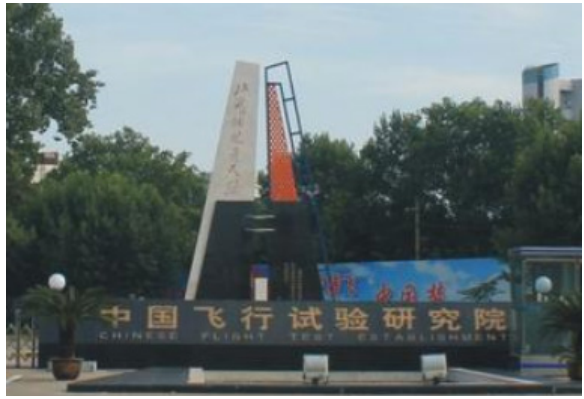
- Flight Test Regiment (试飞团), Xi'an Yanliang, Shaanxi Province with Subordinate Test Flight Groups (试飞大队) at six aircraft factories
- Flight Test and Training Base (飞行试验训练基地), Dingxin, Gansu Province
- Flight Test and Training Base (飞行试验训练基地), Cangzhou (aka Cangxian), Hebei Province.

All three of them are directly subordinate to PLAAF Headquarters; however, it is not clear which first-level departments (Staff Department and/or Equipment

Department) and second-level bureau(s) with the first-level department manage the organizations. It may be a combination of a bureau under the Equipment Department being responsible for the equipment component and a bureau under the Staff Department being responsible for the pilots and test flights.

Besides the flight test regiment at Xi'an Yanliang, the PLAAF has two flight test and training Bases (FTTB), one at Dingxin and one at Cangzhou, Unfortunately, Air Force News and other PLA media sources identify both simply as a PLAAF test and training Base (空军试训基地), so it is sometimes difficult to tell which Base is being discussed. In some cases, however, an article refers to the Base in "northwest China" (西北) or "north China" (华北) to indicate Dingxin or Cangzhou, respectively.

The PLAAF's Flight Test Regiment at Xi'an Yanliang (西安市阎良区) has a long history dating back to the 1950s and is closely linked to the PRC's aviation industry. In 1959, the 2nd Ministry of Machine Industry's 4th (Aviation) Bureau created what it officially calls in English the China Test Flight Establishment (CFTE / 中国飞行试验研究所), which is perhaps better translated as China Flight Test Research Institute. China Test Flight Establishment is used for the foreign community (对外称), but it is identified as the China Aviation Industry Test Flight Center (中航工业试飞中心) for internal purposes. Sometime after 1984, the Chinese name changed to China Flight Test Research Academy (中国飞行试验研究院); however, it retained the same English name (China Flight Test Establishment) and acronym (CFTE).[50] It still retains the same internal name, China Aviation Industry Test Flight Center. To further confuse the issue, it is also known internally as the AVIC 630 Research Institute (630所).[51]



中国飞行试验研究院
CHINESE FLIGHT TEST ESTABLISHMENT

China Test Flight Establishment Headquarters Sign and Website Logo

According to one Chinese website, "Founded in 1959, the China Flight Test Establishment is the only test flight agency in China that takes the certification of civil and military aircraft, aero engines, airborne equipment and other national-level test flights and civilian aircraft. Over the past 40 years, it has undertaken more than 90% of the test flights of new and retrofitted aircraft and engines developed by China. It has completed testing of 29 types of aircraft and 25 types of engines. It has established cooperative relations with more than 10 countries and regions, including the United States, France, Russia, Britain, Italy, South Korea, and Singapore."[52] CFTE is also responsible for overseeing test flying all PLA fixed wing and rotary wing aircraft, including the J-10, J-20, Y-20, and Z-20.[53]

Prototype PLAAF J-20 Fighters at Xi'an Yanliang

In the 1950s, the PLAAF loaned pilots to the Aviation Industry Bureau to test fly new aircraft.[54] In June 1956, the Flight Research Academy (飞行研究院) was established with support from the Soviet Union at Xi'an Yanliang by converting the PLAAF's 11th Aviation School (第11航校). In the beginning, the Research Academy belonged to the Ministry of National Defense's (MND) 1st Ministry of Machine Industry (MMI). In September 1960, it was transferred to joint control by MND's 3rd MMI, the National Defense Science Commission (国防科委), and the PLAAF. In July 1961, it changed its name to a Flight Research Institute (飞行研究所). From August 1969 to August 1973, the PLAAF took control as the PLAAF Test Flight Base (空军试飞基地), and the PLAAF formed a Test Flight Regiment (试飞团). In August 1973, the Test Flight Base reverted to the 3rd MMI and changed its name back to the Test Flight Research Institute. The Test Flight Regiment became subordinate to the Research Institute leadership, but the structure remained under the PLAAF.

The Test Flight Regiment, which is subordinate to the former PLAAF Headquarters' Headquarters Department's Training Department, the current PLAAF Staff Department's Training Bureau, has its own subordinate Test Flight Group at Xi'an Yanliang that conducts test flights on one of the later prototypes for each new type of PLA aircraft.[55] It is not clear who test flies the prototype civilian aircraft. Each new military aircraft prototype has to pass through that stage of testing and be approved each step along the way by a Design Finalization Committee (定型委员会).

The Test Flight Regiment has at least six Test Flight Flight Groups (试飞大队), including one at each of the following aircraft factories: Shenyang, Liaoning Province (1st Flight Group), Harbin, Heilongjiang Province (2nd Flight Group), Chengdu, Sichuan Province (3rd Flight Group), Hongdu, Jiangxi Province (4th Flight Group), Anshun, Guizhou Province (5th Flight Group), and Chenggu, Shaanxi Province (6th Flight Group). Although each flight group is a battalion leader-grade organization, they are organized like a regiment leader-grade organization because of their mission. Each factory also has what is called a Test Flight Station (试飞站), which is run by the factory civilians, has civilian test pilots, and has at least three maintenance groups manned by civilians.

Today the Xi'an flight test organization includes four regiments (1st, 2nd, 3rd, and 4th). The 1st and 2nd regiments operate JL-8 and JL-9 respectively, for basic and intermediate training of test pilots. The 3rd regiment operates J-16, JH-7 & JH-7A, and J-8D flight group, probably for advanced transition training of test pilots. The remaining regiment, likely the 4th, probably serves as a transport/utility

organization (with Y-8C, two stripped Z-8Fs and a Z-9C). Two former regiments (the ex-13th and ex-14th) are physically still located at Xi'an. But they have been upgraded to air brigades (the 170th and 172nd) and are apparently subordinated to PLAAF HQ Staff Department Training Bureau Flight Training Division (空军参谋训练局飞训处). In addition, there is the unique, and very small, Flight Test Regiment (with typically only 4-6 pilots). This is subordinate to the PLAAF Staff Department Test Flight Bureau (空军参谋部试飞局). In addition to aircraft in these units, Xi'an maintains inactive testbed aircraft for occasional use testing new equipment. Identified inactive aircraft include 1xIL-76LL, 1xMa-60H, the KJ-2000 prototype, the A-501 prototype, 1xQ-5J, 2xH-6A, 1xJ-7FS, 5xJ-7I, and 1 each Y-7100/200.[56]

In 1958, the PLAAF built a large base for testing its surface-to-air missiles (SAMs) in the Gobi Desert near Dingxin (鼎新), Gansu Province.[57] During the mid-1990s, the PLAAF began expanding this base, currently known as the Flight Test and Training Base (飞行试验训练基地 or空军试训基地), to include a large tactics-training center where multiple PLAAF units could practice combat methods developed at operational units and the tactics developed at Cangzhou and various operational units. Dingxin is sometimes referred to as the PLAAF Northwest Tactics Training Base (空军西北战术训练基地).

In June 1999, the PLAAF created the Air Force Combined-arms Tactics Training Center (空军合同战术训练中心) in the Badain Jaran Desert (巴丹吉林沙漠), which spans Gansu, Ningxia, and Inner Mongolia.[58] In the same year, it successfully completed a multi-force exercise under high-tech conditions. In December 2003, the Central Military Commission (CMC) approved the creation of the PLAAF's 1st, 2nd, and 3rd Test and Training Bases (军空军第一、二、三试验训练基地) and a Combined-arms Tactics Training Center (空军合同战术训练中心). The opening ceremony was held on 6 January 2004, and the mission was identified as merging research, testing, training, and combat. At that time, the three Base names were changed to the 1st, 2nd, and 3rd Test and Training Areas (试验训练区). The 1st and 2nd Areas and the Combined-arms Tactics Training Center are located in Inner Mongolia, and the 3rd Area is located in Gansu Provinces' Zhangye Prefecture's Shandan County (甘肃省张掖市山丹县).

Today, all four of these organizations have been consolidated under the PLAAF Test and Training Base (空军实验训练基地), which is a corps leader-grade organization. Like the three flight colleges, it is also organized the same way as an operational unit with a Headquarters Department, Political Department, Logistics Department, and Equipment Department. Each of the areas and the

test and training center were previously division leader-grade organizations with subordinate regiments; however, with the shift to a brigade structure, it appears that each of the three areas and the test and training center have most likely been upgraded to corps deputy leader grade.

Over the past few years, the PLAAF has held each of the "four key training brands" (四大品牌) competitions and exercises at the Dingxin Test and Training Base. These include the Golden Helmet (金头盔) military competition and the Red Sword (红剑) exercise, which have been held only at Dingxin, as well as the Golden Dart (金飞镖) military competition and the Blue Shield (蓝盾) exercise which includes the Golden Shield (金盾) competition, which have been held at Dingxin as well as in other locations.[xiii]

As with the Xi'an Yanliang Flight Test Regiment, the Dingxin FTTB is also directly subordinate to the PLAAF Headquarters' Staff Department, and not subordinate to the Western TCAF Headquarters.

The Dingxin Test and Training Base appears to have at least four subordinate air brigades. The 65th Air Brigade appears to be the former Special Mission Testing Regiment. The 66th Air Brigade, whose patch is shown below, appears to be the former operational trials regiment. It also had J-20s until January 2018. Both units appear to be part of the Blue Force "Imaginary Enemy of Chinese Air Force" program, whose patch is shown below. This force may include the 67th Air Brigade and the 151st UAV Brigade at Cangzhou.[59]

xiii See CASI's "China's Four Training Brands", May 2018, for further information.

In 1987, the PLAAF abolished the 11th Aviation School/College at Cangzhou (沧州) airfield near Tianjin and replaced it with a division leader-grade Flight Test and Training Center (飞行试验训练中心 or空军试训中心).[60] Today, it is identified as a PLAAF FTTB (空军飞行试验训练基地 / 空军试训基地), which is also called a Flight Test and Training Center (FTTC/飞行试验训练中心), that has been upgraded to either corps deputy leader grade or corps leader grade. It has three primary missions:

- Test new aircraft under development by the aviation ministry;
- Train the initial cadre of pilots in new types of aircraft before the aircraft are deployed to an operational Base for the first time;
- Devise new air-combat tactics.

It is not clear if the Cangzhou Test and Training Base is a corps leader-grade or corps deputy leader-grade organization; however, it is directly subordinate to the PLAAF Headquarters' Staff Department's Training Bureau.[61] It is not subordinate to the Northern TCAF HQ. The Base appears to have four subordinate air brigades (67th, 170th, 171st, and the 172nd)[xiv] as well as the 151st UAV Brigade. According to various Kongjun Bao articles, Cangzhou previously had three air regiments, numbered the 1st, 2nd, and 3rd. Each regiment had subordinate flight groups and maintenance groups (机务大队).

The 171st Air Brigade operates one flight group of J-11B and two flight groups of J-7E. The 172nd Brigade operates one flight group of Su-30MKK and two flight groups of J-16. The 172nd appears to serve as opposition force (OPFOR) units, what the PLAAF calls its "Blue Force". At the same airfield, the 151st UAV Brigade probably provides support for all the PLAAF Test and Training Base activities as well as testing new UAV types.[62] Although the Base was initially constructed in 1953, the facility spent its first few decades evolving and expanding to reflect Chinese military modernization. In the late 1980s and early 1990s, the Base solidified its role as the facility for elite pilot training.[63]

While Western militaries traditionally train against a unit or collection of units that plays the role of the OPFOR and labels these OPFOR elements the "Red Force" (红军), the Chinese OPFOR is known as the "Blue Force" (蓝军). Reportedly, their unit motto is "Think and fly like the enemy" (像敌人那样思考和飞行).[64] According to one PLA Daily article, the PLAAF's J-10 "Blue Force"

xiv The 67th Air Brigade is thought to be the former Cangzhou OPFOR Regiment and may have been its First Regiment. The 151st UAV Brigade is thought to be a relatively new unit rather than an upgraded Cangzhou FTTB regiment. The 170th Air Brigade is thought to be the former Cangzhou 13th Regiment. The 171st Air Brigade is thought to be the former Changzhou Dissimilar Air Combat Regiment and may have been its Second Regiment. The 172nd Air Brigade is thought to be the former Cangzhou 14th Regiment. There are so many aircraft at Cangzhou that the former Third Regiment aircraft may well be among them, but not associated with an identified Air Brigade.

plays the role of a realistic simulated opponent in "free air combat training," thus helping address the problem of PLAAF units "training against an invisible opponent, and fighting in an unrealistic environment."[65] Reportedly, PLAAF "Blue Force" training simulated Soviet Union Air Force units at first, and the OPFOR elements later switched to playing the role of Taiwan and the United States as the simulated adversaries.[66]

In addition to providing realistic training via OPFOR units, Cangzhou's FTTB gives the PLAAF a venue for developing modern air combat tactics. PLA media reports indicate that Cangzhou FTTB is responsible for development of tactics and techniques, training programs, and certification of new equipment. Specifically, Cangzhou is where the PLAAF further develops tactics that originate on paper at the PLA Air Force Command College in Beijing. Although exact documentation of this process is scant, it seems that Cangzhou's elite training units have the responsibility for translating top-down, doctrinal guidance into air combat tactics.[67]

Additionally, the testing component of Cangzhou's mission also refers to testing one final prototype of all new fighter aircraft models before they are approved for delivery from the factory to an operational unit. At some point during the testing phase, one prototype is sent to the Xi'an Yanliang Airfield, discussed above. After the prototype completes its testing at Xi'an Yanliang, it is usually then sent to the PLAAF's FTTB at Cangzhou, where it is tested for tactics capabilities.[xv]

xv PLA Air Force pilots have been the ones to test fly almost all new combat aircraft at the factories, as illustrated by the examples of the J-7 and J-10. Each factory has what is called a test flight station (试飞站), which is run by the factory civilians and has at least three maintenance groups (dadui) manned by civilians. The PLAAF has a Test Flight Regiment (试飞团), which was formed in 1973 and is assigned to Xi'an Yanliang airfield, where test flights are conducted on one of the later prototypes. It has to pass through that stage of testing and be approved each step along the way by a Design Finalization Committee (定型委员会). The PLAAF has at least six Test Flight Groups (试飞大队), each of which are small (battalion size) but are regiment-grade units, assigned to the aircraft factories as follows: Shenyang (1st Group), Harbin (2nd Group), Chengdu (3rd Group), Hongdu (4th Group), Anshun (5th Group), and Chenggu (6th Group). Information from unpublished PLAAF TO&E, PLAAF TO&E 2018 (database), Sid Trevethan, February 2018.

Acknowledgements

This paper is based on several unpublished databases maintained by Sid Trevethan. Maintenance of which involves nearly daily consultation with international experts, including: Andreas Rupprecht, Henry Boyd, and Xinhui Andy Chan. Support was also provided by Jaap Dijkstrat and Dennis K. Blasko. Most of all, the author wishes to recognize the tireless and patient support of CASI's Research Director, Kenneth W. Allen, who edited and facilitated the entire project.

Appendix 1: Key Terms

Three key PLAAF terms are combat aircraft (作战飞机), supporting aircraft (保障飞机), and frontline (前线), each of which is defined below.

"Combat aircraft are equipped with onboard weapons and special equipment, which are used for anti-air, anti-ground, anti-surface, and anti-subsurface objects, They are used for attack or direct combat support missions. Combat aircraft primarily include fighters, fighter-attack aircraft, attack aircraft, bombers, UAVs, anti-submarine patrol aircraft, airborne command aircraft, command communications aircraft, early warning aircraft, and reconnaissance aircraft, etc."[68]

"Supporting aircraft are aircraft that support combat. These aircraft include transport aircraft, aerial refueling aircraft, search and rescue aircraft, observation aircraft that observe the ground from the air, medical aircraft, and trainers."[69]

"Frontline" is defined as "areas where the PLA engages the enemy directly and normally involves first line units (第一线部队) implementing combat missions."[70]

Appendix 2:
Air Brigades and Combat Aircraft

This appendix consists of four tables. Table 8 lists various non-fighter or ground-attack aviation brigades. Table 9 provides information on all 59 combat aircraft air brigades that have been created from 2011-2018. The table is organized by the five TCAFs in protocol order, followed by the Bases, former air divisions, current air brigades, their location, and the type of airframe. Table 10 provides information on the PLAAF's Aircraft Fleet as of February 2018. Table 11 provides a list of PLA UAV's as of 2018.

Table 8: Aviation Brigades

Subordination	Brigade Name	Location (City & Province)	Airframes
PLAAF HQ	Tnsp & SAR Bde UAV Bde 65th Bde[71] 66th Bde[72] 67th Bde[73] 151st Bde[74] 170th Bde[xvi] 171st Bde[xvii] 172nd Bde[xvii]	Unknown Xingtai, Hebei Dingxin, Gansu Dingxin, Gansu Dingxin, Gansu Cangzhou, Hebei Cangzhou, Hebei Jiugucheng, Jinan Cangzhou, Hebei Cangzhou, Hebei	Z-8K, Mi-171, Y-5C, Y-7 BZK-007, EA-01, GJ-1, WD-1, WJ-1 Multiple[xix] J-16 J-11B, JL-9 UAV J-10B, J-10S J-11BS, J-7E, JL-9 J-16, Su-30, JL-10
Airborne Corps	Aviation Bde Helicopter Dadui	Yingshan, Hubei Yingshan, Hubei	Y-5, Y-7, Y-8, Y-12 Z-8KA, Z-9WA, Z-10K
Eastern TCAF HQ	95th Tnsp Tng Bde Tnsp & SAR Bde	Luanyungang, Jsu Xushou, Jiangsu Nanjing, Jiangsu	J-11B, J-11BS JJ-7, JJ-7A Z-8K, Mi-171, Y-5A/C, Y-7
Southern TCAF HQ	132nd Tnsp Tng Bde Tnsp & SAR Bde	Gongzhuling, Jilin Unknown	JJ-7, J-7II Z-8K, Mi-171, Y-5C, Y-7
Western TCAF HQ	Tnsp & SAR Bde	Lanzhou, Gansu	Z-8K, Mi-171, Y-5C, Y-7H
Northern TCAF HQ	33rd Tnsp Tng Bde 151st UAV Bde Tnsp & SAR Bde	Dali, Yunnan Cangzhou, Hebei Xintai, Hebei	JJ-7, J-7II BZK-007, EA-03xv Z-8K, Mi-171, Y-5, Y-7, Z-9
Central TCAF HQ	Tnsp & SAR Bde	Unknown	Z-8K, Mi-171, Y-5C, Y-7

xvi Command relationships may be complex. See Test and Training Bases Section. Primary relationship probably with the PLAAF Headquarters Training Bureau (人民解放军空军司令部训练局).
xvii Ditto
xviii Split unit at Luanyungang, Jiangsu.
xix J-7H, J-7IIM, J-8F, J-10C, J-10D, J-10SY, J-11B, J-16, JH-7A, Q-5L Q-5N, JJ-7A, JL-10, Y-8, & Y-9.

Table 9: Combat Aircraft Air Brigades Created since 2012[75]

A question mark, "?", indicates unconfirmed but likely status at time of publication

TCAF	Base	Former Division	Brigade	Location (City & Province)	Airframes
Eastern	Shanghai	3rd (abolished)	7th	Wuhu, Anhui	J-16
	Shanghai	3rd (abolished)	8th	Changxing, Chejiang	J-10A, J-10SY
	Shanghai	3rd (abolished)	9th	Wuhu, Anhui	J-20, Su-30MKK
	Fuzhou	14th (abolished)	40th	Nanchang, Jiangxi	J-16
	Fuzhou	14th (abolished)	41st	Wuyishan, Fujian	J-11A/B, Su-27U
	Fuzhou	14th (abolished)	42nd	Zhangshu, Jiangxi	J-7EG, JJ-7A
	Shanghai	28th (abolished)	83rd	Hangzhou, Zhejiang	JH-7A, Q-5J
	Fuzhou	New Formation	180th	Liangcheng, Fujiang	J-6W [Atk Drone]
Southern	Nanning	2nd (abolished)	4th ?	Foshan, Guangdong	J-8DF, JJ-7A
	Nanning	2nd (abolished)	5th	Guilin, Guanxi	J-10B/C, J-10SY
	Nanning	2nd (abolished)	6th	Suixi, Guangdong	Su-27, Su-35
	Nanning	8th (still active)	23rd	Leiyang, Hunan	H-6U
	Nanning	9th (abolished)	25th	Shantou, Guangdong	J-7E, JJ-7A
	Nanning	9th (abolished)	26th	Huiyang, Guangdong	J-10A, J-10S
	Nanning	9th (abolished)	27th ?	Shantou, Guangdong	J-7D, JJ-7A
	Nanning	18th (abolished)	52nd	Wuhan, Hubei	J-7H, JJ-7A
	Nanning	18th (abolished)	54th	Changsha, Hunan	Su-30MKK
	Kunming	32nd (abolished)	96th	Dazu, Chongqing	J-7E, JJ-7A
	Kunming	33rd (abolished)	98th	Chongqing Municipality	Su-27S, Su-27U
	Kunming	33rd (abolished)	99th	Chongqing Municipality	J-7IIM?, JJ-7A
	Kunming	44th (abolished)	130th	Mengzi, Yunnan	J-10A, J-10SY
	Kunming	44th (abolished)	131st	Luliang, Shanxi	J-10B, J-10C J-10SY, JJ-7A
Western	Lanzhou	6th (abolished)	16th	Yinchuan, Ningxia	Su-35S, J-11, Su-27SK/UBK
	Urumqi	38th (abolished)	112th	Malan, Xinjiang	J-7II, JJ-7A
	Urumqi	Unknown	178th	Malan, Xinjiang	UAV
Northern	Dalian	1st (abolished)	1th	Anshan, Liaoning	J-11B, J-11BS
	Dalian	1st (abolished)	2th	Chifeng, Inner Mon.	J-10A, J-10SY
	Dalian	1st (abolished)	3rd	Anshan, Liaoning	J-8F, JJ-7A
	Jinan	5th (abolished)	15th	Weifang, Shandong	JH-7A
	Dalian	11th (abolished)	31st	Siping, Jilin	JH-7A
	Dalian	11th (abolished)	32nd	Dalian, Liaodong	Q-5N?, Q-5J?
	Jinan	12th (abolished)	34th	Gongzhuling, Jilin	J-10A, J-10SY
	Jinan	12th (abolished)	35th	Qihe, Shandong	J-8B, JJ-7A
	Jinan	12th (abolished)	36th	Gaomi, Shandong	J-10A, J-10SY
	Jinan	19th (abolished)	57th	Shanqiu, Henan	J-11B, Su-27SK
	Jinan	21st (abolished)	61st	Yanji, Jilin	J-10B, J-10SY
	Dailan	21st (abolished)	63rd	Mudanjiang, Heilongjiang	J-7H?, JJ-7A
Central	Datong	7th (abolished)	19th	Jining, Shandong	J-11B, J-11BS
	Datong	15th (abolished)	43rd	Datong, Shanzi	J-10A, J-10SY
	Datong	15th (abolished)	44th	Hohhot, Inner Mon.	J-7G, JJ-7A
	Nanning	18th (abolished)	53rd	Wangdangshan, Hubei	J-7IIM, JJ-7A
	Wuhan	19th (abolished)	55th	Jining, Shandong	J-11A, Su-27U
	Wuhan	19th (abolished)	56th	Zhengzhou, Henan	J-10B, J-10SY
	Wuhan	24th (abolished)	70th	Zunhua, Hebei	J-10A, J-10SY
	Wuhan	24th (abolished)	71st	Xishan, Beijing	J-7H, JJ-7A
	Wuhan	24th (abolished)	72nd	Tianjin Municipality	J-10C, J-10SY

Table 10: PLAAF Aircraft Fleet Feb. 2018[76]

A question mark, "?", indicates unconfirmed but likely status at time of publication

Role	Model	Combat Unit Quantity	Support Unit Quantity	Spares in Units	PLAAF Total	Notes
Multi-Role	J-10B	96	0	24	128	
	J-10C	60	0	14	83	
	J-11	40	0	10	50	May upgrade to
	J-11A	72	0	14	86	J-11A
	J-11B	92	0	22	134	
	J-11BS	116	0	26	159	
	J-20	18	8	2	33	
	Su-30MKK	62	0	012	74	
	Su-35S	18	0	01	19	+5 for 2018 delivery
Bomber	H-6H	48	0	4	62	
	H-6K	78	0	9	92	
	H-6M	30	1	4	35	
Strike	J-16	68	0	16	89	
	JH-7A	144	0	36	219	
	Q-5L	32	4	6	42	
	Q-5N	32	4	6	42	
Fighter	J-7IIM	58		0	58	
	J-7D	24		3	27	
	J-7E	120		24	174	
	J-7EH	8		2	10	
	J-7G	42		10	82	
	J-7H	148		36	184	
	J-10	24		6	31	
	J-10A	192		48	254	
	Su-27SK	16		4	20	
Interceptor	J-8D	12		2	14	
	J8-F/DF	100		18	128	
	J8-H/BH/DH	56		14	80	
Specialized	H-6U		12		12	Tanker
	HY-6		12		12	Tanker
	J-10AY		9		9	Air Show Variant
	JZ-8		8		8	Photo Recon
	JZ-8F		72		72	Armed Recon
	KJ-200		4		4	AEW
	KJ-500		3		3	AEW
	KJ-2000		4		4	AEW
	Tu-154MD		10		10	ELINT +1 per year
	Y-8CA		1		1	ELINT
	Y-8CB		4		4	EW
	Y-8E		1		1	Drone Launcher
	Y-8G		7		7	EW
	Y-8GX4		8		8	ELINT
	Y-8H1		1		1	R & D
	Y-8T		5		5	Command Post
	Y-8XZ		4		4	PSYOPS & EW
	Y-9G		1		1	AEW
	Y-12C		2		2	Survey

Trainer	CJ-6		72		72	Basic Trainer
			108		118	Basic Trainer
	CJ-6A		2		2	Bomber Trainer
	HYJ-6		2		2	Bomber Trainer
		44	0	6	55	Combat Capable
	HYJ-7		48	12	61	
	J-10SY		80	4	84	
	JJ-7		298		298	
	JJ-7A		66	4	70	
			14		19	
	JL-8		170		0	
	JL-9		27		27	Combat Capable
		8	1		9	Combat Capable
	JL-10	16	0		16	Combat Capable
			36		36	Bomber Trainer
	L-11		8		13	Parachute Trainer
	L-15					
	Q-5J					
	Su-27UBK					
	Y-5D					
	Y-12D					

Transport	An-30		6		6	
			8 & 2	1	9 & 2	
	737-700/800		2		2	
	737-CP		5		5	Command Post
	CRJ-200		5		5	
	CRJ-700		14		14	
	Il-76		4		4	
	Il-78		2 & 1		2 & 1	
	Lear 35/36A		6		6	Conv. to Tu-154MD
	Tu-154M		4		4	
	Y-5		8		8	
	Y-5A		74		74	
	Y-5B		116		116	
	Y-5C		6		6	
	Y-5K		1		1	
	Y-7-100		8		8	
	Y-7-200A		52		62	
	Y-7G		58		78	
	Y-7H		1		1	
	Y-8		66		71	
	Y-8C		18		23	
	Y-9		20		20	
	Y-11		20		20	
	Y-12IV		20		20	
	Y-12F		20		20	
	Y-20		7		12	
Helicopter	AS332L1		6		6	Transport
	EC-225		2		2	Medevac/SAR
	Mi-17vB5		10		10	Transport
	Mi-171v1V		12		12	Transport/Attack
	Mi-171v4		12		12	Transport
	Mi-171vB5		12		12	Transport
	Mi-171B7Sal		20		20	Mi-171B7Salon SAR
	Z-8J		4		4	Combat SAR
	Z-8JH		4		4	Combat SAR
	Z-8K		24		24	Medevac/SAR
	Z-8KA		12		12	Transport
	Z-8KH		4		4	Transport/Utility
	Z-9		21		21	Transport/Utility
	Z-9A		24		24	Transport/Utility
	Z-9B		10		10	Transport/Utility
	Z-9C		2		2	SAR
	Z-9WZ		48		48	Attack
	Z-10K		16		19	SAR
	Z-18		1		6	Attack

UAV	BZK-005		108?[xx]		108?	
	BZK-006		12?	3?	15?	
	BZK-007		24?		24?	
	BZK-009		12?	3?	12?	
	EA-03		16?	4?	20?	
	GJ-1		56?	12?	52?	
	J-6W	100	0	100	460?	Supersonic attack drone
	WD-1		52?		52?	
	WD-1K		12?		12?	
	WJ-1		52?		52?	
	WZ-5		16?		16?	
						AQN-34N Copy

xx

xx A question mark, "?", indicates unconfirmed but likely status at time of publication

Table 11: PLA UAV's 2018[77]

Role	Model	Manufacturer	Nickname	Notes
Anti-Radiation	Harpy JWS-01	IAI IAI	Unknown Unknown	In PLA Army service Modified Harpy in PLA Army Service
Attack	CH-4B CH-5 WJ-1	CSAC CSAC Chengdu	Long Rainbow Rainbow 5 Peterodactyl 1	Armed CH-4A Enlarged CH-4B Export only Armed WD-1
Reconnaissance	AVIC 601-S CH-1 CH-4A EA-03 TA-1000 WD-1 WD-1K WZ-5 WZ-6	SYADI ALIT CSAC Guishou Tengoen Chengdu Chengdu Ryan ASN	Sharp Sword Rainbow 1 Long Rainbow Soar Dragon Unknown Peterodactyl 1 Peterodactyl 1 Firebee Unknown	HALE Rocket Launch, Parachute Recovery MALE MALE In development. MALE. Reaper like configuration Improved WD-1. MALE. AQN-34N Copy ASN-206 with more range
Recon/ELINT	BZK-009	Guizhou	Wind Shadow	
Recon/ELINT/ AEW	BZK-005	HAIG/BUAA	Giant Eagle	HALE
Recon/Attack	BZK-007 GJ-1 HA-1000 TB-1000 WD-1D WD-2	GIAC Chengdu Tengoen Tengoen Chengdu Chengdu	Sunshine Peterodactyl 1 Unknown Unknown Peterodactyl 1 Peterodactyl 2	Armed military variant Armed WD-1 In development In development. MALE. Stealth WD-1 variant in development. Stealth MALE in development.
Recon/AEW/ Attack	BZK-006 Unknown	XATG/ASNT Guizhou	Unknown Soar Dragon	Armed WZ-6. MAME. In development. Global Hawk like.
Tactical	ASN-206 ASN-209 S-100	Tadiran ASN (365 Inst.) Schiebel	Unknown Silver Eagle Unknown	Rocket Launch, Parachute Recovery Rocket Launch, Parachute Recovery Rotary wing. 18 in PLA Navy.

Endnotes

1 US Predicts 42,000 unmanned Chinese military planes by 2023, Ian McPhedan, News Corp Australia Network, 8 July, 2015.

2 *People's Liberation Army Air Force 2010*, National Air and Space Intelligence Center (NASIC), 2010, Chapter 2, Organizational Structure. See also Kenneth W. Allen, "Introduction to the PLA's Organizational Reforms: 2000-2012," in Kevin Pollpeter and Kenneth Allen, eds., The PLA as Organization v2.0, Defense Group Inc., 2013.

3 Kenneth W. Allen, PLA Air Force Organizational Reforms: 2000-2012, RAND, P. 25. Kenneth Allen and Lyle J. Morris, *PLA Naval Aviation Training and Operations: Missions, Organizational Structure, and Training* (2013-15), CASI, December 2017.

4 Information concerning the 14 training brigades was compiled from multiple articles in *Air Force News*.

5 Dong Huiyu and Mou Xianming, eds., *Dictionary of Modern Military Eduction* (sic) (现代军校教育辞典), Second Edition, Beijing, National Defense University, August 2011, p. 481-482. http://www.sohu.com/a/214861084_184797.

6 Yan Jibin, "Training Does Not Stop, Missions Are Not Reduced, and Preparation Is Not Decreased," *AFN*, 22 February 2012, p. 3

7 Kenneth W. Allen, Dennis J. Blasko, John F. Corbett, The PLA's New Organizational Structure: What is Known, Unknown and Speculation (Part 1), Jamestown, P. 2. Although the downsizing was originally scheduled to be completed by the end of 2017, it has now been delayed until 2020.

8 Articles concerning the TCAF Transport and SAR brigades were found in the following issues of Kongjun Bao, respectively: Eastern (14 June 2017, p. 2), Southern (12 July 2017, p. 2), Northern (9 June 2017, p. 1), and Central (12 July 2017, p. 1). The Western TCAF regiment converted to a brigade in early 2018. But was still being identified as of December 2017 (Kongjun Bao, 26 December 2017, p. 1).

9 https://en.wikipedia.org/wiki/PLAAF_Airborne_Corps. On 21 April 2017, a ceremony was held to inaugurate the new airborne brigades and special operations brigade. Kongjun Bao, 28 April 2017, p. 1.

10 Kongjun Bao, 16 June 2017, p. 1.

11 The 16 June 2017 issue of Kongjun Bao had references to both the Aviation Brigade and the Helicopter Regiment. However, no further references have been found for the helicopter regiment or for any helicopter flight groups.

12 See Kenneth W. Allen, *People's Republic of China People's Liberation Army Air Force*, (Washington, DC: Defense Intelligence Agency, DIC-1300-445-91, May 1991), Section 13. The original source was Wang Dinglie and Lin Hu, eds., *China Today: Air Force*, (Beijing: China Social Sciences Press, 1989), Chapter 1.

13 The information in this subsection on the PLAAF's air division and regiment history comes from Kenneth W. Allen, "PLA Air Force: Lessons Learned 1949-2002," in Laurie Burkitt, Dr. Andrew Scobell, and Dr. Larry Wortzel, eds., *The Lessons of History: The Chinese People's Liberation Army at 75*, Carlisle, PA: Strategic Studies Institute, 2003. The original source was *China Today: Air Force* (当代中国空军), Beijing: China Social Science Press, 1989

14 See Kenneth W. Allen, "PLA Air Force: Lessons Learned 1949-2002," in Laurie Burkitt, Andrew Scobell, and Larry M. Wortzel, eds., *The Lessons of History: The Chinese People's Liberation Army at 75*, (Carlisle, PA: U.S. Army War College Strategic Studies Institute, September 2003), Chapter 4, p. 89-157. The original source was Yao Jun, ed., *A History of China's Aviation*, (Zhengzhou: Dajia Publishers, September 1998), p. 163-164.

15 The information in this subsection on the PLAAF's air division and regiment history comes from Kenneth W. Allen, "PLA Air Force: Lessons Learned 1949-2002," in Laurie Burkitt, Dr. Andrew Scobell, and Dr. Larry Wortzel, eds., *The Lessons of History: The Chinese People's Liberation Army at 75*, Carlisle, PA: Strategic Studies Institute, 2003.

16 Yao Jun, ed., *A History of China's Aviation*, (Zhengzhou: Dajia Publishers, September 1998), p, 293.

17 "The Security Situation in the Taiwan Strait," Report submitted by Secretary of Defense William Cohen to the US Senate as directed by the FY99 Appropriations Bill, 17 February 1999. The PLAAF began reducing the number of air divisions from 50 in the late 1980s.

18 Robert Sae-Liu, "PLAAF fixed-wing fleet cut in major restructuring," *Jane's Defence Weekly*, 14 June 2000, 41.

19 *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China*, 2010, Office of the Secretary of Defense.

20 *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China*, 2017, Office of the Secretary of Defense.

21 *People's Liberation Army Air Force 2010*, Dayton, OH: National Air and Space Intelligence Agency (NASIC), 1 August 2010. Chapter 2 (Organizational Structure). Henceforth identified as PLAAF 2010. Kenneth W. Allen, "The Organizational Structure of the PLAAF" in Richard P. Hallion, Roger Cliff, and Phillip C. Saunders, eds., *The Chinese Air Force: Evolving Concepts, Roles and Capabilities*, Washington, D.C.: National Defense University, 2012. Henceforth identified as PLAAF Structure. This chapter updates information in PLAAF 2010 concerning the PLAAF's organizational structure based on new information.

22 Analysis of multiple Kongjun Bao articles and Chinese media reports. United States Department of Defense. Defense Intelligence Agency, *Directory of PRC Military Personalities*. Washington DC, 2017 and forthcoming 2018 publication.

23 "Air Force Major General Wang Kangping Becomes Commander of Air Force Base," 6 February 2018, http://www.thepaper.cn/newsDetail_forward_1991905.

24 Dong Huiyu and Mou Xianming, eds., *Dictionary of Modern Military Eduction* (sic) (现代军校教育辞典), Second Edition, Beijing, National Defense University, August 2011, p. 481-482.

25 https://zh.wikipedia.org/wik/中国人民解放军空军哈尔滨飞行学院

26 Yan Jibin, "Training Does Not Stop, Missions Are Not Reduced, and Preparation Is Not Decreased," *Air Force News*, 22 February 2012, p. 3.

27 Kenneth Allen, "PLA Air Force Male Aviation Cadet Recruitment, Education and Training," *China Brief*, Volume 12, Issue 5, 2 March 2012.

28 Ni Eryan, "PLA Quietly Advances Reforms in Organizations and Structures," Hong Kong *Wen Wei Po Online* in Chinese, 31 December 2011. The Chinese version of the article used the grade of "corps level" (军级), which refers to both corps leader and corps deputy leader. Ni Eryan, "Adequate Preparations Against War Is the Best Means of Preventing It: Trend of Development of the PLA Air Force's Transformation," Hong Kong Wen Wei Po in Chinese, 21 January 2012

29 Kenneth Allen, "PLA Air Force Male Aviation Cadet Recruitment, Education and Training," (Washington, DC: Jamestown Foundation *China Brief*, 2 March 2012), Vol 12 Issue 5.

30 Ni Eryan, "Adequate Preparations against War Is the Best Means of Preventing It: Trend of Develop-

ment of the PLA Air Force's Transformation."

31 Unpublished Operational Chinese Military Aircraft (database), Sid Trevethan, February. 2018.

32 Wang Dinglie and Lin Hu, eds., *China Today: Air Force*, (Beijing: China Social Sciences Press, 1989), p. 503-504. Liu Yazhou and Yao Jun, eds., *A History of China's Aviation: Second Edition* (Hunan: Hunan Science and Technology Press, August 2007), p. 583.

33 Ni Eryan, "PLA Quietly Advances Reforms in Organizations and Structures," Hong Kong *Wen Wei Po Online* in Chinese, 31 December 2011, which can be found in OSC CPP20111231707011. The Chinese version of the article used the grade of "corps level" (军级), which refers to both corps leader and corps deputy leader. Ni Eryan, "Adequate Preparations Against War Is the Best Means of Preventing It: Trend of Development of the PLA Air Force's Transformation," Hong Kong *Wen Wei Po* in Chinese, 21 January 2012, which can be found in OSC CPP20120121788001.

34 The photos come from *AFN*, 12 April 2012, p. 1; *AFN*, 21 March 2012, p. 1; and http://mil.huanqiu.com/weapon/2012-03/2525149.html

35 *Kongjun Bao*, 7 August 2017, p. 2; 9 August 2017, p. 1; and 31 August 2017, p. 1

36 Author's correspondence with Andreas Rupprecht, 24 January 2018.

37 Kenneth W. Allen, "Introduction to the PLA's Organizational Reforms: 2000-2012," in Kevin Pollpeter and Kenneth Allen, eds., *The PLA as Organization v2.0*, Defense Group Inc., 2013. Accessed at www.china.com.cn/military/txt/2012-02/01/content_24523647.htm and http://club.mil.news.sohu.com/new-club/show.php?forumid=shilin&threadid=4114990 on 25 March 2012.

38 Information accessed at http://chn.chinamil.com.cn/jdtp/2011-12/27/content_4754178.htm on 24 May 2012. *China Military Online*, which is available in Chinese and English, is the only authoritative media of the Chinese People's Liberation Army to release military news and comprehensive military-related information on the Internet.

39 Andreas Rupprecht and Tom Cooper, *Modern Chinese Warplanes: Combat Aircraft and Units of the Chinese Air Force and Naval Aviation*, Harpia Publishing, 2012. TTB = Transition Training Base. http://lt.cjdby.net/thread-1534426-1-1.html. http://wenwen.soso.com/z/q348829425.htm.

40 Author's correspondence with Andreas Rupprecht, 21 August 2017.

41 Ibid

42 Multiple *Air Force News* articles and Unpublished Operational Chinese Military Aircraft (database), Sid Trevethan, February 2018.

43 The Western TCAF Transport and SAR Regiment converted to a brigade in early 2018, but was still being identified in December 2017. *Kongjun Bao*, 26 December 2017, p. 1.

44 *Air Force News*, 16 June 2017. 40 So far, transport and SAR brigades have been identified in all five Theater Commands – Eastern, Southern, Western, Northern, and Central. *Air Force News*, 9, 14, and 27 June 2017, and 12, 14, and 26 July 2017.

45 Author's correspondence with Andreas Rupprecht, 18 March, 2018

46 Ibid

47 http://china-defense.blogspot.com/2017/04/15th-airborne-corps-new-orbat.html. A Close Look at Chinese Airborne Troops, *PLA Daily*, 30 August, 2017, P. 1.

48 The 6 April 2017 issue of *Kongjun Bao* has an article about a Transport Aviation Regiment (运输航空兵团), and the 26 April 2017 issue has the first article identifying it as a brigade.

49 *Kongjun Bao*, 11 October 2017.

50 http://www.kaoyancun.com/yanzhao/cfte/xinxi/37959.html.
http://www.sn.xinhuanet.com/fly/YKJS.HTM.

51 http://zhidao.baidu.com/question/192172502.html.

52 http://www.sn.xinhuanet.com/fly/YKJS.HTM.

53 http://www.360doc.com/content/16/0611/12/26166517_566723963.shtml.

54 Kenneth W. Allen, *People's Republic of China People's Liberation Army Air Force*, Defense Intelligence Agency, May 1991, found at https://www.globalsecurity.org/military/library/report/1991/plaaf-index.html. http://www.baike.com/wiki /熊焰. The original source was *China Today: Air Force* (当代空军), Beijing: China Social Sciences Press, 1989.

55 Author's database, as of February 2018

56 Ibid

57 *China Today: Air Force*, Beijing: China Social Sciences Press, 1989, p. 311. Zhang Nongke and Zhang Jinyu, "Air Force Builds Modern, Comprehensive Tactics training Base," *Jiefangjun Bao*, 28 October 1996, "China Builds Airport Copy," *Associated Press*, 28 April 1999

58 https://zh.wikipedia.org/wiki/ 中国人民解放军空军试验训练基地

59 Author's database, as of March 2018.

60 See Kenneth W. Allen, *People's Republic of China People's Liberation Army Air Force*, Washington DC: Defense Intelligence Agency, May 1991, Section 20. Former USAF Chief of Staff General Larry Welch led a delegation on a visit to the center in April 1989. It is often merely identified as a training Base (训练基地) and sometimes as the North China Test and Training Base (华北试训基地).

61 https://zh.wikipedia.org/wiki/中国人民解放军空军飞行试验训练基地.

62 Author's database, as of March 2018.

63 "空军飞行试验训练基地发展简史," PLAAF.net, January 7, 2008, http://www.plaaf.net/Air-Force-History/Growing-history/201004/258.html.

64 "飞起来吧, 我的战机!," *PLA Army News*, November 12, 2012, http://cd.81.cn/content/2012-11/12/content_5094630.htm

65 Zhang Li and Huang Ziyue, "The First Special Duty J-10 'Blue Force' Gives an Extraordinary Performance," *Jiefangjun Bao*, October 20, 2012.

66 Kenneth W. Allen, "PLA Air Force Operations and Modernization," in Susan M. Puska, ed., *People's Liberation Army After Next* (US Army War College, Strategic Studies Institute, 2000), p. 189-254.

67 "飞起来吧, 我的战机!," *PLA Army News*, November 12, 2012, http://cd.81.cn/content/2012-11/12/content_5094630.htm

68 Yao Wei, editor, *China Air Force Encyclopedia* [中国空军百科全书], vol. 2, (Beijing: Aviation Industry Press, November 2005), p. 657.

69 Ibid

70 *PLA Military Terminology* (中国人民解放军军语), Beijing: Academy of Military Science Press, December 2011, p. 83.

71 Command relationships may be complex. See Test and Training Bases Section. Primary relationship probably with the PLAAF Headquarters Training Bureau (人民解放军空军司令部训练局).

72 *US Predicts 42,000 unmanned Chinese military planes by 2023*, Ian McPhedan, News Corp Australia Network, 8 July, 2015.

73 Split unit at Luanyungang, Jiangsu.

74 Command relationships may be complex. See Test and Training Bases Section. Primary relationship probably with the PLAAF Headquarters Training Bureau (人民解放军空军司令部训练局).

75 Author's database, as of February 2018.

76 Ibid

77 Ibid