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CHINA AEROSPACE STUDIES INSTITUTE

TAKING FLIGHT: CHINA'S MILITARY UNMANNED AERIAL VEHICLE (UAV) INDUSTRY

Prepared by BluePath Labs
John S. Van Oudenaren
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Director, China Aerospace Studies Institute,
Air University, 55 Lemay Plaza, Montgomery, AL 36112

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E-mail: Director@CASI-Research.ORG
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ABBREVIATIONS

AFEU	Air Force Engineering University
AOPA	Aircraft Owners and Pilot's Association of China
ASW	Anti-submarine warfare
AVIC	Aviation Industry Corporation of China
BIT	Beijing Institute of Technology
BUAA	Beihang University
CASIC	China Aerospace Science and Industry Corporation
CASC	China Aerospace Science and Technology
CAS	Chinese Academy of Sciences
CAST	China Academy of Space Technology
CATIC	China National Aero-Technology Import & Export Corporation
CCP	Chinese Communist Party
CETC	China Electronics Technology Company
CICC	Chinese Institute of Command and Control
CMC	Central Military Commission
DSTKL	Defense S&T Key Laboratory
EDD	Equipment Development Department
ELINT	Electronic intelligence
EO/IR	Electro-optical and infrared sensors
EW	Electronic warfare
GAD	General Armament Department
HALE	High-altitude long-dndurance
ISR	Intelligence, surveillance, and reconnaissance
LACM	Land attack cruise missile
MALE	Medium-altitude long-endurance
MAME	Medium-altitude medium endurance
MCF	Military-Civil Fusion
MIIT	Ministry of Industry and Information Technology
MOST	Ministry of Science and Technology
NORINCO	China North Industries Group Corporation Limited
NDRC	National Development and Reform Commission
NRIST	Nanjing Research Institute of Simulation Technology
NUAA	Nanjing University of Aeronautics and Astronautics
NUDT	National University of Defense Technology
NWPU	Northwestern Polytechnical University
PLA	People's Liberation Army
PLA AMS	People's Liberation Army Academy of Military Sciences
PLAAF	People's Liberation Army Air Force
PLAN	People's Liberation Army Navy
PLARF	People's Liberation Army Rocket Force
PRC	People's Republic of China
SASTIND	State Administration of Science, Technology and Industry for National Defense
SAR	Synthetic aperture radar
SOE	State-owned enterprise
VTOL	Vertical take-off and landing
UAS	Unmanned aerial system
UAV	Unmanned aerial vehicle
UCAV	Unmanned combat aerial vehicle

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China National Guizhou Aviation Industry (Group) Co., Ltd. 48
Chengdu Aircraft Design and Research Institute 50
AVIC Harbin Aircraft Industry Group Co., Ltd. 53

AVIC Shenyang Aircraft Design and Research Institute 56
Yangzhou Collaborative Innovation Research Institute 60
Jiangxi Hongdu Aviation Industry Group 61
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EXECUTIVE SUMMARY

Unmanned aerial systems (UAS), including unmanned aerial vehicle (UAV) platforms, are a core element of the PRC's military modernization program. The PLA has operated UAVs since the 1950s. While aerial drones are not a new technology, contemporary UAV systems are improving rapidly due to advances in artificial intelligence and machine learning, robotics, image sensing, battery and energy storage, communications and networking technologies, materials science, and aeronautical design and engineering. As a result, modern UAV systems are becoming increasingly capable, versatile, and autonomous.

All PLA services and theater commands now use UAVs for a range of missions. These include, but are not limited to, intelligence, surveillance, and reconnaissance (ISR); electronic intelligence (ELINT); maritime and border defense patrol; ground and naval strike; air-to-air attack; anti-submarine warfare; air defense suppression, including by using small UAV "swarms;" electronic warfare; communications; transportation and logistical support; emergency medical aid; firefighting; and information operations, including psychological warfare. Moreover, PLA exercises, trainings, and simulations indicate that UAVs would fulfill an array of roles in any land or maritime conflict involving the PRC.

A Military Modernization Priority

The organization of the PRC's industrial base to produce UAV systems occurs at the highest levels of the civilian and military bureaucracies. On the military side, the PLA Equipment Development Department (EDD) plays a leading role as the primary bureaucracy responsible for procuring and developing weaponry. The EDD incorporates expertise from industry and academia through its Unmanned Systems Specialist Group.

As the main bureaucracy for industrial planning and administration in the State Council, the Ministry of Industry and Information Technology (MIIT) plays a key role in guiding the PRC's UAV production efforts. The State Administration of Science, Technology and Industry for National Defense (SASTIND), which is subordinate to MIIT, is the primary civilian agency responsible for managing China's defense industry, including the large state aerospace and defense firms such as the Aviation Industry Corporation of China (AVIC) and the China Aerospace Science and Technology Corporation (CASC) that produce most of China's military UAVs. The Ministry of Science and Technology (MOST) facilitates research on unmanned systems and other technologies related to UAVs through the "National Key Research and Development Program." MIIT, MOST, the Chinese Academy of Sciences, and other state bureaucracies organized "defense state key laboratories" or "state key laboratories" to facilitate research on UAVs and other priority technology areas.

Under the framework of the Military-Civil Fusion (MCF) strategy, the PRC seeks to leverage China's dominant position in the global commercial drone market to boost its military UAV

innovation and production capacity. The PRC appears to have achieved some success on this front, as a growing number of private or mixed-ownership companies are now involved in the UAV supply chain. The Chinese Institute of Command and Control, which has deep links to the PLA, has characterized UAVs as "the most representative products of military-civil fusion." The reasons for UAVs emerging as a robust area of MCF may include relatively low start-up costs, high scalability, and extensive official support.

The Defense Industrial Base

In the late 20th century, many of the UAVs produced for the PLA originated from universities associated with the defense industry, particularly Northwestern Polytechnical University (NWPU), Beihang University, and Nanjing University of Aeronautics and Astronautics (NUAA), as well as enterprises closely linked to them, such as Xi'an Aisheng Technology Group Co., Ltd., also known as NWPU's 365th Institute. However, over the last two decades, large state-owned conglomerates, led by AVIC, CASC, China Aerospace Science and Industry Corporation (CASIC), and China North Industries Corporation (NORINCO), have devoted greater resources and efforts to producing military UAVs. Within this expanding defense production ecosystem, several AVIC and CASC subsidiaries have become not only major producers of drones for the PLA but also significant UAV exporters. The Wing Loong UAV series produced by AVIC subsidiary Chengdu Aircraft Industry Group (CAIG) and the "Rainbow" (*Caihong*) CH UAV series produced by CASC's 11th Academy are particularly popular on the international arms market. UAV exports, primarily to Asian and African states, have been touted as successes for the "Made in China Business Card" in Belt and Road Initiative (BRI) countries.

CAIG is best known for producing advanced fighter aircraft such as the J-20, but it is also a leading producer of military UAVs, including the Wing Loong series of ISR and unmanned combat aerial vehicles (UCAVs) that are used extensively by the PLA. CAIG has a close working relationship with fellow AVIC subsidiary Chengdu Aircraft Design and Research Institute (CADI), which designed several versions of the Wing Loong UAVs. CADI is also the designer for the WZ-7 and WZ-8 high-altitude long endurance (HALE) UAVs produced by China National Guizhou Aviation Industry (Group) Co., Ltd. (GAIC), which is itself a CAIG subsidiary. GAIC also works with Beihang University to produce the medium-altitude long endurance (MALE) BZK-007 reconnaissance UAV. AVIC subsidiary Harbin Aircraft Industry Group also collaborates with Beihang University on the BZK-005 MALE UAV used by the PLA for ISR and ELINT missions.

The CASC 11th Academy, also known as the China Academy of Aerospace Aerodynamics, is also a major producer of military UAVs. Since 1999, the 11th Academy has developed its CH UAV series both for PLA use and export, with the first successful CH UAV flight test occurring in 2004. Through its subsidiary Aerospace CH UAV Co., Ltd., the company became the first PRC military drone-maker to go public, listing on the Shenzhen Stock Exchange in 2017. The CASC 9th Academy, also known as the China Academy of Aerospace Electronics Technology, has emerged as an important player in the high-end military UAV space through its subsidiary,

Aerospace Times Feihong Technology Co. The latter entity produces the "Feihong" brand of UAVs, including the FH-97-A, a high-speed, stealth UCAV, intended to serve as a "loyal wingman" for the J-20 fifth-generation fighter plane.

NORINCO, which played a key role in the development of information system networks in the PRC, appears set to become a more significant player in the military UAV sector going forward. In December 2023, NORINCO acquired a majority stake in Xi'an Aisheng Technology Group Co., Ltd., a major producer of tactical UAVs for the PLA, from NWPU.

Large SOEs continue to dominate the military drone industry. However, in recent years, several private enterprises have become involved in the production of UAV systems, components, and materials. The most successful of these private companies, such as Sichuan Tengden Technology Company, Xi'an Lyncon Electronic Sci. & Tech. Co., Ltd., and Beijing ZhongHangZhi Technology Co., Ltd. (ZHZ), have deep links to the state defense, industrial, and research sectors. They receive state support through multiple channels, including investments and start-up capital; access to restricted technologies and equipment; recruitment of former SOE or defense university researchers; placement in state-organized industrial or MCF parks; and participation in aviation industry or MCF trade expos held by official associations. Companies such as Tengden and ZHZ that sell whole UAV platforms to the PLA also appear to work with the relevant military bureaucracies, and even individual units to provide after-sales service and support, including in the field. The heads of several private companies, including Tengden and ZHZ, also serve on the PLA CMC EDD and S&T Committee's UAV expert groups.

Universities and Research Institutes in UAV R&D

The development of UAVs in China originated at three military aviation-focused universities: Beihang University, NUAA, and NWPU. These universities and others continue to play several key roles in the PRC's development of dual-use UAV technologies, particularly in the research, testing, and application phases. They undertake basic and advanced research, including at state key laboratories or research centers specializing in UAV technology, facilitating research exchange between academia and industry. Leading academic centers of UAV research also work closely with SOEs to design and produce UAVs. Leading universities, particularly the "Seven Sons of National Defense," are key sources of advanced talent for state defense firms. In addition to civilian defense universities, a significant percentage of research and development of UAV systems for military use occurs at PLA universities and research institutions.[i]

[i] The "Seven Sons of National Defense" [国防七子] refer to seven defense-focused universities directly under the MIIT: Beihang University, Beijing Institute of Technology, Harbin Engineering University, Harbin Institute of Technology, Nanjing University of Aeronautics and Astronautics, Nanjing University of Science and Technology, and Northwestern Polytechnical University. The Seven Sons, often in collaboration with SOE research entities, play a crucial role in developing weapon systems and other technologies for the PLA.

INTRODUCTION

Contemporary military conflicts, from the Russia-Ukraine War to the Libyan Civil War, have demonstrated that unmanned aerial vehicles (UAVs), more commonly referred to as "drones," are changing the nature of modern warfare. The People's Liberation Army (PLA) has developed and operated drones since the late 1950s and now incorporates a wide variety of UAVs [无人机] throughout the force. In his 2022 report to the 20th Party Congress, Chinese Communist Party (CCP) General Secretary and Central Military Commission (CMC) Chairman Xi Jinping called for "accelerating the development of unmanned intelligent combat forces."[1]

The U.S. Department of Defense assesses that the PLA has leveraged China's status as a global leader in "unmanned" or "uninhabited"[ii] aerial systems (UAS) [无人系统] to employ a wide range of UAS across all echelons of the military.[2] The PLA now develops, uses, and trains UAVs for an array of combat missions and military operations other than war (MOOTW).

Roles that PLA UAVs train for and undertake include, but are not limited to, intelligence, surveillance, and reconnaissance (ISR); maritime and border defense patrol; ground and naval strike; anti-submarine warfare; air defense suppression (including through the use of UAV swarms); electronic warfare; communications support and data relay; transportation and other logistical support; emergency medical support; firefighting; and information operations, including psychological warfare.[3] Moreover, PLA exercises, trainings, and simulations indicate that UAVs would be expected to fulfill a broad array of roles in any land or maritime conflict involving the PRC. For example, the PLA's Eastern Theater Command (ETC) regularly deploys UAVs as part of aerial sorties crossing the median line in the Taiwan Strait.[4] UAVs have undertaken ISR and accompanied manned warplanes as part of the major recent PLA joint exercises around Taiwan, including the August 2022 live-fire drills after U.S. House Speaker Nancy Pelosi's visit to Taipei, the April 2023 "Joint Sword" exercises, and the "Joint Sword-2024A" ["联合利剑-2024A"] drills following Taiwanese President Lai Ching-te's May 2024 inauguration.[5] PLA troops in the Tibet Military District and Xinjiang Military District train to use UAVs in a potential conflict with India or other border defense contingencies.[6]

[ii] The Chinese word can be "无人" (*wuren*), as in 无人机 (*wurenji;* UAV) or 无人系统 (*wurenxitong;* UAS), can be translated as either "uninhabited/unoccupied" or "unmanned." The latter is used here as it is the term used in official PRC translations of Chinese terms.

Figure 1: A PLA border patrol soldier repairs prepares to pilot a small UAV[7]

Although UAVs are not a new technology, emerging technologies, including artificial intelligence and machine learning, advanced robotics, advanced image sensing, improved battery and energy storage, and improvements in materials science and aeronautical design are combining to make UAVs more effective and efficient in performing their missions. In a July 2024 *People's Liberation Army Daily* article, two experts from the PLA Academy of Military Sciences (AMS) Institute of War Studies observe that, due to "the improvement of autonomous combat capabilities, the ratio of humans to unmanned equipment has gradually changed from 'many controlling one' (that is, multiple people operating one unmanned equipment platform) to 'one controlling one [vehicle]' and 'one controlling many [platforms]'."[8]

The PRC has successfully leveraged Military-Civil Fusion (MCF) to develop a host of military UAV platforms for the PLA's use. Many of those platforms are based on foreign design concepts (e.g., many analysts have noted the similarity of the Wing Loong series to U.S. Predator drones).[9] However, the U.S. military appears to retain the lead in some areas of UAV technology. For example, the U.S. Navy's unmanned aerial refueling MQ-25A Stingray is in development and will likely be deployed on an aircraft carrier in late 2025 or 2026. That deployment would furnish the U.S. military with a comparative advantage in the development of unmanned aerial refueling capabilities.[10] The PLA is also building up its inventory of manned tanker planes, the H-6N and the YY-20A, while working to overcome the technical hurdles necessary to master unmanned aerial refueling.[11]

Figure 2: UAVs were prominently displayed at the October 1, 2019, military parade on the 70th anniversary of the PRC's founding[12]

While the PLA once used foreign-sourced drones, production of military UAVs now relies on indigenous production and development. The PRC's defense and aerospace industrial bases facilitate production of UAVs and other dual-use technologies through MCF that has become, per Tai-Ming Cheung and Eric Hagt, a central element of Xi Jinping's "strategy to establish a technologically advanced and militarily powerful Chinese state."[13]

In addition to furnishing the PLA with increasingly cutting-edge technology, the UAV industry has been a success story for China in a global arms market that is largely dominated by large U.S. and European conglomerates.[14] Along with Turkey, the PRC has also gained ground in the market by benefiting from Washington's interpretation of the Missile Technology Control Regime (MTCR), which has contributed to U.S. reticence export military UAVs.[15]

According to a recent report from the Center for New American Security, since 2018, the PRC has been responsible for about 26% of international arms transfers of UAVs, second after Turkey.[16] In fact, since China entered the military UAV market in the early 2010s, official sources have highlighted the PRC's ability to export mature, cutting-edge platforms whose value has been demonstrated in overseas military conflicts as emblematic of a "new 'Made in China' Business Card" ["中国制造"新名片].[17] In contrast to the global commercial UAV market—which is dominated by DJI / SZ DJI Technology Co., Ltd. [深圳市大疆创新科技有限公司], a private Chinese Shenzhen-based company (albeit one with extensive state support and investment)—all of China's major players in the international arms sales market are large state-owned conglomerates such as the Aviation Industry Corporation of China (AVIC) [中国航空工业集团

公司] and China Aerospace Science and Technology Corporation (CASC) [中国航天科技集团有限公司.[18]

MAIN MANUFACTURERS

As with other weapons systems and military equipment, the production of military UAV systems is dominated by China's largest defense manufacturers: AVIC, China North Industries Corporation (NORINCO), CASC, and China Aerospace Science and Industry Corporation (CASIC) [中国航天科工集团公司]. In terms of their 2023 defense revenue, these are huge companies: AVIC ranked second globally, NORINCO ranked ninth, and CASC ranked 52nd. All three companies are owned by the State-Owned Assets Supervision and Administration Commission (SASAC) [国有资产监督管理委员会] of the State Council, but they are directly managed by the State Administration of Science, Technology and National Defense (SASTIND) under the Ministry of Industry and Information Technology (MIIT).[19]

The PRC's large defense companies have close relationships with, and sometimes directly invest in, defense-focused universities. For example, NORINCO has long-standing collaborative relationships and strategic cooperation agreements with at least three of the "Seven Sons of National Defense,"[20] a group of seven leading universities that are directly subordinate to MIIT and have extensive links to the PLA and China's defense industry. These three universities, Beihang University, Beijing Institute of Technology (BIT), and Northwestern Polytechnical University (NWPU), are all major centers of research and development for military-use UAVs.[21] Moreover, NORINCO recently acquired a majority ownership stake in NWPU's 365th Research Institute, better known as Xi'an Aisheng Technology Group [西安爱生技术集团], a major producer of tactical UAVs used by the PLA, particularly the PLA Army (PLAA).[22]

The relationship between major defense aerospace manufacturers, including UAV producers, is symbiotic, involving not only the sharing of knowledge and resources, but also the mutual cultivation of talent. Numerous instances of such cooperation are included in the profiles section below, but to offer a few examples, AVIC Shenyang Aircraft Design Institute (SADI) and Beihang University's Unmanned Systems Research Institute signed an agreement on party-building and talent exchanges in 2021.[23] CASIC's Third Academy, which is the manufacturing base for Haiwing and other UAV series, also has a joint talent cultivation agreement with NWPU.[24]

LIMITED BUT GROWING ROLE FOR PRIVATE COMPANIES

Although large state-owned enterprises (SOEs) continue to dominate the military drone industry, in recent years, a growing number of private enterprises have become involved in the production of UAV systems, components, and/or materials, managing to gain market share from so-called "tigers" like AVIC.[25] Some larger private companies, albeit ones with close connections to the party, state, industry, and military, such as Sichuan Tengden Technology Co. [四川腾盾科技有限公司], Xi'an Lyncon Electronic Sci. & Tech. Co., Ltd. [西安羚控电子科技有限公司], and Beijing ZhongHangZhi Technology Co., Ltd. [北京中航智科技有限公司] have even begun to produce whole UAV platforms for the PLA, People's Armed Police (PAP), Public Security Forces, and civilian customers.

According to the PLA-linked Chinese Institute of Command and Control [中国指挥与控制学会], "UAVs are the most representative products of military-civil fusion."[26] UAVs may be a particularly robust area of MCF for several reasons, including relatively low start-up costs, high scalability, and extensive official support.

The end of this report includes an appendix listing medium or small mixed-ownership or private UAV-focused PRC companies that may merit further scrutiny.

Key Party and State Actors

The PRC's decision-making regarding unmanned systems, which it regards as core elements of its national defense and economic development strategies, is shaped at the highest levels of the party, military, and state bureaucracies. This report focuses on those military and state bureaucracies in the Central Military Commission (CMC) and the State Council most relevant to organizing the PRC's UAV industrial base.

Central Military Commission

As the supreme military body, the CMC and its Chairman, Xi Jinping, determine overall priorities for national defense and military modernization. Within the CMC, several departments play a key role in working with the relevant civilian bureaucracies, the Ministry of Industry and Information Technology (MIIT) and State Administration of Science, Technology and Industry for National Defense (SASTIND), to oversee China's industrial development and technological advancement, including the development of a wide array of military or dual-use UAVs.

CMC Equipment Development Department

The CMC Equipment Development Department (EDD) [装备发展部] is responsible for providing centralized direction of the PRC's armament system.[27] In this capacity, EDD, which succeeded the previous General Armaments Department (GAD) [总装备部] in the reform and reorganization of China's military initiated at the end of 2015, oversees defense procurement, acquisition, defense research, and development of weaponry and other military equipment.[28] Consequently, the EDD manages contracts and other transactions with defense conglomerates and their subsidiaries.[29]

The EDD works closely with the MIIT's SASTIND [国家国防科技工业局], the main civilian bureaucracy responsible for managing state-owned defense enterprises, to guide defense industry production and technological development based on the ambitious military modernization benchmarks set forth by Xi.[30] In coordination with SASTIND, the EDD manages weapons and equipment research and production licenses for enterprises and other entities.[31] The EDD and SASTIND publish a Weapons and Equipment Scientific Research and Production Licensing Catalog [武器装备科研生产许可目录] of military or dual-use items considered to have a significant impact on national strategic security and social public security that require a license to produce.[32]

The EDD also works with the relevant civilian bureaucracies to set export controls on key military technologies in which it believes China has a comparative advantage, including unmanned systems. In July 2024, the EDD, the Ministry of Commerce, and the General Administration on Customs issued new export control measures on UAVs based on engine power, payload, and capacity to operate military or dual-use equipment such as anti-UAV electronic jamming equipment and high-powered lasers.[33]

EDD Information Systems Bureau

In its role managing information systems for PLA weaponry and equipment, the EDD's Information Systems Bureau [信息系统局] guides and funds research in UAV-related areas. For example, in 2019, the bureau released pre-research guidelines for 106 priority areas of software technology, electronic components, and microelectronics technologies.[34] Priority funded research project areas include developing autonomous and controllable military artificial intelligence computing frameworks for multiple purposes, including supporting unmanned combat equipment such as UCAVs.

EDD Unmanned Systems Specialist Group

As with other technologies, the CMC EDD organizes specialist groups to advise on its approach to the research, development, acquisition, and application of aerial unmanned systems technologies. These expert groups typically include military and civilian academics and defense industry executives and researchers, who advise the CMC on UAV systems.[35]

- The EDD Unmanned Systems Specialist Group [无人系统专业组][36] covers UAVs, but given its name and composition likely includes other unmanned systems as well. Prominent members of this group include:
  - Major General Shen Lincheng [沉林成], group leader[37]
    - Dean, Graduate School, National University of Defense Technology (NUDT) [国防科技大学]
  - Wang Yingxun [王英勋]: member[38]
    - Dean and Doctoral Supervisor of the Beihang University Institute of Unmanned Systems; Leader of the Expert Advisory Group on Aviation Equipment Technology Application of the Armed Police Force [武警部队航空装备技术应用专家咨询组]
  - Xiong Ke [熊克]: member[39]
    - Professor, doctoral supervisor, director of the State Key Laboratory of Mechanical Structure Mechanics and Control [机械结构力学及控制国家重点实验室] at Nanjing University of Aeronautics and Astronautics (NUAA), and Doctor of Engineering from NUAA Key Laboratory of Intelligent Materials and Structures in Aviation Science and Technology
  - Guo Chenghao [郭成昊]: member[40]
    - Professor, NUAA
    - From 2008 to 2023, he was Deputy Director of the National Defense Key Laboratory of Information Systems Engineering [信息系统工程国防重点实

验室] at the 28th Research Institute of China Electronics Technology Group Corporation [中国电子科技集团公司第二十八研究所]

- Gao Xia [高遐]: member[41]
  - Chief of System Engineering Technology at the Institute of Unmanned Systems, Beihang University [北京航空航天大学无人系统研究院]

Other possible names or abbreviations used for this group include:

- Unmanned Systems Specialist Group [无人系统技术专业组][42]
- Unmanned Aerial Vehicles Specialist Group [无人机专业组][43]
- Unmanned Systems Expert Group [无人系统专家组][44]
- Unmanned Systems Technology Specialist Group [无人机系统技术专业组][45]
- Unmanned Systems Technology Pre-Research Specialist Group [无人系统技术预研专业组][46]
- Unmanned Aerial Vehicles Expert Group [无人机专家组][47]

Figure 3: Beihang University Institute of Unmanned Systems Dean and CMC EDD UAV Expert Group Member Wang Yingxun's credentials are highlighted on a poster for ""Smart Swarm 2022" International Unmanned Swarm Technology Competition organized by the Chinese Society of Aeronautics and Astronautics (CSAA)[48]

CMC SCIENCE AND TECHNOLOGY COMMITTEE

Previously a part of the previous General Armaments Department (now EDD), the CMC Science and Technology Committee (S&T Committee) [中央军委科技委] was reorganized as an independent bureaucratic organ within the CMC during the 2015-2016 military reforms.[49] The commission's purpose is to promote defense innovation, research and development of military and dual-use technologies, and undertake civil-military cooperation on applying new or emerging advanced technologies.[50]

Several UAV experts are affiliated with the S&T Committee as advisors, experts and consultants. Along with specific affiliated UAV experts listed below, several of the S&T's advisory committees such as the Strategic Advisory Committee [战略咨询委员会] and the Emerging Military Capabilities Expert Group [新兴军事能力领域专家组] may also be involved with guiding UAV research and development. In 2017, Elsa Kania noted an Intelligent Unmanned Systems and Systems of Systems Science and Technology Domain Expert Group [军委智能无人系统及体系科学技术领域专家组] at the CMC level, in which, if it is still operational, the S&T Committee and EDD are likely involved.[51]

- S&T Committee UAV Experts
  - Tian Gangyin [田刚印]: Chairman, founder and general manager of Beijing ZhongHangZhi Technology Co., Ltd. [北京中航智科技有限公司], which manufactures unmanned helicopters and tilt-rotor UAVs;[52] and chairman of its parent company, United Aircraft [联合飞机][53]

        - Tian may also be affiliated with the CMC EDD Expert Group[54]
    - Wu Mingxi [吴明曦]: Deputy General Secretary; a Chief Scientist at NORINCO[55]
    - Tang Changhong [唐长红]: Honorary dean, NWPU Unmanned Systems Research Institute[56]
    - Nie Haitao [聂海涛]: Consultant; founder and partial owner (2%), Sichuan Tengden Technology Company [四川腾盾科技有限公司]; former deputy director and deputy chief engineer of AVIC's Chengdu Aircraft Design Research Institute (CADI);[57] also a CMC EDD major project chief expert [军委装备发展部重大项目首席专家][58]
- Expert Group on Emerging Military Capabilities [新兴军事能力领域专家组]
    - Wu Mingxi [吴明曦]: Group Chief Scientist[59]

Figure 4: Wu Mingxi, AI expert and Chief Scientist with NORINCO, CMC-affiliated expert

OTHER CMC ENTITIES

Several other CMC bodies appear to be involved with UAVs:

- Logistics Support Department (LSD) [后勤保障部]
    - National-, theater-, and service-level LSDs have negotiated logistical agreements with civilian UAV makers for aerial transportation and other logistical support services

        - For example, in 2017, under the military-civil fusion framework, e-commerce companies Jingdong [京东] and SF Express [顺丰] signed a strategic cooperation agreement with the PLA Air Force (PLAAF) Logistical Support Department to provide "intelligent solutions for air force logistics," including providing UAV delivery services[60]

- CMC Training Management Department [训练管理部]
    - Organizes exercises and talent training on UAVs and other unmanned systems[61]
    - Responsible for overseeing the Nanjing Research Institute of Simulation Technology [南京模拟技术研究所], historically known as the General Staff Department 60th Research Institute [解放军总参谋部第六十研究所][62]
- CMC Office for Strategic Planning [战略规划办公室][63]
    - MCF Bureau: Oversees PLA coordination of MCF efforts
- CMC Military-Civil Fusion Development Committee Office [军民融合发展委员会办公室]
    - Administrative office of CCP Military-Civil Fusion Development Committee, which promotes MCF at all levels, including in the UAV sector[64]

PLA UNIT 93216

Established in June 1958, the PLA's 93216 Unit [93216 部队] is the core scientific research institution for the development and application of the PLAAF's network information systems.[65] This PLAAF unit is based out of Zhongguancun Innovation Park [中关村创业园] in Haidian District, Beijing, near numerous defense enterprises and two of the "Seven Sons of National Defense" universities, Beihang University and BIT.[66]

The primary responsibilities of Unit 93216 are top-level planning, system design, system development, test verification, and support and guarantee tasks in PLAAF communications, navigation, and command and control.[67] This includes UAV systems, as a recent hiring post for the unit advertises openings for command information system professionals specializing in artificial intelligence and UAVs.[68]

The unit has developed "collaborative innovation mechanisms" [协同创新机制] with the defense SOEs that supply the PLA with information systems and other electronic equipment, including AVIC, China Electronics Technology Group Corporation (CETC) [中国电子科技集团], and China Electronics Corporation (CEC) [中国电子信息产业集团].[69] The unit also collaborates with Beihang University, Peking University, and other leading academic institutions. Notably, Unit 93216 is the "chairman unit" [理事长单位] of the China Institute of Command and Control [中国指挥与控制学会], an important platform for Military-Civil Fusion, including in the UAV sector.[70]

PLA Research and Academic Institutions

Much of the research and development of military and dual-use UAV systems occurs at defense state-owned enterprises and their subsidiary companies and research institutes, as well as at defense-focused civilian universities such as Northwestern Polytechnical University (NWPU) in Xi'an. However, a portion of the research, development, and testing of UAVs occurs at PLA research or academic institutions. On the research institute side, this report includes a detailed profile of the Nanjing Research Institute of Simulation Technology [南京模拟技术研究所], historically known as the PLA CMC General Staff Department 60th Research Institute [解放军总参谋部第六十研究所][71] (see pp. 201-202).

This report also includes profiles of NUDT's UAV-focused entities such as the School of Intelligent Science [智能科学学院], the Unmanned Systems Research Institute [无人系统研究所], and the NUDT Advanced UAV Innovation Team [国防科大先进无人飞行器创新团队] (see pp. 198-200). The report also includes a brief profile on the Air Force Engineering University Equipment Management and UAV Engineering College [空军工程大学装备管理与无人机工程学院] (see pp. 203-204). However, several other PLA research or academic institutions also have entities focused on UAVs for which little open-source information was available. These were not profiled, but they merit brief mention here.

As the lead military scientific research organization of the PLA, the PLA Academy of Military Sciences (AMS) [中国人民解放军军事科学院] is responsible for strengthening national defense science and technology innovation. That mission includes the development of technologies such as UAV systems that, while not new, are evolving rapidly, and potentially transforming due to rapid improvement in AI and other emerging technologies.[72]

Within AMS, the National Defense Science and Technology Innovation Institute [国防科技创新研究院], probably established sometime in the mid-2010s, focuses on developing advanced technologies with military applications, including unmanned systems, artificial intelligence, and quantum technology.[73] The PLA AMS also has an Unmanned Systems Research Center [国防科技无人系统研究中心].[74]

The Naval Aviation University [海军航空大学] in Yantai, Shandong, offers a specialty in UAV systems engineering with a direction in unmanned aerial vehicle utilization and command [无人机运用与指挥] for commanding officers.[75] The university also offers a specialty in UAV equipment engineering with a direction in UAV technical support and maintenance [无人机技术保障与维修], also for commanding officers.

The Army Engineering University that is headquartered in Nanjing offers a UAV degree and a specialty in UAV systems engineering [无人系统工程].[76]

STATE COUNCIL

MINISTRY OF INDUSTRY AND INFORMATION TECHNOLOGY

As the main civilian bureaucracy for industrial planning and administration, the Ministry of Industry and Information Technology (MIIT) [工业和信息化部] has a key role in organizing the defense industrial base, including leveraging MCF to promote technological development. The MIIT's 2022 budget cites advancing "construction of a scientific research and production system for weapons and equipment that implements MCF and embedding the military sector in the civilian sector" as among its primary responsibilities.[77]

Within MIIT, SASTIND is tasked with oversight of state-owned defense enterprises in coordination with SASAC, the State Council commission responsible for financial management of SOEs.[78] In addition to SASTIND, the following MIIT offices, departments, and centers appear to play a part in overseeing frameworks to leverage the resources and talents of the aerospace and technology sector to develop the defense and dual-use UAV industrial bases through MCF:

- General Office [办公厅]
    - Publishes, with the SASTIND General Department, a "Recommended Catalog of Technologies and Products for Civilian Participation in the Military" [民参军技术与产品推荐目录] for industrial enterprises of high-tech products in the civilian sector with military applications
        - 2014 catalogue includes UAVs as one of six priority product areas, along with radar, communications, micro-motors, robotics, and remote sensing and data processing[79]
        - 2018 catalogue listed "intelligent unmanned equipment or platforms" [智能无人装备或平台] as a key technology for civilian contributions to military needs[80]
- Second Equipment Industry Department (National Major Technical Equipment Office) [装备工业二司（国家重大技术装备办公室）]
    - Guides development of heavy technical equipment enterprises such as large aircraft and ship manufacturers, coordinates efforts to advance the construction of national key projects, promotes localization of heavy technical equipment, and guides the absorption and innovation of imported equipment[81]
    - The department's mandate appears to include setting technological standards for UAVs, including for evaluation and testing.[82] The 2024 Guidelines for the Promotion and Application of Major Technical Equipment" [首台（套）重大技术装备推广应用指导目录] that were published by the MIIT Second Equipment Industry Department[83] include standards for:
        - Medium and large fixed-wing UAV systems:

        - Range: ≥ 1000 km
        - Cruising speed: ≥ 160 km per hour (km/h)
        - Maximum take-off weight: ≥ 1000kg
        - Payload: ≥ 500 kg
    - Medium and large unmanned helicopter systems:
        - Range: ≥ 300 km
        - Cruising speed: ≥ 100 km/h
        - Maximum take-off weight: ≥ 500 kg
        - Payload: ≥ 120 kg
        - Endurance: ≥ 3 hours
  - In March 2024, the Second Equipment Industry Department's Director Xu Chunrong [徐春荣] presided over the launch of a "pilot program of the innovative application of low-altitude equipment in 18 provinces."[84]

- Department of Science and Technology [科技司]
  - Responsible for administering MIIT's network of State Key Laboratories[85] that seek provide "a foundation for upgrading and transforming China's traditional manufacturing industry by taking advantage of cutting-edge technologies and are also responsible for fundamental research in related subjects"[86]

- Department of Military-Civil Fusion [军民融合推进司]
  - Manages dual-use technology transfers and develops common standards for military and civilian systems[87]

MIIT also organizes the MIIT University Alliance G7 Alliance [G7 联盟] comprising the "Seven Sons of National Defense." The first meeting of the G7 Alliance of the Seven Sons universities, which are administered directly by MIIT rather than SASTIND, was held on June 4, 2017.[88] All of the Seven Sons appear to be involved in developing unmanned autonomous systems, with Northwestern Polytechnical University (NWPU), Nanjing University of Aeronautics and Astronautics, Beihang University, and Beijing Institute of Technology (BIT) perhaps the most significant centers for dual-use UAV research, development, and production.[89]

In early 2014, MIIT announced the establishment of an initial group of seven ministry-wide "collaborative innovation centers" focused on promoting the development of advanced technologies in key industries.[90] The innovation center selected for leading the development of intelligent, advanced UAVs is the Future Aircraft Collaborative Innovation Center [未来飞行器协同创新中心] at Northwestern Polytechnical University, a major center of UAV development and production.[91]

In 2018, the China UAV Industry Innovation Alliance [中国无人机产业创新联盟] was established under MIIT's guidance.[92] The alliance seeks to advance relevant national policies and guidelines; strive for innovation; work to improve the technical level of the industry; establish a horizontal and vertical cooperation and exchange platform for the UAV industrial supply chain;

promote the integration of production, learning, research, and application; advance MCF; regulate the safe use of UAVs; and promote the healthy development of China's UAV industry. Founding members of the alliance include AVIC, DJI, and Chengdu Aircraft Design Institute [成都飞机设计研究所], an AVIC subsidiary.[93]

Along with the Ministry of Education and the Chinese Academy of Sciences, MIIT is one of the major government units responsible for State Key Laboratories, which are intended to develop key research with the aim of transforming China into a leader in global technology, including UAVs and other unmanned systems.[94] MIIT labs are hosted by universities such as Beihang University and BIT, by research institutes, and directly by the Ministry itself.[95]

State Administration of Science, Technology and Industry for National Defense

The State Administration of Science, Technology and Industry for National Defense (SASTIND) [国家国防科技工业局], which was created in 2008, is the primary civilian agency responsible for managing China's defense industry, including the large state aerospace and defense firms such as AVIC and CASC that produce most of China's military UAVs. The successor to the Commission for Science, Technology and Industry for National Defense (COSTIND), SASTIND is directly under MIIT and formulates guidelines, policies, laws, and regulations for the development of national defense science and technology industry and MCF.[96]

SASTIND is technically subordinate to MIIT but operates with a considerable degree of autonomy and has a close official relationship with the CMC's EDD.[97] Specifically, the SASTIND General Office [国防科工局综合司] and CMC EDD co-manage licensing for the production and export of military and dual-use equipment. This responsibility is delegated to both entities based on the National Defense Law of the PRC, the 2008 State Council and CMC Regulations on the Administration of Scientific Research and Production Licenses for Weapons and Equipment [武器装备科研生产许可管理条例], and the "Measures for the Implementation of Weapons Equipment Scientific Research and Production Licenses" [武器装备科研生产许可实施办法] issued by the MIIT and the former CMC GAD in 2010.[98] In addition to working with the CMC EDD on procurement, SASTIND also oversees approvals of military fixed-asset investment projects, and manages the processes for institutions to establish defense science and technology companies or defense technical centers.

In conjunction with CMC EDD, SASTIND manages the PRC's expansive Defense Science and Technology Laboratory (DSKTL) system [国防科技重点实验室] based at state-owned enterprises and research institutions, civilian universities, and military institutions.[99] For example, the State Key Laboratory of UAV Special Technology [无人机特种技术国防科技重点实验室] is based at NWPU.[100] SASTIND and the CMC EDD are both responsible for managing the DSKTL system. However, EDD appears to be more involved during the planning and application stages, when relevant entities apply to establish DSTKLs based on the five-year development plan project guidelines for key laboratories (including both new construction and upgrading existing key laboratories). However, SASTIND may bear greater responsibility for the administration of DSTKLs, including overseeing the approval of lab directors.[101]

Although it is unclear which Department it is under, SASTIND also purportedly has a UAV Management Office [无人机管理办公室] which is the supporting work unit for *UAV Magazine* [《无人机》杂志], while the AVIC Information Center [航空工业信息中心] is the commissioning work unit for the publication.[102]

MINISTRY OF SCIENCE AND TECHNOLOGY

The Ministry of Science and Technology (MOST) [科学技术部] is another important civilian bureaucracy involved in the research and technical development of China's UAV industrial base. As the lead bureaucracy for civilian scientific and technical research, MOST managed the implementation of the 863 program [863 计划] initiated in 1986 to reduce the PRC's dependence on imports and develop indigenous capabilities in key advanced technologies. MOST also launched the 973 Program [973 计划] to strengthen basic research and scientific and technological work. In February 2016, MOST announced that both projects, along with several other initiatives, would be incorporated into a new "National Key Research and Development Program" [国家重点研发计划].[103] The program mainly focuses on major research efforts by large state entities that require "long-term development in the fields of agriculture, energy resources, ecological environment, health, etc. that are related to the national economy and people's livelihood, as well as strategic, basic, and forward-looking major scientific issues, major common key technologies and products, and major international scientific and technological cooperation that are related to the core competitiveness of the industry, overall independent innovation capabilities, and national security."[104]

The National Key Research and Development Program is broken down into different research "directions." The 2024 "High-Tech Direction" [高新技术方向] mainly supports research across research focus areas [重点领域], the most relevant of which to UAV research and development are "Next Generation Information Technology" and "Artificial Intelligence and the Digital Economy," with the most relevant research areas translated below:[105]

- Next Generation Information Technology
    - Remote controlled and unmanned systems, intelligent connected vehicles
        - Develop cooperative perception and control technology for unmanned vehicles based on multi-source sensor fusion and intelligent networking
        - Research and development (R&D) for high-precision on-board sensor devices and modules
        - R&D technology for intelligent advanced driver assistance systems
        - Testing and evaluation technology for intelligent networked vehicles
        - R&D and application technology for 5G-V2X systems
- Artificial Intelligence and the Digital Economy
    - Autonomous Unmanned Intelligent Technology [自主无人智能技术]

- Accelerate the breakthrough of robot autonomous control technology such as positioning, navigation, and recognition based on computer vision in complex environments

Several key UAV research and development research institutions have benefited from the support of the MOST 863 program, which was designated a core element of the National Key Research and Development Program. These entities include AVIC's Chengdu Aircraft Design and Research Institute, which designed the Wing Loong series of UAVs; North Tiantu Aviation Technology Co., Ltd.; NWPU; and BIT.

KEY NATIONAL SOCIETIES AND ASSOCIATIONS

Several state-sanctioned national-level aerospace societies and industry professional associations, such as the China Society of Aeronautics and Astronautics (CSAA) [中国航空学会] and the Chinese Institute of Command and Control (CICC) [中国指挥与控制学会] support China's UAV industry development through MCF. In practice, these organizations advance MCF through a range of activities: organizing expert working groups, holding "matchmaking" events to promote interaction between large defense firms and private entities, organizing youth talent competitions and networking/recruiting fairs with large defense universities, and hosting defense or MCF expos.

Listed below are some aerospace societies and industry professional associations that play a key role in the military and dual-use sectors of China's UAV industry.

CHINESE SOCIETY OF AERONAUTICS AND ASTRONAUTICS

The Chinese Society of Aeronautics and Astronautics (CSAA) [中国航空学会], organized by AVIC, undertakes a range of activities that support the research, development, and production of military UAVs. CSAA is also one of eight participating organizations in the China Association for Science and Technology's (CAST) [中国科学技术协会] Military-Civilian Integration Society Consortium [民融合学会联合], which was established in 2016 to implement Xi's guidance by advancing "an innovation-driven development strategy" and the "military-civil fusion development strategy."[106] For example, in 2018, the consortium co-organized the "New Era Military and Civilian Dual-Use Key Technology Seminar and Jiande Military-Civilian Integration Industry Development Forum" to address the top ten MCF challenges, including "detection, identification, and control technologies for light and small drones operating in complex urban environments."[107]

UAV Systems Special Committee

Under the leadership of the CSAA Board of Directors, the Society's Unmanned Aircraft Systems (UAS) Special Committee [无人驾驶航空器系统专门委员会] plans, coordinates, guides, and sets standards for unmanned aircraft systems work in various fields.[108] The CSAA UAS Special Committee does so by providing advice for major national decisions; aiding management agencies in undertaking UAS management and training; organizing high-level international exchanges; and advancing China's international influence in the field of unmanned aircraft systems.[109] The Special Committee is supported by Beihang University and the National Air Traffic Control Regulations and Standards Research Center [国家空管法规标准研究中心].[110]

UAV Exhibitions and Conferences

As part of its mandate to raise the international profile of China's UAV industry, the CSAA has organized an annual, international UAV conference and exhibition in Beijing since 2006.[111]

Previously known as the China International Unmanned Aircraft Systems Conference and Exhibition [中国国际无人驾驶航空器系统大会暨展览], the conference was upgraded and renamed the Global Unmanned Aerial Systems (UAS) Conference [全球无人系统大会] in 2019.[112] Since that time, the conference has convened annually in Zhuhai, Guangdong, a center of China's aviation industry and home of the renowned biennial China International Aviation & Aerospace Exhibition [中国国际航空航天博览会], commonly known as the Zhuhai Airshow. The exhibition includes all the major military, government, and corporate actors in China's defense aviation industrial base. In recent years, new UAV prototypes such as the FH-97 "loyal wingman" stealth UAV and AVIC's Wing Loong 3 system had a starring role at the 2022 Zhuhai Airshow.[113] The 2024 Global UAS Conference, which was held on November 10-12, immediately preceded the 2024 Zhuhai airshow, as has been the case in recent even-numbered years.[114]

Figure 5: FH-97A displayed at the 14th China International Aviation and Aerospace Exhibition[115]

Youth Talent Development

In 2017, CSAA established the "National Youth UAV and Model Aircraft STEAM Maker Education System" [全国青少年无人机及航模 STEAM 创客教育体系][iii] to promote interest in technology and scientific literacy among China's youth.[116] The CSAA organizes a "National Youth Drone Competition" [全国青少年无人机大赛] in order to thoroughly implement the "Opinions on Further Strengthening the Popularization of Science and Technology in the New Era," focusing on the cultivation of aviation innovation talents in the context of the artificial intelligence era, continuously improving the creativity and imagination of young people, and promoting the enthusiasm of young people to learn about artificial intelligence. Since 2017, the National Youth Drone Competition has been held annually.[117]

[iii] STEAM – "Science, Technology, Engineering, Arts, and Mathematics" education.

Figure 6: Group Picture at the CSAA's 2024 "National Youth Drone Competition"[118]

CHINESE INSTITUTE OF COMMAND AND CONTROL

Established in September 2012, the Chinese Institute of Command and Control (CICC) [中国指挥与控制学会] is, per its website, "the only national-level society in the field of command-and-control science and technology in China."[119] According to the organization, CICC's basic task is to unite China's command and control science and technology workers, and to advance the development of China's command and control system science and technology through academic research; domestic and foreign academic exchanges; activities to popularize science; academic education evaluation and consultation; science and technology exhibitions; scholarly publishing; talent development; and technical review and awards.[120]

The CICC provides command and control system science and technology services to support the PRC's economic development, national defense construction, military transformation, social progress, civilizational improvement, and overall security.[121] In this capacity, the CICC is an important platform for MCF, which it undertakes through several activities, including the China Command and Control Conference, the National Wargames Competition, and the China Military-Civil Fusion Technology and Equipment Expo [中国军民融合技术装备博览会] held annually in Beijing.[122] The CICC also organizes an Unmanned Systems Professional Committee [无人系统专委会], which seeks to leverage cross-disciplinary knowledge and expertise to advance the development of UAVs in defense and security.[123]

The CICC's chairman unit [理事长单位] is PLA Unit 93216, the PLAAF's network information system unit based in Zhongguancun Entrepreneurship Park [中关村创业园] in Haidian District, Beijing.[124] Vice Chairman units include Beihang University's School of Automation Science and Electrical Engineering, BIT, NORINCO, AVIC Luoyang Electro-optical

Equipment Research Institute, and the NUDT School of Systems Engineering.[125] CICC is a national science and technology society organization, and a formal group member of the China Association for Science and Technology (CAST)."[126]

CICC Unmanned Systems Professional Committee

The CICC UAV systems professional committee [无人系统专业委员会] was established in June 2014.[127] The committee's stated aims are to master the latest technological trends of unmanned systems at sea, land, air, and space at home and abroad, carry out domestic and foreign cooperation and exchanges in the field of unmanned system science and technology, promote the development of this discipline, and support scientific and technological progress in the unmanned systems field.

The CICC UAV professional committee collaborates with major research institutes and universities to recommend outstanding scientific and technological talents and highlight input from scientific and technological workers. The committee strives to publish academic, technical, and popular science publications in the unmanned system science and technology field; as well as to organize the collection, review, and recommendation of notable academic papers and outstanding scientific research results.

The committee organizes experts to undertake technical consultations and services, and to provide professional training and continuing education opportunities for UAV professionals. The CICC UAV professionals committee also organizes various seminars, forums, competitions, exhibitions, and other activities that support the development of unmanned system science and technology disciplines. The committee seeks to take the lead in formulating technological standards for unmanned systems. Finally, the committee provides network and resource matching opportunities for its members.

The committee has a close relationship with BIT and may be based on its campus. The affiliated work unit for CICC UAV committee is BIT's School of Mechanical and Electrical Engineering [北京理工大学机电学院]. Its Chairman, Chen Jie [陈杰], is a professor at BIT's School of Information and Electronics [信息与电子学院] and an academician of the Chinese Academy of Engineering [中国工程院院].[128] The committee's Director General is Meng Yang [蒙洋], who leads the Zhongguancun Robot Industry Innovation Co., Ltd. [中关村机器人产业创新], a robotics industry park that hosts 50 companies, over 20 cooperative research institutes, and more than 200 service companies.[129]

China Command and Control Conference

Since 2013, the CICC has organized eleven meetings of the China Command and Control Conference [中国指挥控制大会] held concurrently with the China (Beijing) Military Intelligent Technology and Equipment Expo [中国（北京）军事智能技术装备博览会] (see below) in Beijing each year.[130]

The conference's stated purpose is to "gather talents, promote exchanges, explore new frontiers, and promote cross-border innovation," to thoroughly implement General Secretary Xi Jinping's important instructions on "accelerating the development of military intelligence, improving joint

combat capabilities and full-domain combat capabilities based on network information systems," and "accelerating the modernization of national defense and the military."[131] The conference seeks to promote "integrated development of mechanization, informatization, and intelligence," and advance China's self-reliance and self-improvement of high-level intelligent command and control science and technology. An "Unmanned Command and Control Forum" [无人化指挥控制论坛] is on the agenda for the 2025 conference.[132]

China (Beijing) Military Intelligent Technology and Equipment Expo

Since its founding in 2015, CICC has organized nine iterations of the China (Beijing) Military Intelligent Technology and Equipment Expo [中国（北京）军事智能技术装备博览会], with a tenth exposition scheduled for May 17-19, 2025, in Beijing. This expo includes an unmanned equipment area [无人装备展区] each year.[133] At the 2025 Expo, the unmanned systems on display will include fixed-wing UAVs, rotary-wing UAVs, unmanned surface vehicles, unmanned underwater vehicles, and unmanned ground vehicles.[134]

AIRCRAFT OWNERS AND PILOT'S ASSOCIATION OF CHINA

The Aircraft Owners and Pilots Association of China (AOPA) [中国航空器拥有者及驾驶员协会] is a national social organization under the business guidance of the Civil Aviation Administration of China. The AOPA seeks to represent the interests of Chinese private aircraft owners and pilots, and accepts the supervision, guidance, and relevant regulations of the International Aircraft Owners and Pilots Association (IAOPA).

The AOPA has a Large UAV Professional Committee and UAV Industry-Education Cooperation Professional Committee that overlaps with the CMC EDD experts' group. For example, Wang Yingxun [王英勋], Dean of Beihang University Institute of Unmanned Systems, is a member of both groups.[135] Beihang subsidiary and UAV maker, North Tiantu Aviation, also states that "it is one of the first professional training bases in the country approved by the AOPA." The company states that as the leading AOPA test center in North China, it is responsible for the examination of various UAV training institutions in North China. As an education base that has a full range of multi-rotor, fixed-wing, and helicopter models and has the qualifications to train pilots, captains, and instructors, North Tiantu Aviation has trained over 2,000 UAV pilots to work in China's UAV industry.[136]

Entity Profiles

The remainder of this report is comprised of profiles of the primary entities that produce whole UAV platforms in the PRC. While this may not be a comprehensive list of every such entity, we believe the most important components of the UAV sector of the PRC's defense industrial base are included. Each profile includes an overview of the entity, a listing of key UAV products, notable relationships, subsidiaries, directly subordinate organizations (e.g., labs or offices), as well as basic details such as when they were established, their websites, their aliases, and their addresses.

State-Owned Enterprises

Aviation Industry Corporation of China Subsidiaries

The Aviation Industry Corporation of China (AVIC) [中国航空工业集团公司, abbreviation: 航空工业] is China's largest aviation enterprise that produces a wide array of military and civilian aircraft, including UAVs. AVIC currently has around 100 member units and roughly 400,000 employees.[137] The company has a UAV office [无人机办] that may play a role in coordinating the research, development, and production of UAV platforms and components across AVIC's many subsidiaries.[138]

Only those AVIC entities involved in UAV research, design, testing, production, and sales are listed below. For a detailed breakdown of AVIC and its subsidiaries, see CASI's January 2024 report on AVIC by J.J. Long, Thomas Corbett, and Dan Shats.[139] In 2023, AVIC's total revenue reached 588.02 billion yuan ($82.93 billion).[140]

Chengdu Aircraft Industry Group Co., Ltd.

Overview: Established in 1958 as the PRC's "main base for the development, production and export of aviation weapons and equipment," AVIC Chengdu Aircraft Industry Group Co (CAIG) [成都飞机工业（集团）有限责任公司] is one of China's largest manned and unmanned military aircraft manufacturers.[141] The enterprise was originally called Factory 132 [132 厂] and was one of 156 "national key construction projects" that received assistance and technical support from the Soviet Union to develop the PRC's heavy industry and defense industrial base.[142] In 1970, the 611 Institute [611 所], now more commonly known as the Chengdu Aircraft Design and Research Institute (CADI) [成都飞机设计研究所] joined Factory 132 to form, under the leadership of AVIC, the center of the "three-in-one" ["三结合"] development of Chengdu as a major locus of Chinese aviation production.[143] In 1986, Factory 132 was renamed as the Ministry of Aviation Industry Chengdu Aircraft Company [航空工业部成都飞机公司]. The company assumed its current name AVIC Chengdu Aircraft Industry Group Co (CAIG) in 1998, when it was reorganized as a full-fledged SOE.[144]

As AVIC's largest military aircraft producer, CAIG is a behemoth in the defense aerospace field. In 2021, CAIG's total assets were valued at 151.18 billion RMB (approximately 21.3 billion USD).[145] The company's operational income was reported as about 67.29 billion RMB (around 9.49 billion USD) in 2022.[146] The company manufactures a wide selection of manned and unmanned military aircraft, including the J-10 multi-role fighter series, the JF-17 light fighter (co-produced with the Pakistan Aeronautical Complex), the J-20 Fifth-generation stealth fighter jet, as well as multiple UAV series, most notably the "Wing Loong" [翼龙], literally "Pterodactyl", I, II, and III series.[147]

CAIG, along with its fellow AVIC subsidiary and close partner, CADI, is at the center of AVIC's massive aerospace production base in Chengdu, Sichuan. CAIG is based in Qingyang District [青羊区] with operations centered in Qingyang Aviation New City [青羊航空新城], an area that covers 42 square kilometers and has a population of roughly 370,000 residents.[148]

As China's defense modernization efforts intensified in the 1990s, Qingyang Aviation New City has been the focus of major developments, including the Overseas Chinese Economic and Technological Development Zone [华侨经济技术开发区] established in 1998, the Chengfei Industrial Park [成飞工业园] set up in 2003, the Qingyang Industrial Centralization Development Zone [青羊工业集中发展区] founded in 2004, the Chengdu Western New City Modern Service Industry Comprehensive Functional Zone [成都西部新城现代服务业综合功能区] established in 2010, the Qingyang Headquarters Economic Agglomeration Zone [青羊总部经济集聚区] completed in 2017, and the Chengdu Industrial Innovation and Design Functional Zone [成都工业创新设计功能区] established in 2021.[149] The Aviation High-End Equipment Intelligent Manufacturing Industrial Park [航空高端装备智能制造产业园], the Sichuan Aviation Industrial Park [四川成都航空产业园] and the Chengdu Aviation Equipment Experimental Base [成都航空装备实验基地] were all also recently completed.[150] In December 2022, the National High-End Aviation Equipment Technology Innovation Center [国家高端航空装备技术创新中心], directed by CAIG and CADI, was approved for construction in Chengdu.[151] This center will focus on making breakthroughs in key core technologies in the fields of stealth technology, extreme performance manufacturing, and intelligent testing of high-end aviation equipment.

In 2024, AVIC took the unprecedented step of placing 100% of CAIG's equity, 17.439 billion RMB (around $2.5 billion), under the much smaller AVIC-Zhonghang Electronic Measuring Instruments Co. Ltd. (ZEMIC) [中航电测仪器股份有限公司].[152] The merger, which was approved by the Shenzhen Stock Exchange's Mergers and Reorganization Committee in July 2024, was the exchange's largest restructuring since it launched its registration system.[153] In effect, the restructuring allowed CAIG to go public through a "backdoor listing," i.e. a reverse merger, via ZEMIC, which was already listed as a Shenzhen A-share (300114).[154]

Notable UAV Products

- Wing Loong I [翼龙-1] Unmanned Aerial Vehicle System [with Chengdu Aircraft Design Institute (CADI)][155]

- Medium-altitude long-endurance (MALE) UAV, primarily aerial reconnaissance but can be fitted with air-to-surface missiles to serve as a UCAV
    - The first Wing Loong I flight occurred in October 2007; it has an approximate flight ceiling of 5,000-7,000 meters and a maximum flying weight of 1,200 kilograms[156]
    - Wing Loong I uses a similar design and has a comparable performance to U.S. "Predator-class" UAVs
    - Platform uses push propellers and can be configured with air-to-surface weapons, electro-optical and infrared sensors (EO/IR) and synthetic aperture radar (SAR); customizable with electronic intelligence (ELINT) and Electronic Attack (EA)[157]
    - A 2017 state media interview with Wing Loong series chief designer Li Yidong [李屹东] of CADI reported preparations to send the UAV to Russia for testing for use in armored warfare targeting and reconnaissance, which is notable as the PRC has continued to support Russia's efforts to develop its military UAV capabilities during the ongoing the Russia-Ukraine war[158]

Figure 7: Wing Loong I [翼龙-I] UAV[159]

- Versions/Variants:
    - Wing Loong 1 [翼龙-1]

        - MALE UAV designed for aerial surveillance and reconnaissance first shown at the Zhuhai Airshows in 2008 (per AVIC) and demonstrated internationally in 2009[160]
    - Wing Loong 1-D [翼龙-1D], upgraded version of Wing Loong 1 first test flown in late 2018[161]
        - Features a 330 kg carbon fiber composite airframe supplied by Sichuan Xinwanxing Carbon Fiber Composite Company [四川省新万兴碳纤维复合材料有限公司][162]
    - Wing Loong 1-E [翼龙-1E]
    - Wing Loong WJ-1 [翼龙-1 武装无人机]
        - UCAV, Wing Loong I with air-to-surface missiles for precision strikes.[163]
    - Wing Loong GJ-1[翼龙-1 攻击无人机]
        - Upgraded version of WJ-I with reconnaissance/targeting pod under chin, as well as two hard points for carrying weapon systems[164]
        - The GJ-1 has an external payload of 480 kg (1058 lbs.) and an endurance of 20 hours.[165]
        - The GJ-1 is operated by the PLAAF for several missions including surveillance and reconnaissance; anti-radiation interference and attack, by jamming an adversary's air defense radars, fire control radars, and early warning systems; and tactical targeted strikes[166]
- Wing Loong II [翼龙-II] UAV System
    - MALE UAV, multi-mission; with a significantly higher payload than the Wing Loong I, capable of undertaking ISR, electronic warfare, strike, and border patrol missions; with six hard points (versus two on its predecessor), the Wing Loong II can carry up to ten air-to-ground missiles
    - The Wing Loong II has been in service with the PLAAF since 2018
    - Popular export, sold to Egypt, Morocco, Nigeria, Saudi Arabia, and the United Arab Emirates[167]
- Variants
    - Wing Loong GJ-II [翼龙 II 攻击无人机]
        - UCAV introduced in 2016, the GJ-II has an external payload of 480 kgs (1058 lbs) and an endurance of 20 hours

- Wing Loong II-H
    - Emergency rescue UAV in service with China's Ministry of Emergency Management
    - In addition to disaster surveillance, this UAV can provide emergency communication support by restoring public network communications within a 50km radius

Figure 8: A Wing Loong II UCAV at the 12th China International Aviation and Aerospace Exhibition[168]

- Wing Loong-3 [翼龙-3] UAV System
    - MALE UAV system first shown at the 2022 Zhuhai airshow[169]
    - Chief Designer Zhou Yi [周毅] is affiliated with AVIC, but it is not clear which specific entity[170]
    - Multi-purpose system can be used for anti-air, anti-submarine warfare (ASW), ground strike, maritime strike, search and rescue, and surveillance and aerial reconnaissance, first air-to-air-capable Wing Loong drone
    - The Wing Loong 3 has a maximum range of 10,000 km at medium altitude with a maximum take-off weight of 6,200 kg[171]
- Wing Loong-10 [翼龙-10] UAV System
    - HALE UAV series with some stealth characteristics, previously known by the names of its prototypes: "Fengying" [风影] and "Yunying" [云影], also known as "Cloud Shadow"[172]
    - WZ-10 HALE UAV is the current military name of vehicle in use by PLA

- WZ-10 has a flight ceiling of 15,000 m (49,000 ft) and an endurance of 20 hours; while likely primarily designed for reconnaissance, the WZ-10 can carry the Blue Arrow air-to-ground missile, light cruise missiles, CS/BBM3 (YL-12) GPS-guided bombs, and GB-4 precision-guided bombs[173]
- A WZ-10 sighting was reported in the East China Sea by the Japanese Ministry of National Defense in May 2024[174]

Notable Relationships

- Chengdu Aircraft Design and Research Institute (CADI) [成都飞机设计研究所]: long-term collaborative relationship
  - The Wing Loong I, II and III series were designed by CADI and manufactured by CAIG. Both companies are the two largest stakeholders in AVIC (Chengdu) UAV Systems Co., Ltd. [中航（成都）无人机系统股份有限公司], a major channel for the export of Chengfei UAVs, particularly the Wing Loong series
  - CAIG and CADI also co-direct the National High-end Aviation Equipment Technology Innovation Center [国家高端航空装备技术创新中心] in Chengdu[175]
    - National-level center unveiled in November 2023; led by SASAC, AVIC, and the Sichuan Provincial Government[176]
    - Seeks to boost innovation and promote the use of advanced technology throughout the entire aviation industry[177]
- Northwestern Polytechnical University (NWPU) [西北工业大学]: Strategic Cooperation Agreement[178]
  - Signed in January 2024 to "promote cooperation in basic and applied research, platform co-construction, joint talent training, scientific research projects and scientific and technological achievements with greater efforts, and further expand innovative cooperation areas and cooperation methods"
  - The agreement also expresses hope that strong NWPU graduates will join CAIG as employees
- Chengdu Qingyang District Government [成都市青羊区政府]: Strategic Cooperation Agreement
  - Signed in December 2021, the two sides agreed to jointly build and promote the high-quality development of education in Qingyang Aviation New City [青羊航空新城][179]

Known Subsidiaries

- Guizhou Aviation Aircraft Co., Ltd. [中航贵州飞机有限责任公司][180]
- Changsha 5712 Aircraft Industry Co., Ltd. [长沙五七一二飞机工业有限责任公司]
- Chengdu Chengfei Aviation Industry Development Co., Ltd. [成都成飞航空产业发展有限责任公司][181]

Directly Subordinate Organizations

- Chengfei Aviation Theme Education Base [成飞兴建的成飞航空主题教育基][182]
  - Promotes public interest in aviation

Key Personnel[183]

- Song Chengzhi [宋承志]: Party Secretary and Chairman
- Tian Gang [田刚]: Deputy General Manager
- Liu Shuntao [刘顺涛]: Assistant General Manager
- Ren Jie [任杰]: Chief Designer and Deputy Chief Engineer
- Cheng Jiwei [程基伟]: Executive Deputy Secretary

Year Established: 1958

Aliases

- Factory 132 [132 厂]
- Chengfei Factory 132 [成飞 132 厂]
- AVIC Chengfei [成飞]

Website

- https://cac.avic.com/

Subordinate to

- 100% ownership: AVIC-Zhonghang Electronic Measuring Instruments Co. Ltd (ZEMIC) [中航电测仪器股份有限公司]

Addresses

- No. 88, Weiyi Road, Huangtianba, Qingyang District, Chengdu City, Sichuan Province [四川省成都市青羊区 黄田坝纬一路 88 号][184]

AVIC (Chengdu) UAV Systems Co., Ltd.

Overview: AVIC (Chengdu) UAS [中航（成都）无人机系统股份有限公司] has been a leading military UAV production and sales enterprise, particularly for international exports, since its founding as Chengdu Aerospace High-tech Industrial Base Co., Ltd. [成都空天高技术产业基地股份公司] in August 2007.[185] When AVIC (Chengdu) UAS was "unveiled" under its new name in 2018, SASTIND stated that the Wing Loong UAV project is the "driving force" behind the company, which is also tasked with building up the "Dragon"-series UAV brand.[186] The company touts its Wing Loong UAV and UCAV exports to Belt and Road Initiative (BRI) countries to highlight its success in selling drones on the international market.[187] Along with sales of UAVs themselves, AVIC (Chengdu) UAS performs repairs and after-sales service, and provides

technical services and consultation for Wing-Loong and other UAVs purchased by its customers.[188]

AVIC (Chengdu) UAS provides a means for AVIC to attract equity investment and a platform to export the Wing Loong [翼龙] UAV series co-produced by its parent companies, AVIC subsidiaries Chengdu Aircraft Industry Group Co., Ltd. (CAIG) [成都飞机工业（集团）有限责任公司] and Chengdu Aircraft Design and Research Institute (CADI) [中国航空工业集团公司成都飞机设计研究所]. On September 23, 2021, AVIC (Chengdu) UAS's application to go public was accepted by the Shanghai Stock Exchange Science and Technology Innovation Board. The company's prospectus, included in its application to go public, reported CAIG as its controlling shareholder with a roughly 33% stake, followed by CADI, which held a 20.4% stake.[189]

In June 2022, AVIC (Chengdu) UAV Systems was listed on the Science and Technology Innovation Board of the Shanghai Stock Exchange trading under the abbreviation "中航无人机" (AVIC UAV; A-share code of 688297).[190] The company's IPO raised around four billion RMB in capital.

A 2023 report by a state-owned securities firm reported that due to an increase in military sales, the company's operational income grew massively from 250 million RMB in 2019 to 2.77 billion RMB in 2022.[191] The prospectus for AVIC (Chengdu) UAV's listing also stated that AVIC subsidiaries control 66.73% of the companies' funds, a supermajority share, with the State Assets and Supervision and Administration Commission (SASAC), the company's ultimate controller.[192] The company's total market value as of late August 2024 was 20.689 billion RMB ($2.92 billion).[193]

Notable UAVs

- Wing Loong [翼龙] I and II UAV Systems (with CAIG and CADI) [194]

Notable Relationships

- Chengdu Aircraft Industry Group Co., Ltd. [成都飞机工业（集团）有限责任公司]: controlling stakeholder[195]
- Chengdu Aircraft Design and Research Institute [成都飞机设计研究所]: major stakeholder
- The company is a major exporter of UAVs, particularly the Wing-Loong series, see the chart on the next page for Chengfei's UAV exports over the past decade

Key Personnel

- Zhang Xiaojun [张晓军]: Party Secretary and Chairman[196]

Year Established: 2007
Aliases:

- Chengdu Aerospace High-tech Industrial Base Co., Ltd. [成都空天高技术产业基地股份公司] (former name 2007-2018)[197]

Website

- Archived at https://web.archive.org/web/20211125132509/http://avicuas.com/

Subordinate to

- Chengdu Aircraft Industry Group Co., Ltd. [成都飞机工业（集团）有限责任公司] [controlling stakeholder]

Major AVIC Chengfei UAV Exports (2014-2023)[iv]				
Recipient	**UAV**	**Year (s)**	**Estimated Number Sold**	**SIPRI Trade Indicator Value (1= ~$1 million)**
Morocco	Wing Loong-II	2022-2023	2	8
Nigeria	Wing Loong-II	2020, 2023	5	20
UAE	Wing Loong-II	2017-2018	15	70
Egypt	Wing Loong-I	2016, 2018	42	96
Saudi Arabia	Wing Loong-I	2015-2017	15	45
UAE	Wing Loong-I	2013-2017	25	75
Pakistan	Wing Loong-II	2018	48	192
Saudi Arabia	Wing Loong-II	2017	50	200
Kazakhstan	Wing Loong-I	2016	3	9
Pakistan	Wing Loong-I	2015	5	15
Uzbekistan	Wing Loong-1	2014	5	15
Notes: All quantities are estimates; 2018 Pakistan deal was part of co-production agreement with AVIC 's China National Aero-Technology Import & Export Corporation (CATIC)				

All data in the above table is from the Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, last updated March 2024[198]

[iv] Chengfei [成飞] is the brand name/shorthand for platforms produced by CAIG.

Guizhou Aviation Aircraft Co., Ltd.

Overview: Guizhou Aviation Aircraft Corporation (GAC) [中航贵州飞机有限责任公司] was formed in 2011 through the integration of various factories in Anshun prefecture, Guizhou, namely Guizhou Shuangyang Aircraft Manufacturing Factory [贵州双阳飞机制造厂] (Factory 162 [一六二厂/162 厂]) {also known as 贵航集团双阳飞机制造厂},[199] Guizhou Yunma Aircraft Manufacturing Factory [贵州云马飞机制造厂] (Factory 130 [一三〇厂]), Guihang Aircraft Design Institute [贵航飞机设计研究所] (First Institute [一所]), Guizhou Lingyun Aviation Material Supply and Marketing Company [贵州航空物资供销公司] (Warehouse 602 [六〇二库]), Guizhou Guihang UAV Company [贵州贵航无人机公司], and the Guihang Aircraft Division [贵航飞机事业部].[200] The company employs over 6,300 people.[201] As of late 2021, GAC had about four billion RMB in total assets (around $552 million).[202]

GAC is involved in producing a range of fighter jets, advanced trainer aircraft, general-purpose aircraft, and UAVs including the Harrier Hawk [鹞鹰] UAV Series designed by its wholly owned subsidiary Guizhou Guifei Aircraft Design and Research Institute Co., Ltd. [贵州贵飞飞机设计研究院有限公司].[203] According to the company, it has a complete aircraft scientific research and production system, a digital off-site collaborative aircraft design and manufacturing system, and a UAV test and flight system.[204]

Notable UAV Products:

- Harrier Hawk [鹞鹰] UAV series[205]
  - Harrier Hawk [鹞鹰]
    - MALE UAV, civilian drone intended for emergency response and disaster relief. The first flight occurred in 2008[206]
    - 100-kilogram payload, including a camera and a synthetic aperture radar (SAR)
  - Harrier Hawk II [鹞鹰 II]
    - MALE UAV underwent flight testing in 2018, specifically designed as a military UAV (in contrast to its predecessor)[207]
    - Harrier Hawk II has a wheeled takeoff and landing system, reportedly capable of "all-weather flight"[208]
    - Optoelectronic image reconnaissance and surveillance, radar image reconnaissance, and communication signal detection capabilities[209]

Notable Relationships:

- University of Electronic Science and Technology of China (UESTC) [电子科技大学] School of Mechanical and Electrical Engineering [机电学院]: Cooperation Agreement
  - In May 2017, the two sides signed a cooperation agreement to "share resources and seek common development in projects, technology, talents, equipment, etc., establish

a long-term and stable cooperative relationship, and continue to explore an efficient transformation model of scientific and technological achievements that combines production, education and research, in order to comprehensively enhance Guizhou Aircraft Company's scientific and technological innovation and core competitiveness"

- Guizhou Aircraft Company Party Secretary Wang Wenfei [王文飞] led a delegation to the school's campus later that year to exchange views on deepening cooperation[210]

Known Subsidiaries:

- Guizhou Guifei Aircraft Design and Research Institute Co., Ltd. [贵州贵飞飞机设计研究院有限公司][211]
- Guizhou Guihang Aircraft Design Research Institute [贵州贵航飞机设计研究所][212]
- Guiyang Qianjiang Machinery Factory [贵阳黔江机械厂] (current status unclear)[213]

Directly Subordinate Organizations

- AVIC Fixed-Wing Unmanned Aerial Vehicle Flight Test and Training Base/Unmanned Aerial Vehicle Manufacturing Base [中航工业固定翼无人飞行器试飞、培训基地/无人飞行器制造基地][214]
- A dual-use airfield

Key Personnel

- Zhou Hui [周辉]: Party Secretary, Chairman, Legal Representative and General Manager[215]
- Wang Wenfei [王文飞] was Party Secretary in the late 2010s, current position unclear

Year Established: 2011[216]

Aliases

- Guifei Company [贵飞公司][217]
- AVIC Guifei [航空工业贵飞][218]
- Guizhou Aircraft Company [贵州飞机公司][219]
- GAC[220]

Website

- http://avicgac.com/ (defunct; archived but mostly defunct in archived versions as well: https://web.archive.org/web/20170626012316/http://avicgac.com/)
- http://www.gaius.net.cn/ (possibly defunct)

Subordinate to

- Chengdu Aircraft Industry Group Co., Ltd. [中国航空工业成都飞机工业集团有限公司] (100% ownership stake)[221]

Address

- Guifei Co., Airport Road, Songqi Town, Anshun Development Zone, Guizhou Province [贵州省安顺市开发区宋旗镇机场路贵飞公司][222]

Guizhou Guifei Aircraft Design and Research Institute Co., Ltd.

Overview: The Guizhou Guifei Aircraft Design and Research Institute [贵州贵飞飞机设计研究院有限公司], also known as the Guizhou Aircraft Design Institute [贵航飞机设计研究所], is a comprehensive scientific research and design institute that designs fighter jets, advanced trainer aircraft, general-purpose aircraft, and UAVs.[223] It engages in research and production tasks assigned by the Chinese government, which can include both aviation and non-aviation scientific research and production tasks, development of electromechanical technology, technology transfer, technical consultation, and technical services.[224] The institute's research areas include aerodynamics, overall layout, structural strength, machinery, hydraulic air-conditioning, electrical components, communication and navigation, integrated avionics, flight control, flight testing, reliability engineering, comprehensive support, computer simulation, load measurement and control, UAV test flight, materials, scientific and technological information science, translation, network engineering, software design and development, and other areas.[225] The Guizhou Aircraft Design Institute was originally subordinate to China National Guizhou Aviation Industry (Group) Co., Ltd. (GAIC) before being placed under GAC.[226]

Notable UAV Products:

- Harrier Hawk [鹞鹰] UAV Series with GAC [227]

Directly Subordinate Organizations

- 10 design and research offices and laboratories [设计研究室和试验室][228]

Key Personnel

- Han Ronggao [韩荣高]: Chairman; CEO[229]

Year Founded: 1968[230]

Aliases

- 648 Institute [648 所][231]
- Guizhou Aircraft Design Institute [贵航飞机设计研究所][232]
- Guifei Institute [贵飞所][233]
- Guizhou Aviation Institute [贵航所] [234]
- Guifei Design Institute [贵飞设计院][235]

Former names:

- Guizhou Guihang Aircraft Design Institute [贵州贵航飞机设计研究所][236] (1999-2020)[237]
- The First Design Office of the Third Engineering Bureau of Guizhou Province (011 Base) [贵州省三机局（011 基地）第一设计室] (older)[238]
- First Design Institute of the 011 Base [011 基地第一设计室][239]
- Guizhou Fighter Design Institute [贵州歼击机设计所][240]
- First Design Institute of the 011 Base/ First Institute [011 基地第一设计所[241] / 一所][242]

Website

- N/A

Subordinate to

- AVIC Guizhou Aviation Aircraft Corporation [中航贵州飞机有限责任公司][243]

Addresses

- Guizhou Guihang Aircraft Design Institute, Lingyun Road, Anshun Development Zone, Anshun, Guizhou Province [贵州省安顺市开发区凌云路贵州贵航飞机设计研究所][244]

China National Guizhou Aviation Industry (Group) Co., Ltd.

Overview: China National Guizhou Aviation Industry (Group) Co., Ltd., also known as Guizhou Aircraft Industry Corporation (GAIC) [中国贵州航空 工业（集团）有限责任公司] was set up as part of the "Third Line" [三线] strategy initiated in 1964 to develop defense industries in China's interior to render them less vulnerable to possible U.S. or Soviet nuclear or conventional strikes.[245]

GAIC cooperates with leading UAV research centers such as Beihang University's Institute of Unmanned Systems [北京航空航天大学无人系统研究院] and fellow AVIC subsidiary Chengdu Aerospace Design Institute to produce MALE and advanced HALE UAVs for reconnaissance and strike missions.[246]

Notable UAV Products

- WZ-2000
    - Stealth reconnaissance UAV resembling a smaller version of the U.S. Global Hawk UAV with shorter range first appeared at the Zhuhai International Air show in 2000[247]

- BZK-007 (developed with Beihang University)[248]
    - MALE reconnaissance UAV with 16-24 hours endurance[249]
- WZ-7 [无侦-7] (designed by CADI) also known as the Soar Dragon [翔龙] HALE UAV[250]
    - HALE UAV with a joined-wing design, primarily intended for reconnaissance but can be fitted with anti-ship or cruise missiles, range of 7,000 km, 10 hours endurance at maximum speed[251]
- WZ-8 [无侦-8] (designed by CADI)[252]
    - Hypersonic HALE UAV, incapable of self-take off, must be launched by H-6N Strategic bomber that has a modified ventral fuselage section to accommodate the up to 5,000 kg UAV. Launching at around 33,000 feet, the drone could then achieve high speeds, alternating between glides and engine-powered flight, at speeds over Mach 4.5[253]
- Wing Loong I [翼龙] UAV[254]
- Wing Loong II medium-altitude surveillance UAV[255]
- Yaoying / Harrier Hawk [鹞鹰] UAV (prior to the founding of GAC, which took over production)[256]

Notable Relationships

- Chengdu Aircraft Design and Research Institute (CADI) [成都飞机设计研究所]
    - Designer for WZ-7 and WZ-8 UAVs produced by GAIC[257]
- Beihang University Institute of Unmanned Systems [北京航空航天大学无人系统研究院][258]
    - Collaborated on development of BZK-007 and other UAVs

Known Subsidiaries:

- Guizhou Huaxia Engineering Contracting Co., Ltd. [贵州华夏工程承包有限责任公司][259]
- Guizhou Guihang Investment Management Co., Ltd. [贵州贵航投资管理有限公司]
- Guizhou Guihang Industry Co., Ltd. [贵州贵航实业有限公司]
- Guizhou Guihang Service Operation Management Co., Ltd. [贵州贵航服务经营管理有限公司]
- Guihou Aviation Industry Import/Export Co. [贵州贵航国际贸易有限公司][260]
- Guizhou Jinjiang Aviation Hydraulic Co., Ltd. [贵州金江航空液压有限责任公司]
- Guizhou Xixiu Industrial Trading Co., Ltd. [贵州西秀工业贸易有限公司]
- Guizhou Gaike Aviation Electromechanical Co., Ltd. [贵州盖克航空机电有限责任公司]
- Guizhou AVIC General Aircraft Co., Ltd. [贵州中航通用飞机有限责任公司[261]

Key Personnel

- Ma Xiaoqi [马小琦]: General Manager and Legal Representative[262]
- Lu Jinglei [吕惊雷]: CEO[263] (previous)

Year Established: 1964[264]

Aliases

- Base 011 [011 基地][265]
- Guihang Group [贵航集团][266]
- GAIC (as in Guizhou Aircraft Industry Corporation)[267]
- CAIG (China Aircraft/Aviation Industry Group)[268]
- Guizhou Aviation Group [贵州航空集团][269]
- Former:
    - Third Ministry of Machine Building Guiyang Office [三机部贵阳办事处]
    - Office 011 [011 办事处][270]
    - Guizhou Aviation Industry Group [贵州航空工业集团][271]
    - Guizhou Aviation Management Bureau [贵航管理局][272]
    - Guizhou Aircraft Industry Corporation [贵州航空工业集团公司]
    - China Guizhou Aircraft Industry Group [中国贵州航空工业集团][273]

Website

- http://www.gaic.com.cn/ (defunct; archived: https://web.archive.org/web/20110625061227/http:/www.gaic.com.cn/)

Subordinate to

- China Aviation Industry General Aircraft Co., Ltd. [中航通用飞机有限 责任公司] (100% ownership stake)[274]

Addresses

- 110 Jinjiang Road, Anshun Economic and Technology Development Zone, Guizhou Province [贵州省安顺市经济技术开发区 110 号][275]

Chengdu Aircraft Design and Research Institute

Overview: The Chengdu Aircraft Design and Research Institute (CADI) [成都飞机设计研究所] originated as the Second Fighter Design Institute, one of the eight new PLA research institutes established by the Central Military Commission in 1968.[276] Upon its official launch in 1970, the entity was called the 611 Institute [611 所] and CADI is still sometimes referred to by that name.

In 1979, the organization was formally renamed and registered as the Chengdu Aircraft Design and Research Institute (CADI).

The institute was included among the Ministry of Science and Technology (MOST)'s 863 Program designed to reduce reliance on foreign sources and promote indigenous production of advanced technologies that became part of the "National Key R&D Program" in February 2016.[277]

Since its inception, CADI has cooperated closely with Factory 132 and its successor Chengdu Aircraft Industry Group [CAIG] under the overall leadership of AVIC. CADI has designed several UAV series produced primarily by CAIG, most notably the Wing Loong [翼龙] I, II, and III series. CADI has also designed UAVs for other AVIC subsidiaries, such as the HALE WZ-7 and WZ-8 UAVs manufactured by the China National Guizhou Aviation Industry (Group) Co., Ltd.

Notable UAV Products

- Wing Loong [翼龙] I, II, and III Unmanned Aircraft Systems (with CAIG)
- WZ-7 [无侦-7], Soar Dragon [翔龙] HALE UAV (with AVIC's Guizhou Aviation Industry Group[278]
- WZ-8 [无侦-8] Supersonic hypersonic HALE UAV (with Guizhou Aviation Industry Group)[279]

Notable Relationships

Domestic

- Chengdu Aircraft Industry Corporation of China [成都飞机工业（集团）有限责任公司], partner and co-producer
    - The two companies work together to produce products under the "Chengfei" [成飞] brand, including the J-20 fifth generation fighter jet and the Wing Loong UAV series
    - Together they hold a majority stake in AVIC (Chengdu) UAV Systems Co., Ltd. [中航（成都）无人机系统股份有限公司], which sells and exports the Wing Loong and other UAV series[280]
- Chengdu Qingyang District Government [成都市青羊区人民政府]: co-sponsor of Aircraft Design Center [飞设中心] in district[281]
- Northwestern Polytechnical University (NWPU) [西北工业大学]: Co-founded UAV DSTKL
    - CADI partnered with NWPU and the Air Force Engineering University [空军工程大学] to establish the State Key Laboratory of Unmanned Aerial Vehicle Technology [无人飞行器技术全国重点实验] at NWPU[282]
- Sichuan Xinwanxing Carbon Fiber Composite Company [四川省新万兴碳纤维复合材料有限公司]: material supplier
    - Supplies materials and constructs Wing-Loong I-D body structure under careful guidance from CADI[283]

International:

- CADI claims to have cooperation and technical exchanges with more than 100 enterprises and institutions in more than 50 countries, including the United States, Britain, France, and Russia[284]

Known Subsidiaries

- Chengdu Kaidi Precision Technology Co., Ltd.[成都凯迪精工科技有限责任公司]
- Chengdu Kaidi Property Services Co., Ltd. [成都凯迪物业服务有限公司]

Directly Subordinate Organizations

- UAV Department [无人机部][285]
- Aviation Designer Center [飞设中心]: jointly with Chengdu, Qingyang District Government [成都市青羊区人民政府][286]

Key Personnel

- Wang Haifeng [王海峰]: Chief Designer
    - Chief designer of J-10C and J-10B jets, deputy chief-designer for J-20, mainly focused on fighter planes. As of August 2022, he had been at CADI for 38 years, rising to chief designer from the level of a rank-and-file technician[287]
- Li Yidong [李屹东]: Deputy Chief Designer
    - Chief designer of the "Wing Loong" I and II series of UAVs; his mother was also a scientist at CADI involved in designing the J-8 fighter[288]
- Huang Yun [黄云]: Designer
    - Leader of the team that designed the original Wing Loong prototype in the 2000s. He was also deputy leader of the 863 Program (National High-Tech R&D Program) expert group and made contributions to the designs of the JF-17 and J-10 fighter planes[289]
- Tang Yong [唐勇]: Chief Designer of the Wing Loong-1E variant[290]

Figure 9: Li Yidong, AVIC "Wing Loong" Series UAV Chief Designer[291]

Year Established: 1970

Aliases

- 611 Aircraft Research and Design Institute [611 所]

Website

- Archived version available at https://web.archive.org/web/20130509083637/http:/www.cadi.ac.cn/v2009/
- The domain name for the institute's old web page (http://www.cadi.ac.cn/) is listed as for sale

Subordinate to

- AVIC[292]

Addresses

- 1610 Riyue Avenue, Qingyang District, Chengdu, Sichuan [成都市青羊区日月大道 1610 号]

AVIC Harbin Aircraft Industry Group Co., Ltd.

Overview: One of China's oldest aerospace manufacturers, originating in 1952, Harbin Aircraft Industry Group Co., Ltd. (HAIG) [中国航空工业哈尔滨飞机工业集团有限公 司] is responsible for the development and production of helicopters. HAIG is also involved in UAV research through partnering with Beihang University to produce the BZK-005 series of medium and long-

range surveillance UAVs that have seen considerable operational use, including by the PLA Air Force (PLAAF) and People's Liberation Army Navy (PLAN) in the East China Sea and South the China Sea.[293] Harbin Aircraft Industry Group has 6,200 employees[294] down from nearly 7,000 in 2019.[295]

Notable UAV Products

- BZK-005 Changying [长鹰] UAV system (developed with Beihang University) [296]
    - The BZK-005, which has an endurance of as much as 40 hours, is sometimes dubbed China's version of "Global Hawk" (the U.S. Military's RQ-4 HALE UAV) in service with the PLAAF and PLAN[297]
    - BZK-005-E
        - Export variant[298]

Notable Relationships

- Beihang University[299]
- Airbus – cofounded Harbin Hafei Airbus Composite Manufacturing Centre Co. Ltd.[300]
- Harbin Hafei is the sole supplier of rudders, elevators and other parts for the A350 series aircraft and the main supplier of rudders for the A320 series aircraft[301]
- HAIG has cooperated with over 10 countries including the United States, Russia, Britain, and France[302]
- China has exported variants of the Z-9 helicopter to Bolivia, Cameroon, Ghana, Kenya, Laos, Mauritania, Namibia, and Pakistan[303]
- GKN Nacelle Fan Cover Project - AVIC Harbin Aircraft Industry Group and GKN Aerospace of the United Kingdom signed a subcontracting agreement for the HTF7500 engine nacelle. GKN and AVIC Harbin Aircraft Industry Group cooperated to jointly produce a composite nacelle system for Honeywell's HTF7500 engine[304]

Known Subsidiaries

- Harbin General Aircraft Industry Co. [哈尔滨通用飞机工业有限公司][305]
- Tianjin Helicopter Co., Ltd. [天津直升机有限责任公司][306]
- China Feilong General Aviation Co., Ltd. [中国飞龙通用航空有限公司]
- Tianjin AVIC Jinjiang Aviation Maintenance Engineering Co., Ltd. [天津中航锦江航空维修工程有限责任公司]

100% Ownership:[307]

- Hafei Economic Development Co [哈尔滨哈飞经济开发有限公司] (inactive)
- Hafei SMA Tooling Industry Excellent Center Co [哈尔滨哈飞西玛工装工业优良中心有限公司] (inactive)
- Harbin Hafei Trading Corporation [哈尔滨哈飞贸易总公司]

- Harbin Aviation Industry (Group) Co., Ltd. [哈尔滨航空工业（集团）有限公司] (inactive)

Partial Ownership:

- Shenzhen Shenhang Electronic Machinery Co [深圳深航电子机械有限公司]: 67% stake as of March 2024
- Beijing Bosai Aviation Information Technology Co [北京博赛航空信息科技有限公司]: 30% as of March 2024
- Harbin Shuanghang Economic and Trade Co [哈尔滨双航经贸有限责任公司]: 30% as of April 2024
- Harbin Dongan Automobile Engine Manufacturing Co [哈尔滨东安汽车发动机制造有限公司]: 15% as of March 2024
- Tianjin Feilong Investment Holdings Co [天津飞龙投资控股有限公司]: 29% as of March 2024
- AVIC Helicopter Co [中航直升机有限责任公司]: 3.25% as of March 2024
- Harbin Hafei Airbus Composite Materials Manufacturing Center Co., Ltd./Manufacturing Center [哈尔滨哈飞空客复合材料制造中心有限公司/制造中心[308]
    - Joint venture established by AVIC Helicopter Co., Ltd. (formerly AVIC Harbin Aircraft Industry Co., Ltd.) and its partners and Airbus China, with the purpose of establishing a company in Harbin to manufacture composite parts for Airbus A350 XWB and Airbus A320 series aircraft

Directly Subordinate Organizations

- National technology center [国家级技术中心]
- Postdoctoral workstation [博士后工作站]

Key Personnel

- Wang Xibao [王希豹]: Deputy general manager and chief engineer.
    - Previously served as chief designer and deputy chief engineer of the rotorcraft of Harbin Aircraft Design Institute, chief rotor designer of the Aircraft Design Institute, and deputy chief engineer of the company[309]
    - Wang graduated from Beihang University in 1990 and is a researcher-level senior engineer
- Cao Shengli [曹生利]: Chairman and party secretary
- Chang Hongliang [常洪亮]: researcher
    - Nanjing University of Aeronautics and Astronautics graduate[310]

Year Established:1948[311];1952[312] (Factory 122 [122 厂])

Aliases

- Factory 122 [122 厂][313]
    - Harbin Aircraft Manufacturing Plant [哈尔滨飞机制造厂][314]
    - Hafei Factory 122 [哈飞 122 厂]
- Hafei[315] [哈飞] [316]
    - AVIC Hafei [中国航空工业集团哈飞][317]
- Harbin Aircraft Industry Group (HAIG)[318]
- AVIC HAIG[319]
- Hafei Group [哈飞集团][320]
- AVIC Harbin Aircraft Industry Group Co., Ltd./AVIC Harbin Aircraft Industry Group Co., Ltd. [中航工业哈尔滨飞机工业集团有限责任公司/中航工业哈飞][321](used in 2000s and 2010s)

Websites

- https://www.hafei.com/
- https://www.hafeigroup.net/ (English)
- https://hafei.avicnet.cn/ [defunct; not archived]

Subordinate to

- AVIC:
    - Immediate parent institution: AviChina Industry and Technology Co., Ltd.[322] (may have moved to Avicopter [中航直升机股份有限公司] after the latter's purchase of it was completed)[323] / AVIC[324]
    - Corporate Ownership: Avicopter [中航直升机股份有限公司] (100%);[325] AviChina Industry and Technology Co., Ltd. [中国航空科技工业股份有限公司] (100%)[326] (former)

Addresses

- 15 Youxie Street, Pingfang District, Harbin, Heilongjiang Province [黑龙江省哈尔滨市平房区友协大街 15 号][327]
- Nancheng 2nd Road, Hanan Industrial New City, Harbin [哈尔滨哈南工业新城南城二路][328]

AVIC Shenyang Aircraft Design and Research Institute

Overview: Founded in 1961, the AVIC Shenyang Aircraft Design and Research Institute (SADRI), also known as the Shenyang Aircraft Design Institute (SADI) [沈阳飞机设计研究所], designs and develops combat aircraft and UAVs while also undertaking preliminary research on

aviation technology and furnishing weapons and equipment for the PLA.[329] SADI currently has a scientific research team of over 2,000 people.[330] SADI is a leader in UAVs, avionics, composites, stealth, thrust vectoring, and other aerospace technology research. SADI, also known as the 601 Institute [601 所], appears responsible for developing the AVIC 601-S program to produce a series of low-observable drones that bear the institute's names.[331] Low-observables or "stealth" [隐形] drones developed by SADI include the large HALE UAV GJ-11 (see below), which was the only aircraft to appear alone at the PLA military parade in October 2019 marking the 70th anniversary of the PRC's founding.[332] These UAVs are likely designed to undertake a variety of missions, including reconnaissance, strike, electronic countermeasures, anti-radiation, and anti-stealth.

SADI also serves as an academic institution, training master's and Ph.D. students in relevant fields.[333] SADI's professional training covers 55 fields, including aircraft aerodynamics, flight control, electromechanical systems, avionics, aircraft support, UAVs, aviation product research and development, flight control, fuel systems, integrated electronic fire control, and full aircraft R&D.[334] The institute is also responsible for the digital engineering of the national defense aircraft manufacturing industry.[335]

Figure 10: GJ-11 "Sharp Sword" [攻击-11 利剑] at the 13th China International Aviation and Aerospace Exhibition[336]

Notable UAV Products

- GJ-11 "Sharp Sword" [攻击-11 利剑] UAV (with Jiangxi Hongdu Aviation Industry Group)[337]
    - This large semi-stealth UAV uses a turbofan engine of a large, manned fighter, and has a wingspan of 14 meters, a maximum take-off weight of over 10 tons, a maximum bomb load of more than 2 tons, and has a Mach 0.8 cruising speed[338]

    - A 2021 article in *Aviation Knowledge Magazine* [航空知识杂志], published by the Chinese Society of Aeronautics and Astronautics, characterizes the GJ-11 as an unmanned version of the U.S. B-2 Stealth Bomber, a "golden partner" [黄金搭档] for the J-20 stealth fighter[339]
    - The above article notes that the GJ-11 has a range of 1,500 km and an endurance time of six hours

- "Divine Condor" [神雕] UAV
    - This extremely large HALE UAV, called the "world's biggest drone," has a purported take-off weight of 15-20 tons, a 50-meter wingspan, and reported maximum altitude of 25,000 meters[340]
        - Some analysts assess it may be intended for counter-stealth operations[341]
        - To improve this platform's counter-reconnaissance capabilities, the PLA has also installed a phased array radar to provide accurate fire control data for the platform[342]

- "Dark Sword" [暗剑] Supersonic UAV
    - Essentially a large, unmanned fighter with fixed wings, and wheeled takeoff and landing. A prototype was demonstrated at the 2006 Zhuhai Airshow[343]
    - Little was known of the UAV's development until another model of it appeared on Chinese media in 2018; state media reported at the time that based on the new design, the UAV "appears to have met its main requirements for high maneuverability, supersonic speed, and stealth"[344]
    - Does not appear to be on the market and it is not clear where the project stands as of writing

Notable Relationships

- Jiangxi Hongdu Aviation Industry Group [江西洪都航空工业集团]: Collaborated on the GJ-11 UAV, SADI designed the platform while Hongdu Aviation manufactured the platform[345]
- AVIC Shenyang Aircraft Industry Group Co., Ltd.: official partner[346]
    - Collaborated on developing several warplanes, such as the carrier-based J-15 [歼-15] fighter

- Beihang University Unmanned Systems Research Institute [北航无人系统研究院]**:** agreement on party-building and talent exchanges
    - A co-construction agreement between this institute and Shenyang Aircraft Design Institute's UAV Department was signed in October 2021 to strengthen cooperation on party-building and technical talent exchanges[347]

- Yangzhou Municipal Government [扬州市人民政府]: joint laboratory construction
  - A signing ceremony for the new laboratory was held in January 2024[348]
- Possible link / frequent cooperation with AVIC Shenyang Aircraft Industry Group Co., Ltd. [中国航空工业沈阳飞机工业集团有限公司]

Known Subsidiaries

- Yangzhou Collaborative Innovation Research Institute [扬州协同创新研究院][349]
- Yangzhou Laboratory of Aviation Science and Technology [航空科技扬州实验]
  - Established with the Yangzhou Municipal Government [扬州市人民政府] in Yangzhou, Jiangsu

Directly Subordinate Organizations

- Shenyang Institute, Yangzhou Branch [沈阳所扬州院], also affiliated with the Yangzhou Collaborative Innovation Research Institute [扬州协同创新研究院][350]
- UAV Department [无人机部/航空工业沈阳所无人机部][351]

Key Personnel

- Xi Jixing [奚继兴]: Party Secretary[352]
- Zhang Zhibing [张志冰]: Deputy Director[353]
- Ning Yongqian [宁永前]: Assistant Director
- Song Yingdong [宋迎东]: Vice President[354]
- Lu Yuanjie [卢元杰]: Director of UAV Department [无人机部] [355]
- Fu Jiawei [富佳伟]: Deputy Chief Engineer; General Pneumatic Department Deputy Director [总体气动部副部长][356]
- Zhang Zijun [张子军]: Chief Designer[357]
- Li Tian [李天]: Chief Expert [首席专家] (one of several; a rank rather than title)[358]

Year Established: 1961[359]

Aliases

- 601 Institute [601 所][360]
- Shenyang Institute [沈阳所][361]

Website

- http://www.sadri.avic.com/ (defunct; a 2020 version is archived at https://web.archive.org/web/20200114040306/http://www.sadri.avic.com:80/)

Subordinate to:

- AVIC[362]

Addresses

- No. 40, Tawan Street, Huanggu District, Shenyang, Liaoning [辽宁沈阳市皇姑区塔湾街 40 号][363]

Yangzhou Collaborative Innovation Research Institute

Overview: The Yangzhou Collaborative Innovation Research Institute [扬州协同创新研究院] researches, develops, and produces UAV systems, as well as other general aviation products. These include airborne system design and production, software development, and MCF strategy research and consultation. The Institute is a wholly owned subsidiary of the AVIC Shenyang Aircraft Design Institute (SADI). In 2019, the institute was officially unveiled under its current name, and an 18-member innovation alliance was announced.[364] The Institute underwent a major restructuring in 2021. It was part of the first batch of enterprises to move into the new "Aviation Valley" [航空谷奠] development zone in Yangzhou in 2021.[365] The institute has over 170 employees.[366]

Notable UAV Products

- 160 scientific and technological innovation projects, to form an initial aviation industry development framework covering UAVs, airborne systems, aviation power[367]

Notable Relationships

- Members of Innovation Alliance [创新联盟] launched by SADI and the Yangzhou Collaborative Innovation Research Institute in 2019 include:[368]
  - Dalian University of Technology [大连理工大学]
  - Fudan University [复旦大学]
  - BUAA [北京航空航天大学]
  - China Aeroengine Research Institute [中国航空发动机研究院]

Key Personnel

- Zuo Linxuan [左林玄]: Chairman[369]
- Tao Xiaoyang [陶晓洋]: CEO[370]
- Sun Cong [孙聪]: Academician[371]
- Wang Jun [王浚]: Academician[372]

Year Established: 2019[373]

Aliases

- Shenyang Institute Yangzhou Institute [沈阳所扬州院][374]

- Shenyang Aircraft Design Collaborative Innovation Research Institute [沈阳飞机设计研究所协同创新研究院][375]
- Shenyang Aircraft Design Institute Yangzhou Collaborative Innovation Research Institute [沈阳飞机设计研究所扬州协同创新研究院有限公司][376]

Website

- Unknown

Subordinate to

- Shenyang Aircraft Design Institute (SADI) [沈阳飞机设计研究所] (100%)[377]

Addresses

- Building B, Building 28, Jiangsu Information Service Industry Base, Guangling New Town, Yangzhou, Jiangsu Province [江苏省扬州市广陵新城江苏信息服务产业基地内 28 号楼 B 栋][378]

Jiangxi Hongdu Aviation Industry Group

Overview: Founded in 1951, the Jiangxi Hongdu Aviation Industry Group (HAIG) [江西洪都航空工业集团], previously known as Nanchang Aircraft Manufacturing Company (NAMC), is a key scientific research and production base for trainer aircraft, unmanned aerial vehicles, general aircraft, and missiles.[379] While Hongdu Aviation Industry Group is primarily devoted to producing basic and advanced training aircraft, the company has partnered with Shenyang Aircraft Design Institute (SADI) to produce the GJ-11 "Sharp Sword" (攻击-11 利剑) UCAV.[380]

Notable UAV Products

- GJ-11 "Sharp Sword" [攻击-11 利剑] UCAV (for full details see SADI entry on pp. 57-60)

Notable Relationships

- Shenyang Aircraft Design Institute (SADI) [沈阳飞机设计研究所]: UAV Development Cooperation
  - Cooperated to manufacture GJ-11 UAV designed by SADI[381]

Known Subsidiaries[382]

- Nanchang Aircraft Design Institute [南昌飞机设计研究所]
- Nanchang Missile Design Institute [南昌导弹设计所]
- Jiangxi Hongdu International Electromechanical Co., Ltd. [江西洪都国际机电有限责任公司/洪都国际机电]

- Jiangxi Changjiang General Aviation Co., Ltd. [江西长江通用航空有限公司/长江通用航空]
- Jiangxi Hongdu Aviation Industry Co., Ltd. [江西洪都航空工业股份有限公司/洪都航空]
    - Listed company, seemingly with a name identical to that of the main company

Key Personnel

- Lin Dong [林东]: General Manager, Director and Deputy Party Secretary[383]

Year Established: 1951

Aliases

- AVIC Hongdu [航空工业洪都][384]

Website

- https://www.hongdu.com.cn/

Subordinate to

- AVIC

Addresses

- Aviation City, Nanchang High-tech Industrial Development Zone, Nanchang City, Jiangxi Province [江西省南昌市南昌高新技术产业开发区航空城][385]

Shaanxi Aircraft Industry Corporation

Overview: Shaanxi Aircraft Industry Corporation (SAIC) [中航工业陕西飞机工业(集团)有限公司] undertakes the development, manufacturing, sales, and service of fixed-wing aircraft, special aircraft, and UAVs. The company is also involved in domestic and foreign aircraft parts processing and subcontracting, motor vehicle and medical equipment parts manufacturing, manufacturing of aviation technology equipment, aircraft ground support equipment, civilian machinery and equipment, aircraft modification and repair, and aircraft leasing and service support.[386]

The company was founded in 1964 under the "Third Line" strategy to develop defense industries in the country's interior given the vulnerability of coastal areas to potential U.S. or Soviet attacks.[387] In 2001, SAIC completed a comprehensive corporate transformation and became a large group involved in aircraft manufacturing, large equipment manufacturing, construction and installation, transportation, business services, and other fields.[388] By 2006, SAIC had produced almost 30 variants of the multi-role Y-8 medium-range transport aircraft, which is employed by the PLA Army, Navy, and Air Force.[389] While the company is mainly focused on producing

airlifters for the PLA, it has produced several UAVs, including a UAV "mothership" capable of carrying and deploying smaller drones.

Notable UAV Products

- "Xiangyan" UAV[“翔雁”无人机][390]/Xiangyan I UAV [翔雁I型无人][391]
    - Independently produced and developed by subsidiary Technical Equipment Company [技术装备公司]
- Y-8E [运-8E][392]
    - Y-8 UAV "Mothership"/UAV Carrier [运 8 无人机母机/无人机载机][393]

Notable Relationships
International

- Antonov (Ukraine): Joint development, cooperation agreement
    - In 2002, SAIC signed and Ukrainian aircraft manufacturer Antonov, maker of the Y-8, signed a joint development agreement.[394] Following the deaths of 40 crew members and scientists in a KJ-200 early warning aircraft crash on June 3, 2006, this relationship broadened, as Shaanxi worked with Anotov to significantly improve the design of the KJ-200[395]
    - Unclear how the relationship has been impacted by the ongoing Russia-Ukraine War

Known Subsidiaries[396]

- Aircraft Manufacturing Company [飞机制造公司]
- Technical Equipment Company [技术装备公司]
- Shaanxi Hanjiang [陕西汉江]
- Shaanfei Ruifang [陕飞锐方]

Directly Subordinate Organizations

- AVIC Shaanxi Aircraft Xi'an Office
    - Major production center including:
        - More than ten professional aircraft design studios and aircraft design laboratories
        - Assembly and processing plants
- AVIC Shaanxi Beijing Representative Office [中航工业陕飞北京代表处][397]

Year established: 1969[398]

Key Personnel

- Li Guangxing [李广兴]: Representative[399]

Aliases

- AVIC Shanfei [中航工业陕飞/陕飞][400]
- SAIC[401]

Former names:

- Shaanxi Airplane Industrial (Group) Corporation [陕西飞机工业（集团）有限公司][402]
- AVIC Shaanxi Aircraft Industry (Group) Corporation [中航工业陕西飞机工业(集团)有限公司] [403]
- Base 012 [012 基地] (a major part of this Base later became this company)[404]

Website

- https://www.saic.avic.com/
  - (defunct; archived here https://web.archive.org/web/20230827233014/https://www.saic.avic.com, but this version is much easier to navigate: https://web.archive.org/web/20180529141724/http://www.saic.avic.com/index.html)
- Shanfei.com (defunct; archived here: https://web.archive.org/web/20170606072649/http://www.shanfei.com/)

Subordinate to

- Xi'an Aircraft Industry Group Co. Ltd. [中航西安飞机工业集团股份有限公司][405]

Address

- Building 8, North Yard, 012 Base, Laodong Road, Hantai District, Hanzhong, Shaanxi Province [陕西汉中市汉台区劳动路 012 基地北院 8 号楼][406]
- Liulin Town, Chenggu County, Hanzhong City, Shaanxi Province [陕西省汉中市城固县柳林镇][407]

AVIC UAV

Overview: AVIC UAV [中航无人机] integrates UAV R&D, production, manufacturing, and training.[408] It also provides aerial services such as aerial photography, agriculture and forestry plant protection, land surveying, and power/transmission surveying.[409]

The company is authorized by the Civil Aviation Administration of China (CAA) and certified by the Aircraft Owners and Pilots Association of China (AOPA) as a professional drone training institution[410] and serves as the aviation technology education center of the China AOPA.[411] This is a different entity and should not be confused with the other AVIC subsidiary of the same

(abbreviated) Chinese name, AVIC (Chengdu) UAS Co., Ltd. [中航（成都）无人机系统股份有限公司], which is also known as AVIC UAV [中航无人机].

Notable UAV Products

- Gas-powered (unmanned) helicopters [油动直升机][412]
    - Heavy-fuel ship-borne unmanned helicopters, vertical take-off and landing may allow for quicker operation and access to landing sites
    - Can carry missiles to carry out direct strike operations, integrating reconnaissance and strike[413]
        - Military-grade integrated image transmission link, with a communication distance of 5-100 kilometers, and data encryption transmission can be achieved though commissioned units[414]
- Tethered UAV [系留无人机][415]
    - Used in ports, airports, cargo yards, disaster relief sites, border outposts, and assembly sites[416]
    - Equipped with optoelectronic, infrared and other equipment to implement regional surveillance and emergency support
    - Can be equipped with corresponding professional equipment for telecommunications, radar, sounding, atmospheric monitoring and other activities[417]
- Vertical take-off and landing (VTOL) fixed-wing UAV [垂直起降固定翼无人机][418]
    - Used for reconnaissance, search, forest fire fighting, disaster audit, survey, environmental monitor, and other maritime rights protection activities[419]
- Police UAV [警用无人机][420]
- ZH-ZMN01 [啄木鸟植保无人机]
    - Agricultural industry UAV[421]

Notable Relationships

- China Civil Aviation Emergency Rescue Alliance (CCAERA) [中国民用航空应急救援联盟应急无人机]: Support for UAV professionals' committee
    - Supported Alliance's establishment of "Emergency Drone Professional Committee" [应急无人机专业委员会] in June 2018[422]
- Shijiazhuang Emergency Management Bureau [石家庄市应急管理局]: disaster relief cooperation
    - Organized a team of technicians to provide UAV support when a forest fire broke out in the area[423]

Aliases

- Possibly also known as Shijiazhuang Zhonghang Mechanical and Electrical Equipment Manufacturing Co., Ltd. [石家庄中航机电装备制造有限公司][424]
    - Also known as Zhonghang Electromechanical Equipment [中航机电装备],[425] or Zhonghang Electromechanical UAV [中航机电无人机],[426] or Zhonghang Electromechanical Company [中航机电公司][427]
        - Note there was previously another AVIC organization with a very similar name, Zhonghang Electromechanical [中航机电]
    - It is unclear if this Shijiazhuang Zhonghang is just the name of the parent entity or a different name for AVIC UAV[428]
- UAV Division, Shijiazhuang Zhonghang Mechanical and Electrical Equipment Manufacturing Co., Ltd.[429]
    - A 2018 news item on the company's archived website refers to AVIC UAV as "the UAV division of Shijiazhuang Zhonghang"[430] that may be a former name

Website

- http://avicuav.com/
    - Defunct (archived version: https://web.archive.org/web/20220704002741/http://avicuav.com/)

Subordinate to

- AVIC Tongfei North China Aircraft Industry Co., Ltd.[431]
    - AVIC UAV is a second-level subsidiary of this company, and the two entities are co-located
    - AVIC UAV is directly under: Shijiazhuang Zhonghang Mechanical and Electrical Equipment Manufacturing Co., Ltd. [石家庄中航机电装备制造有限公司][432]
        - Address: No. 99, Hengjing Road, Luancheng District, Shijiazhuang City [石家庄市栾城区衡井 路 99 号][433]

Address

- East Gate, AVIC Tongfei North China Company, Hongtai Street, Luancheng District, Shijiazhuang City, Hebei Province [河北省石家庄市栾城区宏泰大街中航通飞华北公司-东门][434]

AVIC Helicopter Design and Research Institute

Overview: The AVIC Helicopter Design and Research Institute[435] [航空工业直升机设计研究所],[436] also known as the Chinese Helicopter Research and Development Institute (CHRDI), designs and develops a range of civilian, military, and dual-use helicopters, including a series of twelve unmanned helicopters.[437] Founded in 1969, the institute, which is also known as the 602nd Institute [602 所] or "the cradle of Chinese helicopters" ["中国直升机摇篮"], seeks to develop indigenous alternatives to importing foreign helicopters or components.[438] For example, state media reported in 2018 that the institute had developed a conformal aerial antenna able to be used on multiple military and civilian models, replacing an essential technology for which China had previously been dependent on imports.[439]

The institute is divided into two parts, the Jingdezhen Helicopter Base [景德镇直升机基地] in Jingdezhen, Jiangxi Province (known for its famous porcelain), and the Tianjin Helicopter R&D Center in the Tianjin Binhai New Area.[440] CHRDI currently has over 3,000 employees.[441] CHDRI has developed 12 helicopter models, including the Z-8, Z-9, Z-10, Z-11, Z-19, AC series, and UAVs, based on a framework of "military-civil fusion, one machine with multiple models, and series development."[442]

Figure 11: AR-500 unmanned helicopter[443]

Notable UAV Products

- AR-500 unmanned helicopter[444]
    - Rotary-wing UAV developed for naval, including carrier, operations, may be equipped with CM-502 KG missiles and potentially a 12.7 mm heavy machine gun[445]
        - In addition to military operations, the helicopter can undertake firefighting and other disaster relief and has been evaluated by the Ministry of Emergency Management Firefighting Bureau[446]

        - In November 2023, Xinhua reported that the AR-500 is being used by the Shandong Maritime Security Agency for patrol, search and rescue, and oil spill monitoring missions[447]

- AV500 unmanned helicopter[448]
    - Reconnaissance rotary-wing UAV first flown in 2015 with a range of roughly 200km and an endurance of six hours
        - Per CHRDI, this UAV can also be used in paramilitary and civilian fields such as anti-terrorism and riot control, anti-smuggling and anti-drug, law enforcement, public security border inspection, maritime monitoring, traffic diversion, aerial command, agricultural and forestry operations, atmospheric monitoring, forest fire prevention, power line inspection, and disaster assessment[449]
- AV500W "War Wolf" [战狼][450]
    - Armed AV500 variant that can be equipped with small laser-guided missiles or machine guns and has a maximum speed of 170 kilometers per hour and an endurance of four hours
- AV200 unmanned helicopter[451]
    - Smaller military unmanned helicopter (100 kg) with a range of about 100 km that was first flown in 2007, intended for surveillance and reconnaissance mission
- XM20 drone
    - Lighter quad-copter configuration meant to provide tactical ISR[452]
- U8 unmanned helicopter [U8 无人直升机][453]
    - Appears to be co-production with the AviChina Helicopter Branch Company

Notable Relationships

- AVIC Avicopter: Cooperate closely on numerous helicopter models, former parent institution[454]
- Nanjing University of Aeronautics and Astronautics (NUAA) [南京航空航天大学]
    - Jointly manage Defense S&T Key Laboratory of Helicopter Rotor Dynamics [直升机旋翼动力学国防科技重点实验室][455]

Known Subsidiaries

- Defense S&T Key Laboratory of Helicopter Rotor Dynamics [直升机旋翼动力学国防科技重点实验室][456]
    - Jointly overseen with NUAA

Directly Subordinate Organizations

- Jingdezhen:
  - Jingdezhen Helicopter Base [景德镇直升机基地][457]
  - Jingdezhen Unmanned Helicopter R&D Center [景德镇无人直升机研发中心][458]
    - Possibly also referred to as:
      - AVIC Unmanned Helicopter R&D Center [中航无人直升机研发中心][459]
      - Jingdezhen AVIC Unmanned Helicopter R&D Center [景德镇中航工业直升机所无人机研发中心][460]
      - Jingdezhen Helicopter Research Base/UAV Research Base[景德镇直升机研发生产基地/无人机研发中心][461]
- Tianjin:
  - Tianjin Helicopter R&D Center [天津直升机研发中心][462]
    - Possibly also known as AVIC Helicopter Co., Ltd. R&D Center [中航直升机有限责任公司研发中心] (this is under the RI and is located in Tianjin)[463]
- Poyang Unmanned Helicopter Industrial Base [鄱阳无人直升机产业基地];[464] may also be known as Poyang UAV Helicopter Flight Test Base [鄱阳无人直升机试飞基地][465]
- More than 20 helicopter research laboratories specializing in overall aerodynamics, structural strength, rotor transmission, avionics, flight control, comprehensive testing, civil aircraft airworthiness, material standards, and other areas.[466]

Key Personnel

- Xu Jianhua [许建华]: Director[467]
- Deng Jinghui [邓景辉]: Chief Designer[468]
- Wu Zhixiang [吴智翔]: Aviation Industry Safety Director; Quality and Safety Department Head[469]
- Shi Lei [石磊]: AR-500 Unmanned Helicopter Project Leader[470]
- Zhang Jianlong [张剑龙]: Director[471] (former)

Year Established: 1969[472]

Aliases

- Helicopter Institute [直升机所][473]
- AVIC Helicopter Institute [航空工业直升机所][474]
- China Helicopter Design and Research Institute [中国直升机设计研究所][475]
- AVIC China Helicopter Research and Development Institute[476]
- China Helicopter Research and Design Institute[477]

- CHRDI[478]
- 602 Institute [602 所][479]
- AVIC Helicopter Design Institute[480]
- AVIC Helicopter Design and Research Institute [中航工业直升机设计研究所][481]
    - Former name (used as recently as 2019)

Website

- https://chrdi.avic.com/
- http://www.chrdi.com (defunct; archived here: https://web.archive.org/web/20171003115727/http://www.chrdi.com/)

Subordinate to

- AviChina Industry and Technology Co., Ltd. (under AVIC)[482]
- Previously under Avicopter[483]

Addresses

- No. 6-8 Hangkong Road, Zhushan District, Jingdezhen, Jiangxi Province [江西省景德镇市珠山区航空路 6-8 号][484]
- No. 35, Airport Center Avenue, Binhai New Area, Tianjin [天津市滨海新区空港中心大道 35 号][485]

AviChina Jingdezhen Helicopter R&D Branch

Overview: The AviChina Jingdezhen Helicopter R&D Branch [中国航空科技工业股份有限公司景德镇直升机研发分公司][486] undertakes design, research, development, production, and sale of helicopters, aircraft parts, and other equipment. Minimal open-source information is available regarding this entity, but it appears to be co-located with part of the AVIC Helicopter Design and Research Institute (CHDRI, see above) at Jingdezhen Helicopter Base [景德镇直升机基地] and has cooperated with that organization on the development and production of aircraft, including the U8 unmanned helicopter [U8 无人直升机].[487]

Notable UAV Products

- U8 Unmanned Helicopter [U8 无人直升机][488]
    - Appears to be co-produced with CHDRI

Notable Relationships

- Jingdezhen National High-tech Zone [景德镇国家高新区][489]
    - Location and base of operations

Year Established: 2005[490]

Key Personnel

- Zhang Jianlong [张剑龙]: Legal representative [负责人][491]

Aliases

- AviChina Jingdezhen Helicopter R&D Center [中国航空科技工业股份有限公司景德镇直升机研发中心] (previous name)[492]
    - Possibly - Jingdezhen Helicopter R&D Center (Manufacturing Center and UAV Center)［景德镇直 升机研发中心（制造中心和无人机中心）[493]/景德镇直升机研发中心、制造中心和无人机中心］[494]
        - Based on similarity to the above name and sources not specifying which company (though AVIC is mentioned in each article)
- AviChina Jingdezhen Helicopter R&D Branch [景德镇直升机研发分公司]
- Jingdezhen Helicopter Base [景德镇直升机基地] (possibly)
    - China Helicopter Research and Design Institute [中国直升机设计研究所] (which is also under AviChina) has a Jingdezhen Helicopter Base [景德镇直升机基地],[495] which might be the same entity; and the Branch is also located at the Institute[496]
- Jingdezhen Helicopter R&D and Production Base/Jingdezhen Helicopter R&D and Production Industrial Base [景德镇直升机研发生产基地/景德镇直升机研发生产产业基地/景德镇直升机研发生产基地/景德镇直升机研发生产产业基地] (possibly)
    - Based on name/similarity and that it seems unlikely there would be other Helicopter Bases in Jingdezhen, but there are other helicopter producing entities in Jingdezhen, so unclear
- Jingdezhen Helicopter [景德镇直升机][497]

Subordinate to

- AviChina Industry and Technology Co., Ltd. [中国航空科技工业股份 有限公司] (100% ownership)[498]
    - May currently be or previously was under China Helicopter Research and Design Institute [中国直升机设计研究所] (which is also under AviChina)
        - This entity is also located at the institute[499]
        - The Institute has a Jingdezhen Helicopter Base [景德镇直升机基地], which might be the same entity[500]
        - However, in a 2012 AviChina document, the two are described as separate entities that are co-producing an unmanned helicopter [U8 无人直升机][501]

Addresses

- Hutian, Zhushan District, Jingdezhen City, Jiangxi Province (inside the China Helicopter Research Institute) [江西省景德镇市珠山区湖田（中国直升机研究所内）][502]
- No. 6-8 Hangkong Road, Jingcheng Town, Zhushan District, Jingdezhen, Jiangxi Province [江西省景德镇市珠山区航空路 6-8 号][503]
    - Address for China Helicopter Research Institute's Jingdezhen site (the Institute has a helicopter base there that might be the same entity; see Entity Subordination for details)

Lanzhou Wanli Aviation Electromechanical Co., Ltd.

Overview: Lanzhou Wanli Aviation Electromechanical [兰州万里航空机电有 限责任公司] primarily produces aviation motors, electric mechanisms, aircraft lighting, airborne computers, generators, airborne systems, emergency rescue equipment, electric landing gear, and UAV systems.[504] The company, which was founded in 1956 and began construction in 1958, has received the "Outstanding Contribution Award for High-Tech Defense Equipment Development and Construction Project" from six national ministries and commissions. Electric actuation and drive systems comprise over 60% of the company's operating income. Wanli enjoys a 75% domestic market share in this field. It had over 1,400 employees in 2019.[505]

Notable UAV Products

- UAV systems and components

Notable Relationships

- Jiangsu Tengxuan Science and Technology [江苏腾旋科技]: Long-term strategic partnership agreement signed in 2017[506]
    - Signing ceremony held in Wuxi, Jiangsu province on September 21, 2017, "Wuxi local government, financial investment companies, and representatives of the Navy stationed in Lanzhou attended the event to witness this milestone event in the development history of Jiangsu Tengxuan" per a press release from that company
- Northwestern Polytechnical University: Joint mechanical and electrical R+D center[507]
- Northwestern Polytechnical University Unmanned Systems Technology Research Institute [无人系统技术研究院]: Visit during graduate student recruitment trip to Lanzhou area defense industries[508]
    - On July 16-17, 2024, two doctoral and eight master's students visited the company as part of the "Thousands of Students Entering Defense Employment Practicum" [千名学子进国防就业实践][509]

- R&D Cooperation Projects worth 40 million RMB (about $5.6 million total) with the following entities in the fields of UAV and missile technologies:[510]
    - Xi'an Jiaotong University [西安交通大学]
    - Northwestern Polytechnical University [西北工业大学]
    - Beijing Institute of Technology [北京理工大学]

Known Subsidiaries

- Wanli Modern Manufacturing Technology Center [万里现代制造技术中心][511]

Directly Subordinate Organizations

- Aviation Electromechanical Research Institute [航空机电研究院][512]
- Five professional laboratories researching areas such as aviation motors[513]
- Gansu Provincial Aviation Electric Actuation Key Laboratory [甘肃省航空电作动重点实验室][514]

Key Personnel

- Chao Shiyuan [晁世元]: Chairman[515]
    - "Gansu Province Outstanding Science and Technology Innovation Entrepreneur Award" winner [甘肃省优秀科技创新企业家奖获得者][516]
- Sheng Guocang [盛国苍]: CEO; Deputy Party Secretary[517]
- Li Yong [李勇]: Chief Engineer; Deputy CEO; Director of Science and Technology Committee[518]
- Tian Pei [田沛]: Deputy Party Secretary; Secretary of Discipline Inspection Commission[519]
- Dan Saijun [但赛君]: Chief Accountant[520]

Year Established:1956[521]

Aliases

- State-Owned 135th Factory [国营第一三五厂][522]
- Lanzhou Wanli Aero Electro-mechanism Co., Ltd[523]
- Wanli [万里][524]
- AVIC Wanli [航空工业万里][525]

Website

- www.lzwanli.com.cn (defunct; archived here, though most of site isn't available: https://web.archive.org/web/20220501215827/http://lzwanli.com.cn/)

Subordinate to

- China Avionics Systems Co., Ltd. [中航航电系统公司] (100% ownership)[526]

Addresses[527]

- No. 71, Wanxin Road, Anning District, Lanzhou, Gansu Province [甘肃省兰州市安宁区万新路 71 号][528]
- No. 30, Wanli West Village, Anning West Road, Anning District, Lanzhou, Gansu Province [甘肃省兰州市安宁区安宁西路万里西村 30 号][529]

Xi'an Flight Automatic Control Research Institute

Overview: The Xi'an Flight Automatic Control Research Institute (FACRI) [西安飞行自动控制 研究所], also known as the AVIC 618th Research Institute, is the navigation, guidance and control (GNC) technology research and development center of the PRC's aviation industry, integrating product design, development, production, and service.[530] The institute provides services from parts manufacturing to system integration for platforms including fighters, transport aircraft, bombers, helicopters, UAVs, missiles, and other types of aircraft to users from multiple industries and military services.[531] FACRI has two aviation science and technology key laboratories for flight control and inertial navigation, and a Defense S&T Key Laboratory of Aircraft Control and Integration Technology (with Beihang University School of Automation Science and Electrical Engineering) [自动化科学与电气工程学院].[532] It has 3,100 employees.[533]

Notable UAV Products:

- Fighter and UAV Flight Control Systems [战斗机及无人机飞控系统][534]
- Unmanned Helicopter Flight Control System [无人直升机飞控系统][535]

Notable Relationships:

- Beihang University [北京航空航天大学]: Co-organizer of DSTKL
    - Defense S&T Key Laboratory of Aircraft Control and Integration Technology [自动化科学与电气工程学院]
    - Research Visit: On April 11, 2024, a delegation led by Xi'an FACRI Director and Deputy Party Secretary Yang Weiping [杨卫平] visited Beihang University to participate in a research symposium and to exchange views on scientific and technological innovation, transfer and transformation of scientific and technological achievements, talent team building, platform construction, talent training, and school-enterprise cooperation[536]
- Co-developed the AT200 cargo UAV with CAS Institute of Engineering Thermophysics and Langxing UAV Company (the main developers), along with CETC's 54th RI [中电 54 所], CASC 9th Academy's 773rd Research Institute [航天 773 所] and NWPU[537]

    - For CAS Institute of Engineering Thermophysics, it was likely the Intelligent Unmanned Aerial System Laboratory [中国科学院 智能无人飞行系统实验室/无人飞行器实验室][538]

- Sanyi Heavy Machinery [三一重机] worked closely with them to develop the SY365 intelligent excavator [SY365 智能挖掘机], which can perform automatic path planning operations, UAV auxiliary functions, and auxiliary operations such as one-key trenching, leveling, loading, or weighing[539]

Directly Subordinate Organizations

- AVIC Navigation, Guidance and Control (GNC) Technology R&D Center [中国航空工业制导、导航与控制（GNC）技术研究中心][540]
    - It houses the Defense S&T Key Laboratory of Aircraft Control and Integration Technology [飞行器控制一体化技术国防科技重点实验室] and the Flight Control and Inertial Navigation Aviation Science & Technology Key Laboratories [飞行控制和惯性导航两个航空科技重点实验室][541]

Key Personnel

- Yang Weiping [杨卫平]: Director and Deputy Party Secretary[542]
- Du Yanwei [都岩巍]: Deputy Director[543]
- Li Hua [李华]: Deputy Director
- Peng Yongtao [彭永涛]: Chief Engineer and Deputy Director
- Wang Donghui [王东辉]: Deputy Director (2019)[544]
- Song Kepu [宋科璞]: Director[545] (former)

Year Established: 1960[546]

Aliases

- AVIC 618th Research Institute [618 研究所][547]
- 618 Institute [618 所][548]
- AVIC Automatic Control Institute [航空工业自控所][549]

Website

- https://www.facri.com/

Subordinate to

- China Avionics Systems Co., Ltd[550]

Address

- No.129, Jinye Road, Yanta District, Xi'an, Shaanxi Province [陕西省西安市雁塔区锦 业路 129 号][551]
- No. 92 Dianzi 1st Road, AVIC No. 618 Institute, Xi'an, Shaanxi Province [西安市电子一路 92 号][552]

China National Aero-Technology Import & Export Corporation

Overview: The core business of China National Aero-Technology Import & Export Corporation (CATIC) [中航技进出口有限责任公司], formerly known as China National Aviation Technology Import and Export Corporation [中国航空技术进出口总公司] is the import and export of military aviation technology.[553] According to a 2018 SASTIND note, at that time, CATIC had a cumulative yearly import and export trade volume of over $40 billion.[554] CATIC develops or co-develops fighters, trainers, helicopters, and UAVs, as well as integrated avionics, airborne weapons, advanced target detection, navigation, telecommunication, and training systems with foreign partners. CATIC also assists with the development and support of weapon systems through product licensing. CATIC has successfully undertaken several cooperative R&D programs, including the K8 series of trainers, JF-17 light fighters, and UAVs with international partners.[555]

CATIC emphasizes its role in facilitating technology transfers of military aviation equipment, including drones to foreign end users, as well as supporting foreign partners, such as Pakistan, to indigenously produce their own UAVs. On its website, the company states it has successfully carried out international technology transfer projects in avionics system integration techniques, weapon integration techniques, and UAV design. Therefore, technology transfer cooperation can be explored in mission and weapons systems design, engineering development, and trials of fighters, trainers, helicopters, and UAVs." [556]

Notable UAV Products

- CATIC is responsible for working with international customers to jointly develop products, such as the K-8 trainer aircraft, JF-17 combat aircraft, and the Wing Loong UAV series.[557]
- CATIC exports the following UAVs produced by AVIC subsidiaries:[558]
    - Wing Loong I and Wing Loong II
    - AR-500A [AR-500A 无人机]
    - AR-165 [AR-165 电动多旋翼无人空中作战系统]
    - Wing Loong 10-A
- U8E unmanned surveillance helicopter [U8E 无人机][559]
- V750 unmanned helicopter[560]

Notable Relationships

Clients (all appear to be AVIC subsidiaries):[561]

- AECC Aero Science [中国航发航空科技股份有限公司]
- AVIC Industry Finance Company [中航工业产融控股股份有限公司]
- AVIC International Leasing Co., Ltd.[中航国际融资租赁有限公司]
- Catic Shenzhen [中国航空技术深圳有限公司]

Suppliers (all appear to be AVIC subsidiaries):[562]

- ZH Electronic Measuring Instruments Co (ZEMIC) [中航电测仪器股份有限公司]; parent company for Chengdu Aircraft Industry Group (CAIG) [成都飞机工业（集团）有限责任公司][563]
- Jiangxi Hongdu Aviation Industry Group [江西洪都航空工业股份有限公司]
- Rainbow Digital Commercial Co., Ltd. [天虹数科商业股份有限公司]
- Catic Shenzhen [中国航空技术深圳有限公司]

Other Notable Relationships:

- Northwestern Polytechnical University: Talent development agreement
    - 2020 cooperation agreement to cultivate international talent to better export AVIC technology in accordance with the Belt and Road Initiative (BRI)[564]
- Nanjing University of Aeronautics and Astronautics: Joint talent development and international training
    - 2020 talent cultivation and scholarship agreement, including future joint training of international students[565]

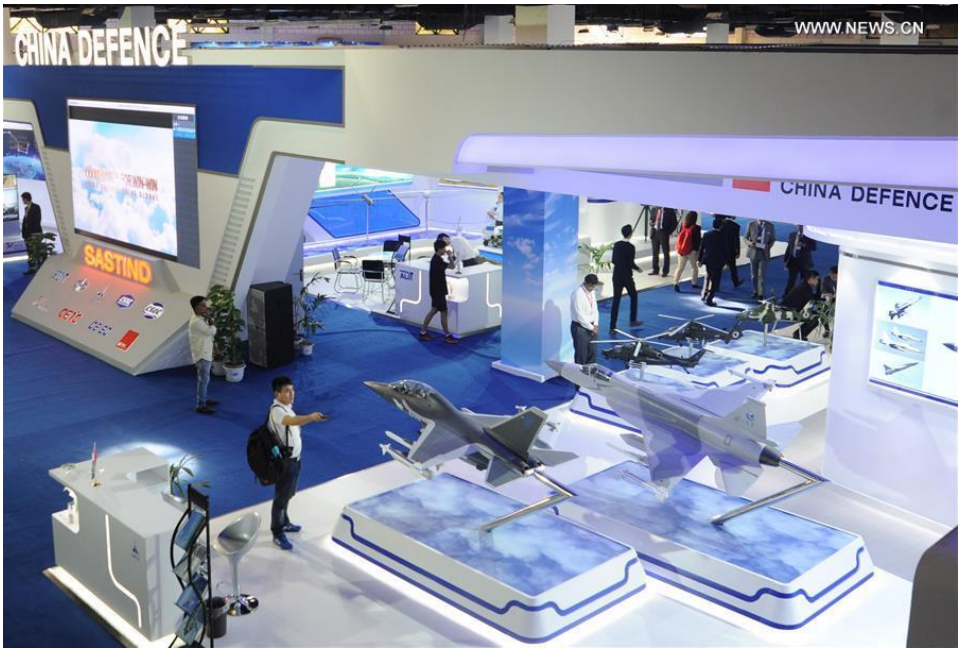

Figure 12: The China Defence Pavilion at IDEAS 2016 in Karachi, Pakistan[566]

International:

- Per its website, CATIC has representative offices in numerous countries:
  - Bolivia, Ecuador, Venezuela, Russia, Egypt, Angola, Congo, Djibouti, Algeria, Ethiopia, Kenya, Mauritania, Morocco, Namibia, Tanzania, Zambia, Zimbabwe, Bangladesh, Cambodia, "Persian Gulf" region (a possible reference to Iran), Kazakhstan, Laos, Burma, Pakistan, Saudi Arabia, Sri Lanka, and Thailand[567]
- Pakistan is a major customer
  - In 2018, AVIC and Pakistan Aeronautical Complex (PAC) Karma reached a joint agreement to produce 48 Wing-Loong-II UAVs with strike capabilities[568]
  - CATIC and other AVIC subsidiaries regularly exhibit at Pakistan's largest defense exhibition, the biannual International Defence Exhibition and Seminar (IDEAS)[569]
- BRI, presumably exporting aviation equipment and other products[570]
- Argentina and Peru: CATIC sold aircraft to the Air Forces and/or security services of both countries[571]
- As of 2017, CATIC was marketing AVIC UAVs, including the Wing Loong II, to Mexico[572]
- Active in Cote d'Ivoire[573]

Known Subsidiaries

- CATIC Investment Co., Ltd. [中航技易发投资有限公司]- 100% ownership[574]

Directly Subordinate Organizations

- Established more than 40 production lines and overhaul lines[575]

Key Personnel

- Liu Yu [刘宇]: chairman[576]
- Jiang Jian [姜健]: CEO[577]
- Sun Zhiwei [孙志伟]: Deputy CEO[578]
- Gao Wei [高伟]: Assistant to CEO[579]
- Tang Jianming [唐建明]: Party Committee Deputy Secretary[580]
- Zhou Jianhua [周建华]: Product Department Director [581]
- Tang Xing [唐星]: Human Resources Department Director [582]
- Zhang Nannan [张囡囡]: After-Sales Support Division Director[583]

Aliases

- CATIC[584]
    - Also see web address/URL: CATIC.cn
- China Aviation Technology [中航技][585]
- China National Aviation Technology Import and Export Corporation [中国航空技术进出口总公司][586]

Website

- https://www.catic.cn/cn/

Subordinate to

- AVIC [中国航空工业集团公司] (50%)[587]
- AVIC International [中国航空技术国际控股有限公司] (50%)[588]

Addresses

- No. 15, Ronghua South Road, Beijing Economic and Technological Development Zone, Beijing [北京市北京经济技术开发区荣华南路 15 号院][589]
    - Building 9, No. 15 Courtyard Ronghua S. Rd., Beijing EEZ, Beijing [北京市北京经济技术开发区荣华南路 15 号院 9 号楼][590]

CHINA AEROSPACE SCIENCE AND TECHNOLOGY (CASC) SUBSIDIARIES

CASC 11th Academy / China Academy of Aerospace Aerodynamics

Overview: The CASC 11th Academy [航天科技十一院/十一院] was founded in 1956 by aerospace pioneer Qian Xuesen [钱学森] as China's first large-scale R&D center.[591] The academy undertakes research and development of space launch vehicles, aerodynamics, satellites, missiles, and other strategic weapons.[592] The 11th Academy, now also known as the China Academy of Aerospace Aerodynamics [中国航天空气动力技术研究所] is based in Beijing with manufacturing facilities in Tianjin. Along with missiles, ground effect aircraft, and hovercraft, CAAA produces short- to long-range UAVs. CAAA has over 4,000 employees with over "50 academic and technical leaders and experts with outstanding contributions at or above the group level."[593]

In early 1999, the China Academy of Aerospace Aerodynamics' predecessor, the Beijing Aerodynamics Institute [北京空气动力技术研究所], responding to the PLA's "urgent need" for drones, formed a UAV project demonstration group under Chief Engineer Shi Wen [石文].[594] The group focused on the development of medium-and short-range UAVs. In 2001, the HW-01 prototype successfully completed a test flight, thereby supporting the feasibility of the Academy developing UAVs. In April 2002, the Special Aircraft Division, which includes drones in its research portfolio, was established. In June 2004, the Institute was approved to be upgraded to the China Academy of Aerospace Aerodynamics. [595]

Shi Wen and his team began developing the CH or Caihong ("Rainbow") [彩虹] UAV series at the CASC 11th Academy in 1999.[596] Over the years, the CH-series has expanded to include a range of hand-launched, rocket-launched, and full-sized UAVs that take off like traditional aircraft.[597] The production and development of CH drones has had significant leadership continuity with CH-Series Chief Designer Shi Wen at the helm for over two decades, including leading the development of the new CH-7 stealth UAV first revealed at the 2022 China Airshow in Zhuhai.[598]

The CASC 11th Academy also developed the AR [射手] series of air-to-ground, laser guided missiles for use on CH UAVs and other aircraft.

Figure 13: CH-5 UAV on display at the 12th China International Aviation and Aerospace Exhibition[599]

Notable UAV Products

- Caihong [彩虹] CH UAV Series
  - CH-1
    - First flight tested in 2004[600]
  - CH-2[601]
    - First flight tested in 2004, primarily designed for reconnaissance sorties
  - CH-3
    - First flight in 2007, has a unique canard layout
    - CH3-A variant has a payload of over 100 KG and can operate as a UCAV with laser-guided AR1 air-to-ground missiles[602]
  - CH-191 (also known as BZK-008)[603]
    - This fixed-wing UAV uses a twin-boom layout with an inverted v-tail and a pair of skids as landing gear
    - Propulsion provided by a two-blade propeller using a pusher engine mounted on the back of the fuselage
    - The CH-91 drone is primarily intended for ISR missions. Also known as the BZK-008[604]

- CH-4
  - CH-4 A Variant, reconnaissance UAV
  - CH-4B Variant, mixed attack and reconnaissance UAV
  - An upgraded version of the CH-4 with longer endurance and increased flight capacity made its maiden flight in 2022[605]
- CH-5
  - MALE UAV, first flown in 2015, per Shi Wen, the Chief Designer of CH UAV-series, the CH-5 can remain airborne for up to 30 hours with eight AR-1 missiles, light-weight laser-guided air to ground missiles designed for UAVs)[606]
- CH-6
  - Large HALE multipurpose UAV system aimed at high-end arms and dual-use markets debuted in 2021[607]
- CH-7
  - Large stealth UCAV, maximum takeoff weight of around ten tons with an endurance of about 15 hours expected to complete development by the end of 2024[608]
  - A prototype of the CH-7 was showcased at the 2022 Zhuhai airshow. Per the designers of the CH-7, the UCAV is "equipped with electronic countermeasures, optoelectronics, and radar payloads, and can use its low detectability to advance into enemy positions, get closer to targets to perform long-term combat missions, intercept enemy radar, communication and other electronic signals"[609]
  - The platform can also conduct reconnaissance, identification, and surveillance of high-value targets such as enemy command posts, missile launch sites, and ships
  - The CH-7 is equipped with an internal bomb bay, and can opt to launch anti-radiation missiles, air-to-ground missiles, long-range bombs or anti-ship missiles and other weapons to destroy targets according to warfighting requirements
- The CH-7 employs dual-aircraft long-distance positioning to coordinate combat with manned fightersCH-10[610]
  - Tilt-rotor UAV integrating helicopter and fixed-wing aircraft technology can be equipped for reconnaissance or strike missions with an endurance time of about seven hours[611]

- CH-802[612]
    - Fixed wing, hand-launched, micro-wing UAV released in 2008, used for reconnaissance and battlefield situational awareness
    - Reportedly provided to some PLA Army units[613]
- CH-811A[614]
    - Tethered UAV for aerial reconnaissance and monitoring.
- CH-814[615]
    - Vehicle-mounted multi-rotor for surveillance, armed police anti-terrorism and stability maintenance operations[616]
- CH-821/-822[617]
    - Helicopter UAV used primarily for firefighting missions[618]
- CH-901 Loitering Munition[619]
    - The CH-901 suicide drone is a fixed-wing UAV with a conventional layout with cylindrical fuselage and high-wing configuration. The whole system weighs about 45 kilograms (about 99 pounds) and can be carried by a solider or a sport-utility-vehicle

- AR Missile Series [射手系列导弹]
    - AR-1 [射手-1 导弹] Air-to-Ground Anti-Tank missile, can be equipped with blast armor piercing warheads designed for CH series UAVs[620]
    - AR-2 [射手-2 导弹] laser-guided air-to-ground missile designed specifically for UAVs to perform military attack missions

Notable Relationships:

- SASTIND [国家国防科技工业局]: Research Visit
    - Former SASTIND Deputy Director Xu Zhanbin [徐占斌] and Deputy Party Secretary Xiang Ming [向明] made a research visit to the CASC 11th Academy in November 2022[621]
    - Per CASC, "Xu Zhanbin visited the 11th academy's UAV exhibition hall and assembly workshop, watched an introductory video on the Rainbow series of UAVs, listened to relevant work reports, and learned about the history of the academy[622]
    - Xu affirmed the 11th Academy's achievements in the innovation and development of UAVs, market development, and international competition
- Chongqing Research Institute of Harbin Institute of Technology [哈工大重庆研究院]: Research Cooperation

- CASC 11th Institute President Hu Meixiao made an investigative visit in July 2024 to promote research focused on promoting widespread application of ceramic materials and hydrogen power technology[623]

- China Defense Co., Limited [中善防務裝備有限公司]: supplier
  - Shenzhen-based company produces CASC's 11th Academy's AR-2 short range missiles[624]

- Russian Central Aerodynamics Research Institute (TsAGI): strategic cooperation agreement
  - TsAGI's President visited the academy in July 2019 for technical exchanges and cooperation negotiations and signing of strategic cooperation agreement[625]

- Dassault Systèmes (France)
  - French aerospace company Dassault Systèmes Vice President David Segler visited the Institute in August 2019 to promote the digital transformation, practical cooperation, and informationization[626]

Known Subsidiaries

- Aerospace CH UAV Co [航天彩虹无人机股份有限公司] (see profile below)[627]

Directly Subordinate Organizations

- Special Aircraft General Technical Design Department [特种飞行器总体技术设计部]
  - Develops, designs, trial produces and tests special aircraft. The Department is responsible for the "Rainbow" UAV CH series [彩虹无人机][628]
  - The Department has engaged in several research projects concerning the overall design and test verification technology of high-altitude solar flight platforms, overall design and test verification technology of new ground-effect aircraft, aerodynamic shape optimization design, flight test technology of micro-aircraft, missile-borne UAV technology, the overall design of intelligent deformable aircraft, and other special aircraft technology fields[629]

- Beijing UAV Application System Engineering Technology Research Center [北京市无人机应用系统工程技术研究中心]
  - The 11th Academy established the Beijing UAV Application System Engineering Technology Research Center in December 2014.[630] The Center seeks to promote the industrial development of UAVs in Beijing, advance the integration and industrialization of UAV application systems, and improve the engineering research level of the entire industry
  - The Engineering Center seeks to undertake in-depth research on the application direction of UAV systems, promotes MCF, establishes an industry-university-

research cooperation platform, conducts academic exchanges on UAV application system technology, effectively breaks through common key technologies in the field of UAV applications, breaks down foreign key technology barriers, and enhances the industry's overall scientific and technological research capabilities[631]

- Minimal information is available on the Center following its 2014 launch

Key Personnel

- Hu Meixiao [胡梅晓]: President[632]
- Wang Yianxu [王献雨]: Party Secretary[633]
- Huang Yuqun [黄育群]: Director[634]
  - Previously Deputy President of CASC[635]
- Shi Wen [石文]: Chief Designer of CH UAV series[636]
- Ou Zhongming [欧忠明]: Chief Designer of CH-5 UAV[637]
- Zhao Lichen [赵立晨]: Deputy President (as of January 2020)[638]

Year Established: 1956

Aliases

- Beijing Aerodynamics Institute [北京空气动力技术研究所] (former name)[639]
- Ministry of National Defense, Fifth Research Institute, Aerodynamics Laboratory [国防部第五研究院空气动力研究室] (former name, 1956)[640]
- Institute of Aerodynamics [空气动力研究所] (former name, 1959)[641]

Website

- http://www.caaa-spacechina.com

Subordinate to

- CASC

Addresses

- No. 17 Yungang West Road, Fengtai District, Beijing [北京市丰台区云岗西路 17 号][642]

Aerospace CH UAV Co., Ltd.

Overview: Aerospace CH UAV Co., Ltd. [航天彩虹无人机股份有限公司], a subsidiary of CASC's 11th Academy, develops, manufactures and sells CH [彩虹] series UAVs along with other military and dual-use equipment. The company was the first military UAV manufacturer to go public, listing on the Shenzhen Stock Exchange in 2017.[643] The company identifies as a key representative of China's "high-tech products 'going global,'" with its business entailing exporting CH series UAVs to foreign customers.[644] As of 2021, the company had over 300 employees.[645]

Notable UAV Products

- CH [彩虹] line of UAVs (see the CASC 11th Academy profile for details), range of products include:
    - Gyrowing UAVs, solar-powered UAVs, hydrogen-powered UAVs, MALE and HALE reconnaissance and strike UAVs, and UAV-mounted weapons[646]

Notable Relationships:

- See below table for major export destinations of CH UAVs such as Pakistan and Saudi Arabia

Known Subsidiaries:

- Rainbow UAV Technology Co, Ltd [彩虹无人机科技有限公司][647]
    - Founded in 2016,[648], or 1999[649]
    - Makes the same UAVs as its parent, so it may have been carved out in the 2017 when the overall company became listed on the stock exchange; this may be the actual UAV production unit

Directly Subordinate Organizations

- Rainbow UAV Taizhou Production Base [彩虹无人机台州生产基地][650]
    - Produces CH-4 and CH-5 UAVs[651]
    - This base has four functional sectors: medium and large UAV manufacturing, airborne weapons manufacturing, UAV flight application technology research and development, and UAV application-level aviation vocational training[652]

Key Personnel

- Hu Meixiao [胡梅晓]: Chairman
    - As of April 2022, also President of China Academy of Aerospace Aerodynamics (CASC 11th Academy)[653]
- Wen Xi [文曦]: general manager[654]
- Li Pingkun [李平坤]: deputy general manager[655]
- Du Zhixi [杜志喜]: deputy general manager and Secretary of the Board of Directors[656]
- Wang Zhaokui [王昭奎]: deputy general manager[657]
- Huang Guojiang [黄国江]: First Level Specialist[658]
    - He has served as deputy director of the design room of the Guizhou Aviation Group Aircraft Design Institute, deputy general manager of the Guizhou Aviation Group (GAIC) UAV Company, director of the Guizhou Aviation Group UAV Office, assistant to the general manager of Guizhou Aircraft Co., Ltd., and assistant to the president of the China Academy of Aerospace Aerodynamics. At GAIC, Huang was the chief designer for the WZ-2000 UAV that debuted in 2000[659]

- Zhao Handa [赵寒达]: final assembly expert[660]

Year established: 2001[661]

Aliases

- Caihong Company [彩虹公司][662]
- Aerospace CH[663] [航天彩虹][664]
- Zhejiang Nanyang Technology Co., Ltd.[665] [浙江南洋科技股份有限公司] (former – changed in 2018)[666]
    - CASC bought a controlling stake in Zhejiang Nanyang around this point[667]
- Zhejiang Nanyang Electronic Film Company [浙江南洋电子薄膜有限公司] (former name– changed in 2006)[668]
- HTCH[669]
- CHUAV [彩虹无人机][670]

Website

- http://www.htchuav.com/ (defunct; archived: https://web.archive.org/web/20211016123301/http://www.htchuav.com/)
    - English archived site: https://web.archive.org/web/20211016121724/https://htchuav.com/en/index.html

Subordinate to

- CASC 11th Academy[671]

Addresses

- No. 17, Yungang West Road, Fengtai District, Beijing [北京市丰台区云岗西路 17 号院][672]
    - Beijing R&D Center
- No. 788 Haihao Road, Taizhou, Zhejiang Province [浙江省台州市海豪路 788 号][673]
    - Rainbow UAV Taizhou Base

Major CASC CH Exports (2003-2023)				
Recipient	**UAV**	**Year**	**Estimated Number Sold**	**Total SIPRI Trade Indicator Value (1= ~$1 million)**
DR Congo	CH-4B	2023	9	36
Iraq	CH-5	2023	?	?
Serbia	CH-95	2023	1	2
Nigeria	CH-4B	2020	4	16
Serbia	CH-92	2020	6	6
Pakistan	CH-4A	2019	10	30
Laos	CH-4B	2019?	2	8
Algeria	CH-3	2018	5	12
Algeria	CH-4A	2018	5	15
Saudi Arabia	CH-4A	2018	5	15
Indonesia	CH-4B	2017-2020	6	24
Jordan	CH-4B	2016	6	24
Sudan	CH-3	2015	5	12
Sudan	CH-4A	2015	5	15
Turkmenistan	CH-3	2015	2	4.8
Saudi Arabia	CH-4B	2014-2018	20	80
Iraq	CH-4B	2014-2016	20	80
Nigeria	CH-3	2014, 2020	7	16.8
Myanmar	CH-3	2013-2015	12	28.8
Pakistan	CH-3	2011-2019	50	120
Unknown	CH-1	2003	2	1.6
Note: All quantities are estimates				

All data is from Stockholm International Peace Research Institute (SIPRI) Arms Transfers Database, last updated March 2024[674]

CASC 9th Academy

The CASC 9th Academy [航天科技九院] is also known as the China Academy of Aerospace Electronics Technology (CAAET) [中国航天电子技术研究院].[675] The 9th Academy researches and develops inertial guidance, telemetry, and remote control systems, as well as aerospace computing software, microelectronics, and electromechanical components.[676] It has over 16,000 office workers and 5,000 special technical employees, with many subordinate organizations located in Beijing, Shanghai, Chongqing, Shaanxi, Hangzhou, Wuhan, Guilin, Zhengzhou, and other locations.[677] CAAET has won multiple awards, including the Top-Class National S&T Progress Award and the National May 1st Labor Day Certificate of Merit, as well as receiving Civilizational Unit of a Central State Organ, National Advanced Internal Audit Unit, and National Mass Sports Advanced Unit designations.[678]

Subsidiaries

- China Aerospace Times Electronic Co., Ltd. (CATEC) [中国航天时代电子有限公司] / Aerospace Times Electronic Co. Ltd [航天时代电子技术股份有限公司] (technically the latter is subordinate to the former, but it appears to act as its public face / stock listed company)[679]
    - Website: http://www.catec-ltd.cn/ (defunct; archived: https://web.archive.org/web/20220501134044/http://www.catec-ltd.cn/)
    - The company is mainly engaged in the research and development, production and sales of aerospace electronic information and unmanned system equipment products, which include UAVs that can complete designated tasks autonomously or through remote control, which are first used in the military field and then in the civil field[680]
    - The company's unmanned system equipment product business is the research and development, design, manufacturing and sales of unmanned system equipment, mainly including unmanned aerial systems, precision guidance systems and other unmanned system equipment, and are mainly used in national defense and national economic fields such as national defense equipment, logistics and transportation[681]
    - It appears to have had a UAV Division from at least 2010-2020,[682] around when it began gradually transferring the UAV Division's business to subsidiary Aerospace Feihong,[683] which seems to handle most if not all its UAV business now (see below)
    - Its 2024 mid-year report listed a balance of 236,440,813.19 RMB (around $ 33.7 million) in research & development expenses with 18,399,080.56 RMB (about $2.62 million) for internal development expenses for UAV program (Feihong) [无人机项目（飞鸿）],[684] which was separate from the expenses for Aerospace Feihong itself
    - Subsidiary: Aerospace Times Feihong Technology Co., Ltd. [航天时代飞鸿技术有限公司][685]
- Factory 289 [289 厂] undertakes UAV datalinks [无人机数据链][686]

Directly Subordinate Organizations

- Unmanned Systems General Department [无人系统总体部][687]
  - Major products appear to be the Feihong series of UAVs (presumably made by subsidiary Aerospace Feihong) and the Feiteng [飞腾] series precision guided weapons[688]
  - Possibly also referred to as the 9th Department [九部]

Key Personnel

- Liu Meixuan [刘眉玄]: president[689]
- Wang Yawen [王亚文]: Party Secretary (as of June 2022)[690]

Website

- http://www.caaet.cn/

Address

- No. 1 Fengxuan East Road, Haidian District, Beijing, 100094 [北京海淀区丰滢东路 1 号][691]

Aerospace Times Feihong Technology Co., Ltd.

Overview: Founded in 2018, Aerospace Times Feihong Technology Co., Ltd. [航天时代飞鸿技术有限公司], also known as Aerospace Times Feihong Company [航天飞鸿公司], is primarily engaged in the development and production of unmanned aerial vehicle systems. At the 2022 Zhuhai Airshow, the "Feihong" [飞鸿] brand featured the "Feihong-97A" prototype AI-piloted UCAV intended to serve as a "loyal wingman" to the J-20 fighter jet.[692] The company has justified this focus based on the industry-wide belief that the "loyal wingman" is expected to subvert the traditional manned air combat mode and create a new ecological niche in the traditional air combat system.[693]

In December 2020, Aerospace Feihong Company officially moved into Zhongguancun Yanqing Park [中关村延庆园] in Beijing.[694] In December 2021, a transitional plant was put into use. On June 8, 2022, a land transfer contract for the Yanqing UAV Equipment Industrial Base [延庆无人机装备产业基地] project to Aerospace Feihong Company was officially signed, with construction beginning in late 2022. As an industrial project that is an area of focus for the State-owned Assets Supervision and Administration Commission (SASAC) during the 14th Five-Year Plan period, the Aerospace Feihong Yanqing UAV Equipment Industrial Base is set to receive a total investment of over 1.2 billion yuan (around $165 million). The Yanqing Base will include "one digital manufacturing management platform, four UAV digital manufacturing production lines, and five common capability centers."

On January 10, 2023, Aerospace Feihong held a ceremony to unveil the Aerospace Era Feihong Testing Technology Co., Ltd. and Unmanned Intelligent System Research and Training Base in Baotou, Inner Mongolia.[695] The base's test area covers more than 7,000 acres and will be built into a comprehensive test base integrating unmanned intelligent system research and training, testing and identification, scientific research flight tests, training, maintenance support and other derivative businesses. The base, per the company, is notable as the first time in China's history that a scientific research institute has independently operated a research and training base. According to the relevant person in charge of the 9th Institute's Aerospace Feihong Company, the unmanned intelligent system research and training base will be put into operation to provide research and training resource guarantees, professional technical support, system maintenance and other services for the Feihong series of drones and various users, in order to improve on and better meet the testing needs of unmanned systems and optimize cost control. The new base will also have data interconnection and interoperability with Feihong's Beijing Yongfeng Base to facilitate scientific research and efficient production.

Notable UAV Products

- FH-96V shipborne composite wing UAV [FH-96V 舰载复合翼无人机][696]
- FH-97
    - High-speed stealth multi-purpose UAV first displayed at 2021 Zhuhai Airshow[697]
- FH-97A[698]
    - UCAV, "loyal wingman" intended to accompany manned fighter aircraft such as the J-20 to perform and air escort air superiority operations and air defense suppression missions[699]

Notable Relationships

- Inner Mongolia, Baotou City, Damao Banner [内蒙古包头市达茂旗]: co-established Aerospace Times Feihong Technology Testing Corporation [航天时代飞鸿测试技术有限公司][700]
- CMC EDD Unmanned Systems Technology Pre-Research Specialist Group [装备发展部无人系统技术预研专业组]: member unit[701]

Known Subsidiaries:

- Aerospace Times Feihong Technology Testing Corporation [航天时代飞鸿测试技术有限公司] with Inner Mongolia, Baotou City, Damao Banner [内蒙古包头市达茂旗]
    - UAV test site and demonstration base Baotou, Inner Mongolia[702]

Key Personnel

- Deng Shuai [邓帅]: Chief Designer, Feihong UAV systems[703]

Year Established: 2018

Aliases

- Aerospace Feihong [航天飞鸿]
- Aerospace Feihong Corporation [航天飞鸿公司]
- Beijing Aerospace UAV System Engineering Research Institute [北京航天无人机系统工程研究所][704]

Website

- Not found

Subordinate to

- CASC 9th Academy [航天科技集团九院][705]
  - Aerospace Times Electronic Co. Ltd [航天时代电子技术股份有限公司]: parent company and majority stakeholder (roughly 53% as of December 2022)[706]

Addresses

- Room 149, Building 2, Yanqing Park East Ring Road, Zhongguancun, Yanqing District, Beijing [北京市延庆区中关村延庆园东环路 2 号楼 149 室][707]
- No. 1 Fengxuan East Road, Haidian District, Beijing, 100094 [北京海淀区丰滢东路 1 号][708]

CHINA AEROSPACE SCIENCE AND INDUSTRY CORPORATION SUBSIDIARIES

China Aerospace Science and Industry Corporation Third Academy

Overview: Established in 1961, the China Aerospace Science and Industry Corporation (CASIC) Third Academy [航天科工三院] integrates research and production of several different missile systems, including over 20 types of cruise missiles, such as the HY-, YJ-, and HN-series of missiles, and the CJ-10 land-attack cruise missile (LACM). The academy designs missile products, as well as missile aerodynamics, propulsion, inertial guidance, radar measurement and control, infrared lasers, special materials, launchers, and computer systems.[709] In addition to missiles, the 3rd Academy is heavily involved in the development of UAVs and UAV systems.[710] In particular, the CASIC Third Academy appears to specialize in developing high-altitude and high-speed UAVs that can perform both reconnaissance and attack operations.[711]

Two entities under the CASIC Third Academy are primarily responsible for UAV production and sales. The Haiwing Aviation General Equipment Company [海鹰航空通用装备有限责任公司] is the Third Academy's base for UAV production and development. The China Haiwing Academy of Electro-mechanical Technology [中国海鹰机电技术研究院] serves as the international marketing platform for Haiwing UAVs.[712]

Notable UAV Products

- The CASIC Third Academy designed the Haiwing UAV series that includes a range of UAV models, manufactured by Haiwing Aviation General Equipment Company [海鹰航空通用装备有限责任公司]

- Falcon [猎鹰] UAV (WJ-700)
    - High-altitude, high-speed, UAV surveillance and combat system with autonomous wheeled take-off and landing
    - The Falcon is customizable with 11 configurations and 9 combat forms.
    - Depending on the configuration, the Falcon UAV can carry a variety of equipment and airborne weapons, including anti-ship, anti-radiation and precision strike missions, perform electronic reconnaissance and jamming missions with a maximum payload of 3,500KG and an endurance of 20 hours[713]
- WJ-010 UAV
    - Very small UAV dubbed the "air hand grenade" [空中手榴弹] as it can be folded up and carried in the backpack of an individual soldier, can easily change out payloads to fit out for reconnaissance or attack missions[714]
- WJ-100
    - Small multi-purpose UAV with a payload of around 15 kilograms and an endurance of five hours[715]

Notable Relationships

- Northwestern Polytechnical University (NWPU): Collaborative Innovation Cooperation Agreement[716]
    - Signed in September 2020, the agreement focuses on joint cultivation of talent. In October 2021, a delegation led by CASIC Third Academy Party Secretary Shi Xinxing visited NWPU to discuss progress in implementing the agreement, talent training, technological innovation and other areas of cooperation

Known Subsidiaries

- Haiwing Aviation General Aviation Equipment LLC [海鹰航空通用装备有限责任公司] (see below for full profile)
- China Haiying Academy of Electro-mechanical Technology [中国海鹰机电技术研究院]
    - International marketing platform for CASIC's Third Academy including the promotion and sale of Haiwing UAVs[717]

Directly Subordinate Organizations

- Unmanned Technology Research Institute [无人机技术研究所所][718]

Key Personnel

- Chen Ximing [陈锡明]: Party Secretary[719]
- Gong Bo [龚波]: Deputy Party Secretary and General Manager
- Huang Xingdong [黄兴东]: Deputy Party Secretary
- Shi Yi [施毅]: Vice President
- Shin Xinxing [史新兴]: Senior Executive
- Ma Hongzhong [马洪忠]: Chief Designer Sky Hawk UAV, CASIC 3rd Academy UAV Technology Research Institute[720]

Year Established: 1961

Aliases

- HiWING [海鹰]
- CASIC Flight Technology Research Institute/ Flight Technology Research Institute [中国航天科工飞航技术研究院/飞航技术研究院][721]

Website

- http://www.fhjs.casic.cn/
- Recruiting site: https://web.archive.org/web/20190110035546/http://blog.sina.com.cn/infoht3

Subordinate to

- China Aerospace Science and Industry Corporation [中国航天科工][722]

Addresses

- Xili No. 1 Courtyard, Yungangbei, Fengtai District, Beijing [北京市丰台区云岗北区西里 1 号院][723]

Beijing Specialized Machinery Institute

Overview: Also known as the CASIC Third Academy, 8359th Research Institute [航天三院八三五九所/8359 所], the Beijing Specialized Machinery Institute [北京特种机械研究所] was established in 1965 and is located in Haidian District, Beijing.[724] It is mainly responsible for missile and UAV launch, loading, attachment, transportation, testing, research, development, production, and support tasks.[725] Areas of particular focus include aeronautical missile systems and UAV launching, loading, hooking, transportation, testing, and other equipment tasks involving hydraulic and pneumatic technologies.[726]

The institute's products have been used in the Shenzhou [神舟] No. 8, Shenzhou No. 9 and Tiangong [天宫] No. 1 spacecraft.[727] They have been widely used in the fields of power transformer manufacturing, and mechanical equipment manufacturing.[728] Its products are designed for the aerospace, aviation, locomotive, nuclear industry, ports, as well as other sectors.[729]

The institute has an Unmanned Equipment Research Laboratory [无人装备研究室][730] / Unmanned Platform Equipment Research Laboratory [无人平台装备研究室].[731] The institute undertakes testing of UAVs at high-altitudes on the Qinghai-Tibet Plateau to ensure the platforms can "meet the complex requirements of future battlefields."[732]

Nearly 900 employees work at the institute, with engineering and technical personnel accounting for over 60% of staff.[733] In addition to UAVs, the institute appears to be engaged in research and development of unmanned ground vehicle systems.[734]

The Institute has successively won more than 100 provincial and ministerial-level scientific and technological achievements awards.[735] The institute's registered capital amount is 59.75 million RMB (about $8.2 million), with fixed assets totaling 275.8 million RMB (about $35.5 million).[736]

Notable Relationships

International

- ELSEWEDY Cable Group (Egyptian company): transformer test station
  - Signed a contract for the construction of a power transformer test station with a total contract value of US$1.39 million[737]
- PTTI (U.S.): joint project
  - In January 2009, the Institute signed an impulse voltage generator project with PTTI, an American company[738]
- University of Manchester, U.K.: purchasing agreement

- Purchasing contract for a complete set of test equipment for impulse voltage generators signed in July 2010

- Quebec High Voltage Laboratory: order contract, signed August 2010[739]

Key Personnel

- Zeng Zhiyong [曾智勇]: Director (2011)[740]
- Li Mingyang [李明洋]: Chief Technician[741]

Subordinate to

- CASIC Third Academy [航天科工三院]

Year Established: 1981[742]

Address

- 149 West Fourth Ring North Road, Haidian District, Beijing [北京市海淀区西四环北路 149 号][743]

Hiwing General Aviation Equipment Co., Ltd.

Overview: In 2012, China Aerospace Science and Industry Corporation (CASIC) integrated its UAV business resources in the Beijing, Shenyang, and Tianjin areas to create Hiwing Aviation General Equipment Co., Ltd. [海鹰航空通用装备有限责任公司]. The company produces the "Haiying" [海鹰], i.e., Seahawk, UAV brand.[744] The company notes its UAVs are used in both the domestic and foreign markets for land surveying and mapping, maritime patrol, power line inspection, meteorological detection, emergency rescue, environmental monitoring, forest fire prevention, and police patrol.[745] Hiwing General Aviation Equipment relies on the scientific research and production systems of its parent institution the CASIC Third Academy to manufacture UAVs.[746] Its primary business comprises military UAVs, target drones, civil UAVs, and commercial UAV operation services, with a focus on mid-to-high-end UAVs such as high-altitude and high-speed, integrated reconnaissance and strike, and fixed-wing model platforms.[747]

In 2019, Hiwing General Aviation Equipment was selected as a pilot institution for the State-owned Assets Supervision and Administration Commission "double hundred action" ["双百行动"] state-owned enterprise (SOE) reform program.[748] The company currently has more than 320 employees, including four group-level model chief engineers, three people enjoying special government subsidies, nearly 30 chief engineers, deputy chief engineers, and experts from the Science and Technology Commission, and more than 60% of the R&D personnel and masters and doctors or above.[749]

Notable UAV Products

Fixed-wing series:[750]

- HW-100 [Seahawk] **[**海鹰-100]
  - HW-120[751]
    - Very small UAV (~2kg) that can be hand carried and assembled in field, has an endurance of 45-60 minutes
  - HW-110A
    - Small electric powered hand launched UAV with short-range and endurance (roughly one hour), patrol and police applications[752]
- HW-200
  - HW-210[753]
    - Small, long endurance drone
    - Take-off weight of 22kg, with 12-16 hours of flight time
    - Vehicle ejected/launch take off mode
  - HW-220
    - Aerial photography drone[754]
  - HW-230
    - Small general purpose unmanned aerial platform[755]
  - HW-260
    - Small, long endurance drone[756]
- HW-300
  - Small, multi-purpose long-flight UAV that can be unpackaged and ready for take-off in two hours, per manufacturer[757]
  - Requires much less area to take off and land than larger UAVs[758]
  - HW-310 - medium-sized UAV general flight platform[759]
- HW-350
  - Small multi-purpose long-endurance UAV[760]
- HW-500
- HW-600 Sky Hawk UAV
  - Described by CASIC Third Academy designer Ma Honzhong [马洪忠] as a "High-altitude, high-speed, stealth, and high-risk environment reconnaissance UAV"[761]
  - HW-610 - surveillance and attack drone[762]
    - New type of MALE UAV designed for military market
    - This UAV has a 3–5-hour flight time and 350 km range

        - In addition to reconnaissance, the UAV can be equipped for precision ground strikes and electronic countermeasures by mounting precision-guided weapons and electronic jamming devices

- HW-800
- Sky Hawk (WJ-600) [天鹰] UAV[763]
- Falcon (WJ-700) [猎鹰] UAV[764]

Rotor-wing series:[765]

- HW-X100
- HW-X200

Notable Relationships

- Beihang University and CASC's CAAA jointly carried out a "UAV flight safety management system development" [无人机飞行安全管理系统研制] project in 2014 for the Beijing Municipal Science & Technology Committee [北京市科委][766]
- May be part of Beijing Municipal Science & Technology Committee UAV Alliance [北京市科委无人机联盟][767]
    - CASIC 3rd Academy is the chairman unit, and as one of its main UAV subsidiaries, it would be logical for it to be involved[768]
- Beijing Hangke Rongsheng Technology Development Co., Ltd. [北京航科融盛科技发展有限公司] signed a UAV project and product cooperation framework agreement in 2017[769]

Known Subsidiaries

- Haiying Aviation General Equipment Co., Ltd. Wuhu Branch [海鹰航空通用装备有限责任公司芜湖分公司][770]
    - Wanjun District, Wuhu City, Anhui Province [安徽省芜湖市湾沚区][771]
    - Alias: Wuhu Branch [芜湖分公司][772]
- Haiying Aviation General Equipment Co., Ltd. Shenyang Branch [海鹰航空通用装备有限责任公司沈阳分公司][773]
    - Aliases:
        - Haiying Aviation General Equipment Co., Ltd. Production and Test Flight Support Center [海鹰航空通用装备有限责任公司生产与试飞保障中心][774]
        - Shenyang Branch [沈阳分公司][775]
    - Dadong District, Shenyang City, Liaoning Province [辽宁省沈阳市大东区][776] / No. 3, Dongta Street, Dadong District, Shenyang [沈阳大东区东塔街 3 号][777]

- May be related to another CASIC 3rd Academy subsidiary Shenyang Aerospace Xinguang Group Co., Ltd. [沈阳航天新光集团有限公司][778] – Hiwing General Aviation Equipment listed information about them on its website[779]

Directly Subordinate Organizations

- Wuhu Branch [芜湖分公司]

Key Personnel

- Ma Hongzhong [马洪忠]: chairman, legal representative, beneficial owner,[780] president of 302nd institute [302 所长][781]
  - Chief Designer of Skyhawk UAV [天鹰无人机总设计师][782]
    - Appears to be the same person as "Ma Zong" (or possible "Chief Ma") [马总], who led the development of the Skyhawk and is a CASIC UAV chief expert [中国航天科工无人机领域的首席专家][783]
  - Member of the CSAA Technical Committee on Guidance, Navigation and Control (TCGNC) [中国航空学会制导、导航与控制分会][784]
- Liu Liu [刘柳]: manager (one of several), board member, director[785]

Year Established: 2012[786]

Aliases

- CASIC 302nd Institute [中国航天科工集团三院三〇二所]
  - Widely referred to as the same from 2022 onward,[787] contact person Ren Xuejiao [任雪姣] and the phone number (010-6819050)[788] are the same as those on 302nd Institute job ads, as are some addresses[789]
  - Note: as of at least 2015-2017, the 302nd Institute and Hiwing General Aviation Equipment were separate entities;[790] they appear to have (or at least Hiwing General Aviation Equipment began to be identified as the 302nd RI) merged at some point between that time and 2022
  - Beijing UAV Technology Research Institute [北京无人机技术研究所] – alternate name for 302nd Institute when it was separate from Hiwing General Aviation Equipment[791]
    - They both use a 302nd Institute email (casic302@163.com) and the description, address, contact people, and phone number are the same as well[792]
- CASIC 3rd Academy UAV Technology Institute [中国航天科工三院无人机技术研究所][793]
- Hiwing Aviation Company [海鹰航空公司][794]

- Hiwing AGE (possibly)[795]
- CASIC UAV Technology Institute [中国航天科工集团有限公司无人机技术研究所][796]

Website

- http://www.hiwingage.com (defunct/inaccessible; archived here: https://web.archive.org/web/20170516060317/https://www.hiwingage.com/)
    - Defunct / mostly blank English site archived here: https://web.archive.org/web/20160422010222/http://www.hiwingage.com/en/
- http://www.hiwingage.com.cn/ (defunct – no archive)
- http://302s.fhjs.casic.cs/ (defunct – no archive)

Subordinate to

- CASIC 3rd Academy [航天科工三院] (45% ownership)[797]
    - Haiying Group [航天科工海鹰集团有限公司]
        - It may potentially be subordinate to or at least affiliated with this because it appears to be a 3rd Academy subsidiary that has other subsidiaries with the name Haiying [海鹰] in them under it: the 302nd Institute is listed under its group;[798] both (as well as another subsidiary with Haiying in its name) are located in the same building [北京丰台海鹰路 1 号院航天海鹰科技大厦];[799] and its website lists the same UAVs as the 302nd Institute[800]

Addresses

- 8th Floor, Aerospace Haiying Technology Building, No. 1 Haiying Road, Fengtai, Beijing [北京丰台海鹰路 1 号院航天海鹰科技大厦 8 层][801]
- Building 1, Haiying Road, Science City, Fengtai District, Beijing [北京市丰台区科学城海鹰路 1 号楼][802]
    - Possibly same location as above
- Floor 501, North Gate, Yungang Third Aerospace Academy, Fengtai, Beijing [北京丰台云岗航天三院院直北门 501 楼][803]
    - Possibly just for deliveries/correspondence
- No. 1, Xili, Yungang North District, Fengtai District, Beijing [北京市丰台区云岗北区西里 1 号院][804]
    - Same address as CASIC 3rd Academy – possibly same area as address immediately above
- 4th Floor, Building 208, No. 48 Haotian North Street, Changyang Town, Fangshan District, Beijing [北京市房山区长阳镇昊天北大街 48 号 208 号楼四层][805]

    - Registered address [注册地址] [806]
- May also have a location in Tianjin[807]

CHINA NORTH INDUSTRIES CORPORATION (NORINCO) SUBSIDIARIES

Xi'an Aisheng Technology Group Co., Ltd.

Overview: Xi'an Aisheng Technology Group Co., Ltd. [西安爱生技术集团有限公司] has been the production platform for Northwestern Polytechnic University's [西北工业大学] UAV manufacturing efforts for over three decades. In late 2023, defense giant NORINCO acquired a controlling stake in Aisheng Group.[808] However, Aisheng Group retains deep links to NWPU, which also has a close cooperative relationship with NORINCO.[809]

In 1984, the Ministry of Aviation Industry designated NWPU as China's chief design unit for the development of small UAVs, and the "Northwestern Polytechnical University UAV Research Institute" (365th Institute) was established.[810] On July 14, 1992, NWPU established Xi'an Aisheng Technology Group based on the 365th Institute.[811]

In 1995, the State Council's Development Research Center characterized Xi'an Aisheng as China's largest UAV research and production base, and the company received the "Best in China" ["中华之最"] designation.[812]

The company's UAV team participated in parades in Beijing: in October 2009 to commemorate the 60th anniversary of the PRC's founding and in July 2017 to mark the 90th anniversary of the PLA.[813]

As of 2018, Xi'an Aisheng Group had reportedly delivered thousands of UAVs to the PLA in the previous decades and claimed to hold a large share of the Chinese military UAV market.[814] The company appears to have developed a focus on small man-portable, including hand-launched drones, and truck-launched surveillance UAVs, used by the PLA, particularly the PLA Ground Forces, for tactical surveillance and reconnaissance.[815] In 2020, NWPU reported that Aisheng Group had researched, developed, and manufactured four UAV series (target, reconnaissance, attack, and general use) of 15 platforms with over 50 different models combined, as well as three series of eight types of small aeroengine models.[816]

In May 2021, Aisheng Group was restructured from a state-owned enterprise to a limited liability company. In February 2023, NWPU, Aisheng Group, and NORINCO reached an agreement, wherein the latter company will increase its investment to take a controlling stake in Aisheng and acquire an equity stake in the University.[817] On December 12, 2023, with approval from the MIIT and the Ministry of Finance, Aisheng Group approved a new company charter.[818] On December 18, 2023, Aisheng Group officially became a holding company of NORINCO.[819] As of 2023, the company had 657 employees.[820]

At the time of its acquisition by NORINCO, NWPU credited Xi'an Aisheng Group with "pioneering the development of UAVs in China." NWPU also acknowledged the company for the following "firsts" in the history of Chinese UAV development:[821]

- First target UAV
- First reconnaissance UAV
- First ship-borne UAV
- First anti-radiation UAV

- Achieving the first comprehensive export of China's UAV system, technology, and production line

Notable UAV Products

- ASN-15 hand thrown reconnaissance UAV
  - Hand-launched UAV has been deployed by the PLA ground forces for intelligence, surveillance and reconnaissance roles, equipped with a camera and has an endurance of about an hour[822]
- ASN-206 reconnaissance UAV[823]
  - Developed in the 1990s[824]
  - Reportedly in service in the PLA[825] and widely employed among tactical units[826]
  - And "can carry a variety of payloads, making it flexible for day and night missions, including ISR and communications relay"[827]
- ASN-207 reconnaissance UAV[828]
  - Developed in the 1990s[829]
  - Reportedly in service with the PLA Army[830]
- ASN-209 "Silver Eagle" [银鹰][831]
  - Medium-altitude medium-endurance (MAME) UAV[832]
  - Reportedly in service in the PLAN and used for communications relay and electromagnetic confrontation[833]
- ASN-212 - small (50 kg) UAV[834]
  - This model has a limited range and payload, but can perform battlefield surveillance, damage assessment, and border patrol missions[835]
- ASN-213[836]
  - 5-kilogram UAV, with the ability to fold its wings depending on its mission or phase of flight[837]
- ASN-215[838]
  - Maximum take-off weight of 220 kg, a 60 kg payload, and a maximum altitude of 6000 meters[839]
  - Reportedly in service with the PLA[840]
- ASN-217 hand-launched electric UAV[841]
  - Capable of providing tactical ISR support[842]
  - Some similarities to the RQ-11 UAV used by the U.S. armed forces

- ASN-229A surveillance and attack drone [察打一体无人机][843]
    - Long-endurance, with a satellite-based data link and the ability to carry air-to-ground missiles[844]
- ASN-301 anti-radiation loitering munition[845]
    - Shown in a fire unit that can consist of 54 drones
- ASN-102 Target Drone UAV System [AS-102 小型靶标无人机系统]
- ASN-216 Vertical Take-off and Landing UAV System [ASN-216 垂直起降无人机系统][846]
- Engines (likely for its UAVs):[847]
    - HS-350 Engine [HS-350 型发动机]
    - HS-510
    - HS-700
    - HS-990

Notable Relationships

- In 2016, then-parent NWPU signed an agreement with Xixian New Area [西咸新区] in Shaanxi to build a civilian UAV manufacturing base [民用无人机产业化基地] in Fengxi New City [沣西新城] to help expand NWPU and Aisheng's operations[848]
- NWPU Defense S&T Key Laboratory of UAV Special Technology [无人机特种技术国防科技重点实验室]
    - Helped establish this lab[849]
    - This lab undertakes much of the research for the dual-use ASN-series.[850] The anti-radiation ASN-301 (possibly a clone of the Israeli Harpy imported by China in the 1990s and 2000s)[851] was designed by husband-and-wife duo, Zhou Zhou [周洲] and Zhu Xiaoping [祝小平], both working for this lab[852]

Known Subsidiaries

- "Aisheng Jingbian UAV Test Company" [爱生无人机试验测试靖边有限公司] [853]
    - 51% ownership stake
    - NWPU Asset Management Company holds a 49% stake[854]
    - Possibly also known as the UAV Test Center [无人机试验测试中心][855]
- Aisheng UAV Xixian New Area Development Co., Ltd. [爱生无人机西咸新区发展有限公司][856]
- Xi'an Aisheng UAV Technology Co., Ltd. [西安爱生无人机技术有限公司][857]

Directly Subordinate Organizations

- National Engineering Research Center for Unmanned Systems [无人系统国家工程研究中心][858] / National Engineering Research Center for UAV Systems [无人机系统国家工程研究中心][859]
    - Appears to be the same entity, which is another NWPU entity profiled in that section
- Special UAV Equipment Technology Research Institute [特种无人机装备技术研究院][860]
    - Co-founded with the East Zone Management and Service Center of China-Korea (Yantai) Industrial Park [中韩（烟台）产业园东区管理服务中心] and Shandong Jianying Intelligent Control Technology Co., Ltd. [山东剑鹰智控科技股份有限公司]
    - The project supports basic research on military and civilian UAVs, combining technology transformation with research and innovation, to form a full industry chain integrating UAV systems, R&D, production, testing, flight testing, and talent training in Yantai, Shandong
- Xi'an UAV Swarm Intelligence and Future Aircraft Engineering Research Center [西安市无人机智能集群与未来飞行器工程研究中心][861]
- Shaanxi Provincial Unmanned Aerial Vehicle System Innovation Center [陕西省无人机系统创新中心][862]
- Xi'an UAV System Intelligent Control Engineering Technology Research Center [西安市无人机系统智能控制工程技术研究中心][863]
- Aircraft R&D Center [飞行器研发中心][864] (possibly)
- Xi'an Industrial Wireless Network Engineering Technology Research Center [西安市工业无线网络工程技术研究中心][865]

Key Personnel

- Wang Junbiao [王俊彪]: Director, Deputy Party Secretary, Deputy General Manager[866]
    - Director of the National Engineering Center for UAV
    - Director of the National Defense Unmanned Aerial Vehicle Research Center
    - Member of the National Drone Expert Group
    - Leader of the Shaanxi Province Manufacturing Informatization Expert Group
    - Director of the Shaanxi Province Digital Manufacturing Engineering Technology Research Center
    - Member of the Academic Committee of Northwestern Polytechnical University[867]
- Xue Jianqiang [薛建强]: Legal representative, chairman[868]
- Wang Kuangbiao [王狂飙]: General Manager, Board member[869]

Year established: 1958[870]

Aliases

- NWPU's 365th Research Institute [西北工业大学第 365 研究所][871]
- 365th Research Institute [365 研究所]
- NWPU Drone Institute [西工大无人机所][872] / Northwestern Polytechnical University Unmanned Aerial Vehicle Research Institute [西北工业大学无人机研究所][873]
- Xi'an Aisheng Technology Group [西安爱生技术集团][874]
- Xi'an ASN Technology Group [西安爱生技术集团公司][875]
- Aisheng Group [爱生集团][876]
- ASN UAV [爱生无人机][877]

Website

- http://aisheng.nwpu.edu.cn/; (older defunct site: http://www.asngroup.com.cn/; archived here, but mostly blank/defunct: https://web.archive.org/web/20130331015654/http://www.asngroup.com.cn/ / https://web.archive.org/web/20130314035759/http://www.asngroup.com.cn:80/English)

Subordinate to

- NORINCO (previously NWPU)

Addresses

- No. 34, Fenghui South Road, Xi'an, Shaanxi Province [陕西省西安市沣惠南路 34 号][878]

Beihang UAS Technology Co., Ltd. / Beijing Beihang Tianyu Changying UAV Technology Co., Ltd.

Overview: Beihang UAS Technology originates from Beihang University's efforts to develop unmanned aerial systems (UAS) through its Unmanned Systems Research Institute [无人系统研究院].[879] On its website, the company touts its dedication to Beihang University's "Changying Spirit" [长鹰精神] of "perseverance, innovation, and soaring to the sky" pledging to strive "tirelessly towards its development vision of 'becoming a world-class drone company.'"[880] As "the science and technology research industrialization platform of Beihang University", the company undertakes production "of UAS and related systems R&D, manufacturing, sales, and services."[881] The company has nearly 250 employees.[882]

On July 21, 2023, Beihang University, the Taizhou City Government, Zhejiang Province, and NORINCO signed an investment agreement.[883] The company is now a member unit of NORINCO under the name of Beijing Beihang Tianyu Changying UAV Technology Co., Ltd. [北京北航天宇长鹰无人机科技有限公司].[884]

Notable UAV Products:

- TYW-1 strike-capable reconnaissance UAV[885]
- BZK-005E "Changying" [长鹰] long-range reconnaissance UAV[886]
    - Used by the PLA for long-range reconnaissance and electronic intelligence missions[887]
    - BKZ-005 is offered for export[888]
- WZ-5
    - China's first high-altitude high-speed reconnaissance UAV[889]
- Hui Feng [灰蜂-4]/ HF-4 UAV[890]
- Hui Feng[灰蜂-5]/HF-5[891]
- Logistics Unmanned Cargo Aircraft [物流无人机][892]
- HF-6[893]/ Small Long Flight UAV [小型长航时无人机][894]

Notable Relationships

- Suppliers include:[895]
    - Beijing Sinotech Going Sci. & Tech. Co., Ltd.[896] (CNTEC) [北京中科国信科技股份有限公司]
    - AVIC Airborne Systems Co., Ltd. [中航机载系统有限公司]
        - Major listed AVIC subsidiary[897]
- Taizhou Bay Circular Economy Industrial Cluster Management Committee [台州湾循环经济产业集聚区管理委员会]
    - Signed Beihang UAV Project Investment Cooperation Agreement [北航无人机项目投资合作协议书] in 2019, with Beihang UAS receiving a special subsidy fund totaling RMB 70 million (around $9.95 million)[898]
- Partnership with Garuda Indonesia
    - Indonesia's national airline carrier is using three BKZ-005 drones for cargo transportation[899]

Known Subsidiaries

- Beijing Future Garden Education Technology Co., Ltd. [北京未来花园教育科技有限公司][900]
    - 100% ownership[901]

- Beihang Changying Aviation Technology (Taizhou) Co., Ltd. [北航长鹰航空科技（台州）有限公司][902]
  - 100% ownership[903]
  - Building 9, No. 99, Haixiu Road, Taizhou City, Zhejiang Province [浙江省台州市海秀路 99 号 9 幢][904]
  - Branch: Beijing Beihang Aerospace Changying UAV Technology Co., Ltd. Taizhou Branch [北京北航天宇长鹰无人机科技有限公司台州分公司][905]
- Beihang Changying Aviation Technology (Hengshui) Co., Ltd. [北航长鹰航空科技（衡水）有限公司][906]
  - 100% ownership[907]

Key Personnel[908]

- Cai Hangqing [蔡航清]: Legal Representative Chairman
- Song Lihui [宋立辉]: Director, Manager
- Chen Song [陈松]: Director
- Wang Heng [王恒]: Director
- Wu Anqing[吴安青]: Director
- Liu Lijun [刘立军]: Director
- Wei Kai[卫凯]: Director
- Li Zhengan [李正安]: Chairman of the Board of Supervisors
- Lin Weili [林为利]: Supervisor
- Zuo Shenhong [左申宏]: Supervisor
- Du Feng [杜峰]: Financial Director

Year Established: 2016[909]

- A previous iteration of this enterprise appears to have been founded in 1988[910]

Aliases

- BHUAS[911]
- Beihang UAV Company [北航无人机公司][912]
- Beijing Chanying Company [北航长鹰公司][913]
- Tianyu Changying [天宇长鹰][914]
- Beihang Changying UAV Coimpany [北航长鹰无人机公司][915]
- Beihang Changying [北航长鹰][916]
- Beijing Beihang Tianyu Changying UAV Technology Co., Ltd. [北京北航天宇长鹰无人机科技有限公司[917]

- Previous:
  - Possibly - Beihang Changying Technology Co Ltd [北航长鹰科技有限公司][918]
  - Beijing Beihang Machinery Factory [北京北航机械厂] (until 2009)[919]
  - Beihang University Machinery Factory [北京航空航天大学机械厂] (2009-2015)[920]

Website

- http://www.buaauas.com/ (defunct; archived: https://web.archive.org/web/20240330095516/http://buaauas.com/)

Subordinate to

- Majority-owned (51%) by NORINCO [中国北方工业有限公司][921]
- BUAA Holdings Co, Ltd[922] (23.5%) [北京北航资产经营有限公司][923]
  - State-owned funds:
    - Taizhou City Improvement Investment Limited Partnership (12.7%) [台州市优化升级投资合伙企业（有限合伙）][924]
    - Taizhou Dongtou Industrial Investment Group Co., Ltd. (6.3%) [台州东投产业投资集团有限公司][925]
    - Taizhou Industrial Investment Co., Ltd. (6.3%) [台州市产业投资有限公司][926]
- Despite its multiple stakeholders, the company remains deeply connected to Beihang University
  - It is unclear if the entity is a direct subsidiary or offshoot of Beihang Institute of Unmanned System [北京航空航天大学无人系统研究院], but the company bases its research off the "Beihang University UAV science and technology research industrialization platform" [北航无人机科研和科技成果转化的平台][927]
  - The company appears to have assumed the Institute's UAV production, noting it is "in charge of UAS and related systems R&D, manufacturing, sales and services of Beihang University" [主要承担北航无人机型号研制及生产任务][928]
  - In other sections of its website, this company claims to be the former UAV Institute, stating that Beihang took the former UAV institute and restructured it into Beihang UAS in 2016 [北航将原无人驾驶飞行器设计研究所改组组建为北航天宇长鹰无人机公司] or that it was "previously" the Institute[929]
  - However, the Beihang UAV Institute's website says it changed its name in 2016.[930] Moreover, the corresponding English parts of the website just say that it was formed from the former UAV Institute[931]

Addresses

- 12th Floor, Weishi Building, No. 39 Xueyuan Road, Haidian District, Beijing [北京海淀区学院路 39 号唯实大厦 12 层][932]

- Beihang University UAV Building and Zhichun Road Zhizhen Building, No. 37 Xueyuan Road, Haidian District, Beijing [北京海淀区学院路 37 号北京航空航天大学无人机楼知春路致真大厦][933]

China NORINCO Institute of Computer Application Technology

Overview: The main research areas of the China NORINCO Institute of Computer Application Technology [中国兵器工业计算机应用技术研究所] include UAS design and development, vehicle-integrated electronic systems, and network information systems.[934] The institute has R&D capabilities focusing on unmanned platform control technology, among other specialties.[935] The first Chinese email was sent to them, and it was the first work unit to register a ".cn" address.[936]

The Institute developed the Golden Eagle CR500 unmanned helicopter system [金雕 CR500 无人直升机系统], which is a coaxial twin-rotor unmanned helicopter system [共轴双旋翼无人直升机系统] with battlefield reconnaissance, target positioning, illumination, communication relay, and damage effectiveness assessment functions that was developed for the defense market.[937] The Golden Eagle CR500 can be used for a variety of missions, including battlefield reconnaissance, communication relay, anti-submarine warfare, and material transportation.[938] The NORINCO Institute of Computer Application Technology may have also developed the SR100 unmanned helicopter, which is used for agriculture and forestry work.[939]

As of 2016, the Institute had been carrying out UAV research and product development for over a decade.[940] It has a team specializing in small and medium-sized UAVs overall design, adaptive flight control technology research and application system integration, and can develop fixed-wing, helicopter, and electric multi-rotor aircraft.[941]

In the civilian, police, and military fields, the Computing Institute has developed a variety of fixed wing UAVs and unmanned helicopter platforms with a take-off weight of 10-300 kilograms and a payload of 3-100 kilograms, creating UAVs with reconnaissance, monitoring, sighting, target indication, fire strike, information assurance, and other functions. [942]

Recent university job postings indicate that UAVs remain a focus with the university hiring, in September 2024, for an "Integrated UAV Design" [无人机总体设计] specialist with an advanced degree.[943] The institute employs nearly 400 people as of 2023.[944]

Notable UAV Products

- Golden Eagle CR500 unmanned helicopter system [金雕 CR500 无人直升机系统][945]

Notable Relationships:

- Relationships with numerous state, military, research, and higher-education entities but little open-source information is available

Known Subsidiaries

- NORINCO UAV Research Institute Co. [中兵无人机研究院有限公司]
  - 60% ownership[946]
  - The two entities held a joint employment seminar together[947]
  - They also posted a joint job advertisement elsewhere[948]

Key Personnel:

- Liu Peizhi [刘培志]: chief engineer/designer[949]

Alias

- NORINCO Computing Institute [兵器计算所][950]

Website

- http://jsjjs.norincogroup.com.cn/ (defunct; website is not archived)

Year established: 1978[951]

Subordinate to

- NORINCO Group
  - Northern Information Control Research Institute Group Co., Ltd. [北方信息控制研究院集团有限公司][952]

Website

- https://web.archive.org/web/20190319022941/http://bfxx.norincogroup.com.cn/

Address:

- No. 10, Caidaigou, Haidian District, Beijing [北京市海淀区车道沟 10 号][953]

NORINCO UAV Research Institute Co.

The NORINCO UAV Research Institute Co. [中兵无人机研究院有限公司] company undertakes research on medium and low-altitude unmanned operational systems [中低空无人作战体系], top-level design, technological innovation, product research and development and system integration to create a UAV industrialization base [无人机产业化基地].[954] It also carries out intelligent UAV manufacturing and sales.[955] Its main products include unmanned helicopters, multi-rotor drones, micro drones, and special drones [无人直升机、多旋翼无人机、微小型无人机、特种无人机].[956] The company focuses on fulfilling the operational and support needs of "all-domain operations" and "three-dimensional attack and defense" and may develop military products for export (it "pays attention to the needs of international military trade").[957] As of September 2024, the company had 170 employees.[958]

Key Personnel

- Li Dingzhu [李定主]: Chairman[959]
- Wang Shaojun [王少军]: Board member and manager[960]

Subordinate to

- NORINCO Group
  - Northern Information Control Research Institute Group Co., Ltd. [北方信息控制研究院集团有限公司]
    - Listed under this entity on a Norinco recruitment site[961]
    - Subsidiary of NORINCO Institute of Computer Application Technology [中国兵器工业计算机应用技术研究所][962]
      - 60% ownership of it;[963]did a joint job seminar together;[964] and placed another joint job advertisement elsewhere[965]
  - NORINCO [中国北方工业有限公司], 40% ownership[966]

Year established: 2021[967]

Addresses

- Building 5, Courtyard 5, Dijin Road, Haidian District, Beijing [北京市市辖区海淀区地锦路 5 号院 5 号楼][968]
- Building 5, Courtyard 5, Dijin Road Environmental Protection Technology Park, Haidian District, Beijing [北京市海淀区地锦路环保科技园 5 号院 5 号楼][969]
  - Appears to be an alternate address for the same location as above
- Room 408, Unit 2, Building 15, No. 16 Yingcai North Third Street, Changping District, Beijing [北京市昌平区未来科学城英才北三街 16 号院 15 号楼 2 单元 408 室][970]

UAV R&D Center

The China Academy of Ordnance Science UAV R&D Center [兵科院无人机研发中心/无人机研发中心] is under NORINCO's direct subsidiary, the China Academy of Ordnance Science [中国兵器科学研究院/兵科院]. The Center has been in existence since at least August 2023.[971] The Center's director is Liu Dawei [刘大卫], who attended the 2024 International Conference on UAV Applications and Anti-UAV & UAV Industry Exposition [国际无人机应用及防控大会暨无人机产业博览会].[972]

The Center may have a relationship with the NORINCO Group Power Research Institute [中国兵器工业集团动力研究院有限公司/兵器动力院/动力研究院] – Director Liu Dawei visited

their booth at the aforementioned UAV Industry Exposition, where he inspected a 5kW UAV heavy oil piston engine [5kW 无人机重油活塞发动机], which was undergoing mounting testing [搭载试验], and praised the Institute's UAV power serialization [动力系列化] R&D.[973]

It was visited by NORINCO Group Party Secretary and Chairman [董事长] Cheng Fubo [程福波] in May 2024,[974] and by Beihang University's School of Aeronautic Science and Engineering [航空科学与工程学院] graduate students in August 2023 at the China Academy of Ordnance Science's Huaishuling [槐树岭] location in Beijing's Fengtai District [北京丰台区] indicating that this is where the Center may be located.[975]

The Center employs at least three Beihang University alumni: Ma Chaoqun [马超群], Zhai Junda [翟俊达], and Zhang Zhitao [张志涛].[976]

North Navigation Control Technology Co., Ltd.

Overview: Following a NORINCO re-organization in 2011, the mission of North Navigation Control Technology Co., Ltd [北方导航控制技术股份有限公司] has been to serve as an industrial base for production of NORINCO weapons, information equipment, navigation and control products, dual-use unmanned platforms and other high-tech products.[977] This entity previously manufactured UAVs, but it is unclear to what extent it is still involved with their production after 2014. The company currently employs over 2,200 people.[978]

Notable UAV Products

- Huaying [华鹰] UAV series
  - Huaying-1 [华鹰一号/华鹰救灾一号][979]
  - "Huaying" second generation fixed-wing multi-purpose UAV remote sensing system ["华鹰"二代固定翼多用途无人机遥感系统][980]
    - Huaying UAV listed as nationally-supported project ["十二五"国家支撑项目] for the "Twelfth Five-Year Plan"" [中兵光电华鹰无人机被列为"十二五"国家支撑项目][981]
- UAV reconnaissance system [无人机侦查系统][982]
- Unmanned platform system adapted to future high-tech warfare [适应未来高科技战争的无人平台系统][983]
- Remote sensing mapping, artificial weather modification UAV system [遥感测绘、人工影响天气无人机系统][984]
- Outpost hand-thrown surveillance drone / "Outpost" single-soldier hand-launched unmanned aerial vehicle system [前哨手抛监测无人机/ "前哨"单兵手抛无人机系统][985]
  - Delivered to Egypt in 2010; provided training for these drones in Cairo in 2014[986]

Notable Relationships

- Beijing Economic and Technological Development Zone [北京经济技术开发区] or Yizhuang Development Zone [亦庄开发区] (i.e., Beijing Economic-Technological Development Area-E-Town)
    - The company is based in this zone
    - In February 2023, Yi Yuanjia [伊元甲], Director of the Economic Development Bureau for the Beijing Economic and Technological Development Zone[987]
    - Yi came to the enterprise to assess the company's production line and attain in-depth understanding of the company's production and operation, scientific and technological research and development, industrial layout, and the resumption of work and production in the first quarter (following the rollback of the "dynamic clearance" policy, i.e. zero-COVID, in late 2022)[988]

Known Subsidiaries:

- Zhongbing Aviation Technology Co., Ltd. [中兵航联科技股份有限公司][989]
    - 51.95% ownership
    - Mainly engaged in the research, development and production of military electrical connectors
- Zhongbing Communication Technology Co., Ltd. [中兵通信科技股份有限公司][990]
    - 50.82% ownership
    - Mainly engaged in the research, development and production of military communication systems and equipment
- Hengyang North Optoelectronics Information Technology Co., Ltd. [衡阳北方光电信息技术有限公司][991]
    - 90.69% ownership
    - Mainly engaged in the cooperative development and production of Red Arrow [红箭] series products and military product outsourcing services

Directly subordinate organizations:

- Production branch factories [生产分厂][992]
    - Final assembly branch factory [总装分厂]
    - Precision machinery manufacturing branch factory [精密机械制造分厂]
    - Optical branch factory [光学分厂]

Year established: 1960[993]

Aliases:

- Northern Navigation [北方导航][994]

- Northern Tianniao Intelligent Technology Co., Ltd. [北方天鸟智能科技股份有限公司/北方天鸟] (former name, 2000-2008)[995]
- Beijing North China Optical Instrument Co., Ltd. [北京华北光学仪器有限公司/华北光学] (former 2001-2008)
- China North Optical-Electrical Technology Co., Ltd [中兵光电科技股份有限公司[996]/中兵光电[997]] (former – 2008-2012)
- Factory [218 厂][998]

Website:

- http://bfdh.norincogroup.com.cn
- old website: http://www.bfdh.com.cn/ (defunct; archived: https://web.archive.org/web/20170324064501/http://www.bfdh.com.cn/)

Subordinate to

- NORINCO is the majority stakeholder, website is under NORINCO's domain name[999]

Address:

- No. 2, Kechuang 15th Street, Yizhuang Economic and Technological Development Zone, Beijing [北京市亦庄经济技术开发区科创 15 街 2 号]

CHINA ELECTRONICS TECHNOLOGY GROUP CORPORATION ENTITIES

China Electronics Technology Group Corporation 27th Research Institute

Overview: The China Electronics Technology Group Corporation (CETC) 27th Research Institute [中国电子科技集团公司第二十七研究所/中国电科 27 所/二十七所] institute appears to be in the process of joining forces or perhaps merging to become the CETC New Defense Technology Co., Ltd. [中电科新防务技术有限公司/新防务公司] as its website states that becoming this company is it's a goal.[1000] A CETC CSR report links the two outfits together.[1001] Moreover, both entities have the same top leader (Zhou Bin [周彬]) and address.[1002] As of this writing, the institute has around 1,716 employees.[1003]

Notable UAV Products

- MJ-I "Agile-I" unmanned helicopter system ["敏捷-I"无人直升机系统][1004]
    - Intelligent small, unmanned helicopter system; can carry out reconnaissance, fixed-point detailed investigation, target locking and tracking[1005]
- MJ-III "Agile-III" unmanned helicopter system ["敏捷-III"无人直升机系统][1006]
    - Dual-use light unmanned helicopter system[1007]
    - Can carry various equipment and payloads[1008]
    - Can fulfill military tasks such as communications relays, battlefield reconnaissance, electronic jamming and serve as a helicopter target drone[1009]
- TD450B unmanned helicopter system [TD450B 无人直升机系统][1010]
    - A 500Kg-class dual-purpose light unmanned helicopter system with coaxial configuration[1011]
    - Can undertake as battlefield reconnaissance, electronic jamming, communication relay, material delivery and other military tasks, and can also carry a variety of payloads for as needed for different missions[1012]
- MX-6 "Minxing" six-rotor unmanned aerial vehicle system [敏行"六旋翼无人机系统][1013]
- "Sky Eagle" [天鹰]: Multipurpose Tactical UAV Series[1014]

Directly Subordinate Organizations

- Unmanned Platform and Defense Systems Department [无人平台与防御系统事业部][1015]
    - CETC UAV System R&D Center [中国电科无人机系统研发中心/中国电子科技集团公司无人机系统研发中心][1016]
    - Research used in development of "Sky Eagle" UAV series[1017]
    - Affiliated units:
        - Main body, aircraft design, flight control and navigation, comprehensive information processing, airframe structure and strength laboratories[1018]

- UAV body processing workshop [无人机机体加工车间] and a flight test base [飞行试验基地][1019]

Key Personnel

- Zhou Bin [周彬]: president; also, chairman and Party secretary of the CETC New Defense Technology Co., Ltd.[1020]

Year established: 1967[1021]

Aliases

- CETC New Defense Technology Co., Ltd. [中电科新防务技术有限公司/新防务公司][1022]

Website

- https://27.cetc.com.cn

Address

- No. 36, Boxue Road, Zhengdong New District, Zhengzhou City, Henan Province [河南省郑州市郑东新区博学路 36 号][1023]

CETC Intelligent Systems Research Institute (ISRI)

Overview: Founded in 2018 under the CETC Electronic Science Research Institute / China Academy of Electronics and Information Technology (CAEIT) [中国电子科技集团公司电子科学研究院/电科院],[1024] the CETC Intelligent Systems Research Institute (ISRI) [智能系统研究所/智能所][1025] focuses on smart unmanned system swarms.[1026] Led by Zhao Yanjie [赵彦杰],[1027] ISRI employed over 50 people on its team in 2020.[1028] ISRI works on unmanned platforms,[1029] and has recruited for UAV pilots.[1030] It has undertaken various military projects [重大、重点项目],[1031] the team's research results are mostly concentrated in the military field,[1032] and it is the supporting/affiliated unit for the/a PLAAF AI Equipment Applications Specialized Group [空军人工智能装备应用专业组].[1033]

After its founding in 2018, IRSI appears to have absorbed CETC's Intelligent Unmanned Systems Research Center [智能无人系统研究中心] that has also been led by Zhao Yanjie since its 2015 founding.

Notable UAV Products:

- UAV Swarm Systems (potentially)

Directly Subordinate Organizations

- Intelligent Unmanned Systems Research Center [智能无人系统研究中心]
    - Founded in 2015 under the CETC Electronic Science Research Institute / China Academy of Electronics and Information Technology (CAEIT) [中国电子科技集团公司电子科学研究院/电科院] Innovation Center [创新中心][1034]
    - Center hosts a team led by Zhao Yanjie [赵彦杰] that focuses on intelligent UAV swarm systems [智能无人机集群系统][1035]
    - China's first intelligent unmanned swarm innovation team, the group has conducted various swarm flight tests fixed-wing UAVs (including 200 at a time), and has repeatedly broken the world record for fixed-wing UAV swarm flights[1036]
    - Zhao also leads CETC's intelligent unmanned swarm program [智能无人集群项目], which could be related to or associated with the Center[1037]
        - A job ad for the Institute says the team has repeated broken fixed-wing UAV swarm records,[1038] which an article on Zhao and the Center also said their team had done[1039]
        - Job ads for the Institute said the team was the first domestic UAV swarm innovation team [智能无人集群创新团队][1040] / the first domestic UAV swarm system integration innovation team [智能无人机集群系统集成创新团队],[1041] while an article on the Center said it was the first domestic unmanned swarm innovation team [智能无人集群创新团队][1042]

Key Personnel

- Zhao Yanjie [赵彦杰]: Leader, ISRI; Leader, Intelligent Unmanned Systems Research Center; Leader CETC intelligent unmanned swarm program[1043]

Aliases:

- Intelligent Unmanned Systems Research Institute [智能无人系统研究所] (possible)
    - Zhao Yanjie has been mentioned as leader of both this entity in 2020 and of ISRI before 2019 and afterwards[1044]

Year Established: 2018

Website

- N/A

Subordinate to

- CETC

Address

- No. 11, Shuangyuan Road, Badachu, Shijingshan District, Beijing [北京市石景山区八大处双园路 11 号][1045] (appears to be co-located with CAEIT)

Network Communications Research Institute

Overview: The Network Communications Research Institute [网络通信研究院], also known as CETC Network & Communications Group Co., Ltd. (CENC) [中电网络通信集团有限公司/中电网通], is an amalgamation of several CETC research institutes (RIs): the 7th, 34th, 39th, 50th and 54th RIs, with the 54th RI being the primary unit).[1046] The 54th RI has produced UAV tracking and control systems.[1047] The 34th RI has developed UAV airborne wireless laser communication equipment.[1048]

Founded in 1952, the 54th Research Institute combined with other research institutes in 2017 to become CENC.[1049] Currently, CENC has over 18,000 employees, and focuses on military electronics, including military communications, military measurement and control, satellite navigation and positioning, communications and network countermeasures, reconnaissance intelligence, aerospace ground comprehensive applications, and antennas.[1050]

Notable UAV Products

- Ground command and control system for HH-100 commercial unmanned transport aircraft [HH-100 商用无人运输机][1051]

Key Personnel

- Yuan Pu [原普]: Party Secretary and Board Chairman
- Zhang Guihua [张桂华]: Deputy Party Secretary, General Manager Director
- Qin Jiancun: Deputy Party Secretary

Website

- https://dktx.cetc.com.cn/

Subordinate to

- CETC[1052]

Year Established: 2017

Address

- No. 589, Zhongshan West Road, Shijiazhuang City, Hebei Province [河北省石家庄市中山西路 589 号][1053]

OTHER RELEVANT ENTERPRISES

BEIJING ZHONGHANGZHI TECHNOLOGY CO., LTD.

Overview: Founded in 2012, Beijing ZhongHangZhi Technology Co., Ltd., [北京中航智科技有限公司], also known as ZHZ in English, is a wholly owned subsidiary, and potentially the core unit, of United Aircraft [联合飞机]. Nominally private, United Aircraft, established in 2014, has deep ties to the PRC's defense industrial complex. The company's chairman, who also founded, leads, and majority owns ZHZ, Tian Gangyin [田刚印] is a member of the Central Military Commission's (CMC) Science and Technology Committee expert group.[1054]

According to the ZHZ's website, the company is devoted to serving its "military and commercial customers by our UAV solutions applicable to diversified industries and scenarios covering the full life cycle of UAV." Moreover, the company touts its status as the first privately-owned enterprise that is also a backbone company for the development of MCF.[1055] The company and its founder Tian have focused on and developed a niche in co-axial unmanned helicopters (helicopters with two rotors with same axis of rotation but going in opposite directions). This new TDD220 co-axial helicopter UAV prototype attracted attention at the 2014 Singapore Air Show and was offered a 3.5 billion RMB (around $495 million) investment by Singaporean state-owned investment firm, Temasek.[1056] Despite the high offer, Tian decided to keep the company in China in part due to his strong "patriotic inclinations."[1057]

In 2015, United Aircraft obtained its first national invention patent for an unmanned co-axial helicopter.

As of 2022, ZHZ reported having around 417 employees.[1058]

Notable UAV Products

- TD220 Coaxial Unmanned Helicopter [TD220 共轴无人直升机][1059]
  - The first ZHZ UAV to gain a foothold in market, appeared at 2013 Beijing Science and Technology Expo[1060]
- TD550 Unmanned Helicopter[1061]
  - Released in April 2023, this UAV is designed to adapt to high-altitude flight, including withstanding high winds
  - The helicopter is gas-powered and can fly continuously for 8-9 hours with a full tank. Its maximum payload at an altitude of 5,500 meters is 120 kilograms

Notable Relationships

- Beijing Institute of Technology (BIT) [北京理工大学]: Incubator, Partner
  - In 2014, ZHZ and BIT co-founded the Unmanned Aerial Vehicles Autonomous Control Research Institute of [无人飞行器自主控制研究所][1062]

- Beijing Municipal Government [北京市政府]: financial assistance
    - Provided 50 million yuan (around $ 7 million) in support during the company's early days[1063]
- Tsinghua University [清华大学] – in 2017 United Aircraft signed a cooperation framework agreement [合作框架协议］and jointly established the "UAV Technology Joint Research Center" [无人机技术联合研究中心][1064]
- NUAA: 2017, jointly established the "ZHZ – NUAA Aerospace College Industry-University-Research Base"［中航智–南航航空宇航学院产学研基地][1065]
- PLA
    - Per ZHZ's website, the company delivered multiple sets of unmanned helicopters to the PLA in 2021 and undertook multi-service and multi-regional exercise support[1066]

Known Subsidiaries

- Beijing Zhongguancun UAV Innovation Center Co., Ltd. [北京中关村无人机创新中心有限公司] (founded 2018) (100% ownership)[1067]
- Beijing ZHZ Defense Co., Ltd [北京中航智防务科技有限公司] (100% ownership)[1068]
- Hebei Xiangle Technology Co., Ltd. [河北翔乐科技有限公司] (100% ownership)[1069]
    - Records also list ZHZ's CEO Tian Gangyin as legal representative and the company's business stated scope includes UAV design[1070]
- Chengdu United Airlines Technology Co., Ltd. [成都联合飞机科技有限公司] (100% ownership)[1071]
- Harbin United Airlines Technology Co., Ltd. [哈尔滨联合飞机科技有限公司] (100% ownership)[1072]
- Tangshan United Airlines Technology Co., Ltd. [唐山联合飞机科技有限公司] (100% ownership)[1073]
- Beijing United Science and Intelligent Technology Co., Ltd. [北京联科智能科技有限公司] (100% ownership)[1074]
- Tangshan Fengnan District United Aircraft Operation and Maintenance Co., Ltd. [唐山市丰南区联合飞机运维有限公司] (100% ownership)[1075]
- Dongtai United Aircraft Technology Co., Ltd. [东台联合飞机科技有限公司 (100% ownership)[1076]
- Dunhuang Flight Test Base [敦煌实验试飞基地][1077]
    - Dunhuang Test and Flight Base conducts UAV beyond visual range, multi-environment, and multi-altitude flight tests for United Aircraft. It is dedicated to the test and flight business of unmanned system research, identification, delivery, after-sales support, demonstration, etc.

- Xi'an United Intelligent Equipment Research Institute Co., Ltd. [西安联飞智能装备研究院有限责任公司] (100% owned)
    - The company is focused on the development of advanced military aviation equipment (flight control, avionics, electromechanical and navigation systems, etc.) and ground measurement and control systems (ground station, data link, etc.)[1078]
- Hefei United Aircraft Technology Co., Ltd. [合肥鸿蒙机械制造科技有限公司]
    - The company is described as "a high-performance lightweight composite material solution provider under United Aircraft. It is committed to integrating advanced composite material technology into UAV and derivative fields, deeply interlocking technological innovation with customer needs, and fully commercializing it for UAV fuselage, rotor, radome, military shelter, bulletproof and explosion-proof products"[1079]
- Wuhu United Aircraft Technology Co., Ltd. [芜湖联合飞机科技有限公司][1080] - 100% owned by United Aircraft[1081]

Directly Subordinate Organizations

- The company reports branches in the same location as the above surrogates (these may be the same entities)[1082]

Key Personnel

- Tian Gangyin [田刚印]: Chairman, Founder and General Manager, ZHZ; Chairman of United Aircraft [联合飞机][1083]
    - UAV expert for the CMC Science and Technology Committee also affiliated with CMC EDD Expert Group.[1084]
        - Born in 1982, Tian is regarded as a rising star in the military drone industry. He studied at Beijing Institute of Technology (BIT) majoring in aircraft design and engineering
        - Began his career as a technician in the drone industry after graduating in 2005
        - In 2007, he rented space from BIT to start his own UAV company with 40,000 RMB in seed capital, eventually receiving almost 300,000 RMB from the Chinese Academy of Sciences (CAS) and his company originally found success manufacturing flight controllers
        - In 2012, Tian developed the first electronically controlled coaxial unmanned helicopter
        - Tian Gangyin is also a deputy member of the Heilongjiang Provincial People's Congress[1085]

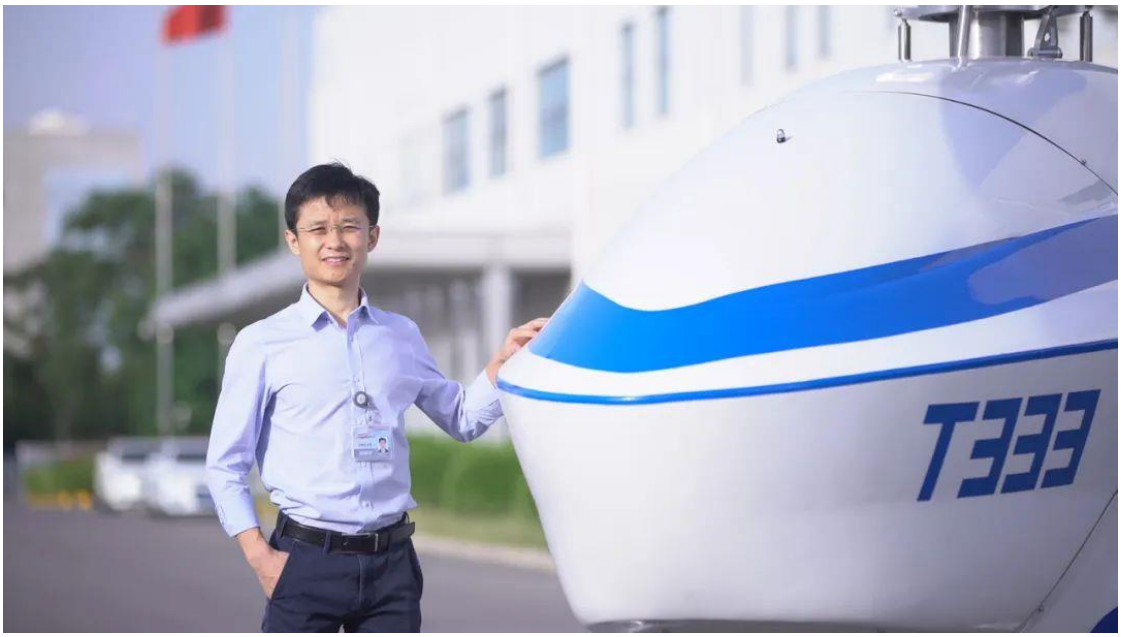

Figure 14: Tian Gangyin Chairman, Founder and General Manager, ZHZ [1086]

Year Established: 2012[1087]

Aliases

- ZHZ [中航智][1088]
- Zhonghangzhi[1089]
- Beijing ZHZ[1090] [北京中航智] [1091]
- Beijing ZHZ Company [北京中航智公司][1092]

Website

- https://www.zhz.com/

Subordinate to

- United Aircraft [联合飞机], owns 100% of company; Tian Gangyin is the chairman of both companies[1093]

Addresses

- Room 211, 2nd Floor, Building 2, No. 20 Tongjin South Road, Beijing Economic and Technological Development Zone, Beijing [北京市北京经济技术开发区同济南路 20 号 2 幢 2 层 211 室]
- Building 1, Courtyard 20, Tongji South Road, Beijing Economic and Technological Development Zone [北京经济技术开发区同济南路 20 号院 1 号楼]

SICHUAN TENGDEN TECHNOLOGY CO.

Overview: Founded in 2016, Sichuan Tengden Technology Company [四川腾盾科技有限公司] produces the TB series medium altitude-long endurance (MALE) UAV series for military and civilian use.[1094] The company is nominally private but has received significant state investment; both the Fujian provincial and Guangxi Zhuang Autonomous Region governments have invested in Tengden. Moreover, the company's founder and partial owner, Nie Haitao [聂海涛] is a former director at AVIC's Chengdu Aircraft Design Research Institute (CADI) that has designed a host of UAVs, most notably the Wing-Loong series. Nie has also served as a CMC S&T Committee Expert.

Sichuan Tengden Science and Technology's is wholly owned, via direct and indirect ownership, by Sichuan Tengden Science Innovation Joint Stock Limited Company [四川腾盾科创股份有限公司]. Through their investments, the Fujian provincial and Guangxi Zhuang Autonomous Region governments control the two largest ownership stakes in Sichuan Tengden Science Innovation Joint Stock Limited Company [四川腾 盾科创股份有限公司]. As of 2024, the parent company had 800 employees.[1095]

Notable UAV Products

- TB "Twin -tailed Scorpion" [双尾蝎] UAV Series
  - "Twin -tailed Scorpion" TW328 (TB)[1096]
    - Per Tengden, the TW328 is the "world's first type of large-scale double-engine, modular, multi-role MALE fixed wing UAS"[1097]
    - The commercial version has a maximum take-off weight of 2,800 kg, a range of 6,000 km and an endurance of 35 hours
    - The TB-001 Scorpion cargo drone that can carry a 2.8-ton payload over a 6,000 km distance is the company's flagship program
    - The company also has a modified version of the TB-001 that can para-dropped supplies, which the UAV performed in December 2017 to a Huawei repair crew fixing a cell tower in mountainous Yunnan Province[1098]
    - Tengden Technology is also collaborating with SF Express Delivery Company to build another version of the TB-001 capable of carrying a 1.2-ton payload[1099]
    - The company president told the media, "All [Tengden UAVs] can carry weapons"[1100]
  - TB-001: Military version of [双尾蝎] UAV
    - Can be equipped with a variety of air-to-ground missiles
    - Evidence indicates the TB-001 is in service with PLA's Eastern Theater Command and has been spotted approach Japanese airspace on multiple occasions[1101]

- TB-001 drones were also spotted near Okinawa in June 2024[1102]
- Used by the PLA on several occasions to conduct intelligence, surveillance, and reconnaissance (ISR) sorties skirting the air defense identification zones of Japan and Taiwan[1103]
- Sorties of the TB-001 in early August 2022 were in the vicinity of impact areas for PLA Rocket Force (PLARF) missiles during the exercises conducted by the PLA in the beginning of that month leading some observers to conclude that these UAVs may have been adopted by the PLARF.[1104] Imagery of the PLARF Base 61 subordinate UAV regiment from August 23, 2022 indicates that this unit has indeed adopted TB-001s.[1105] If this is the case, it is one of the first cases of a mixed ownership enterprise supplying the PLA with a large and complete system instead of individual components that would be integrated into a system produced by a defense conglomerate

- "Twin -tailed Scorpion" [双尾蝎 A] - TW328-A
  - Enhanced variant of original "Twin -tailed Scorpion" UAV with a third engine, unclear if this platform has been adapted for military use
  - world's first type of large-scale triple-engine, modular, multi-role MALE UAS
- "Twin -tailed Scorpion" [双尾蝎 D]
  - Tengden claims this is the world's first four-engine UAV[1106]
  - Military-use UAV has a reported take-off weight of more than 4.3 tons and a maximum load of 1,500 kilograms[1107]
  - PLA sources have suggested that given the UAV's payload it may also be modified to carry electronic jamming equipment[1108]
  - May also be used as an anti-submarine warfare platform[1109]

Figure 15: Twin-tailed Scorpion-D quad-engine drone transport (CCTV-7)[1110]

- AAT200 commercial UAV
    - In December 2017, Tengden announced that it was preparing to build the world's largest commercial UAV, the AT200
    - Essentially an unmanned turboprop plane, the AT200, is envisioned as having a maximum range of 7,500km and cargo capacity of 3.4 tons[1111]
    - A modified utility aircraft converted into a transport/airlift UAV may help address logistical issues in China's far-flung military outposts in the South China Sea and mountainous western regions[1112]
- Leviathan - TW165 (TU) [混江龙][1113]
    - Multi-role amphibious light UAS
- Striking Hawk - TW312 (TA) [扑天雕][1114]
    - Medium-scale single-engine, highly cost-effective, multi-role MALE fixed wing UAS
- Featherless Arrow - TH145 (HA) [没羽箭][1115]
    - Plateau-type, multi-role medium-scale UHS

Notable Relationships

- PLA Academy of Military Sciences, National Innovation Institute for Defense Technology [国防科技创新研究院]: The company signed Cooperation Agreement with the Academy of Military Sciences National Innovation Institute of Defense Technology [人民解放军军事科学院国防科技创新研究院] entitled "Intelligent Aircraft Technology Joint Laboratory Construction Cooperative Agreement" [《智能飞行器技术联合实验室建设合作协议》][1116]
- The company has also worked with the Jiuquan Satellite Launch Center and most likely the Sichuan Provincial Military-Civil Fusion Integration Fund on the construction of a commercial space launch site[1117]
    - Variants of the TB-A can function as a mobile satellite ground station, which likely involved input of the former PLA Strategic Support Force or other defense conglomerate affiliated organizations[1118]
- In early 2021, Sichuan Tengden Technology publicized an agreement with the Saudi Ministry of Defense, under which Sichuan Tengden Technology was paid roughly $263 Million USD for indigenous Saudi production rights for the TB-001 and associated technology transfer[1119]
- TB-001 UAVs participated in a 2017 test for emergency logistics delivery. This test was the result of a joint program between Sichuan Tengden Technology and Shunfeng UAS [丰鸟航空科技有限公司][1120]
- In 2018, TB-001 UAVs took part in a 2018 PLAAF Logistics Department exercise focused on UAS based sustainment of disparate forces[1121]

- Sichuan Tengden Technology has supplied UAV flying services to Chinese Academy of Sciences Institute of Propulsion to aid in a project that required flight testing[1122]
- Sichuan Tengden Technology allegedly cooperates with Wuhu Diamond Aero Engine, a minority owned subsidiary of CETC specializing in the production of aircraft components and engines[1123]
- The TU series of amphibious cargo drones have been adopted in a limited capacity by China Post[1124]
- Kangde New Composite Material Group Co. Ltd. [康得新复合材料集团股份有限公司] - announced the signing of an agreement in January 2018 at the first THX Unmanned Aerial Vehicle System Application Development Conference in Chengdu to launch a UAV development project[1125]

Known Subsidiaries

- The parent company, Sichuan Tengden Science Innovation Joint Stock Limited Company [四川腾盾科创股份有限公司] has the following subsidiaries:[1126]
    - Tengden Technology [腾盾科技], aka Sichuan Tengden Technology Co. [四川腾盾科技有限公司]
        - 94.0887% ownership by parent company[1127]
    - Tengfeng Technology [腾凤科技]
    - Tengying Aviation [腾英航空]
    - Tenghang Technology [腾航科技]

Figure 16: Nie Haitao, Tengden founder[1128]

Key Personnel

- Nie Haitao [聂海涛]: founder,[1129] legal representative, beneficial owner, chairman, general manager[1130]
    - Nie is a former deputy director and deputy chief engineer of the AVIC Chengdu Aircraft Design Research Institute [成都飞机设计研究所], where he was involved in the design process of the J-10 and the FC-1[1131]
    - Additionally, Nie has served on several expert committees including as the group lead for the AVIC 863 Program Key Project Group [中航工业国家 863 计划重大专项专家组][1132] as a CMC Science and Technology Committee [中央军委科技委] expert,[1133] CMC EDD major project chief expert [军委装备发展部重大项目首席专家], and CMC S&T advisor [军委科技委顾问][1134]
    - Nie's experience and ties to the defense industry and the government bodies responsible for managing defense science and technology development undoubtedly helped him in establishing his company, obtaining large government investment, and marketing his company's products
- In addition to Nie, the company is said to employ engineers who worked on UAV projects at the 611th RI prior to their employment by Sichuan Tengden Technology[1135]
- Wang Chao [王超]: Tengden Technology Innovation Head[1136]

Year established: 2016[1137]

Aliases

- Tengden[1138]
- Tengden Technology [腾盾科创][1139]
- Sometimes spelled "Sichuan Tengdun"

Website

- https://www.tengden.com/

Subordinate to

- Sichuan Tengden Science Innovation Joint Stock Limited Company [四川腾盾科创股份有限公司]
    - Through their investments, the Fujian provincial and Guangxi Zhuang Autonomous Region governments control the two largest ownership stakes in Sichuan Tengden Science Innovation Joint Stock Limited Company [四川腾盾科创股份有限公司][1140]

Addresses

- Guobin Industrial Investment, No. 50, Jinke East Road, Jinniu District, Chengdu, Sichuan Province [四川省成都市金牛区金科东路 50 号国宾工投][1141]
    - Possibly alternate address for same location: No. 501, Building 4, No. 50 Jinke East Road, Jinniu High-tech Industrial Park, Chengdu, Sichuan Province [四川省成都金牛高新技术产业园区金科东路 50 号 4 号楼 501 号][1142]
- No. 101, 1st Floor, Building 7, No. 50, Jinke East Road, Jinniu High-tech Industrial Park, Chengdu [成都金牛高新技术产业园区金科东路 50 号 7 栋 1 层 101 号][1143]

XI'AN LYNCON ELECTRONIC SCI. & TECH. CO., LTD.

Overview: Xi'an Lyncon Electronic Sci. & Tech. Co. [西安羚控电子科技有限公司], Ltd., also known as Lycon e Tech, was founded as a leader in the "civil UAV supply chain," based on Northwestern Polytechnical University's (NWPU) National Key Laboratory of UAV Special Technology.[1144] According to NWPU, the company has "participated in the development of many key defense models for the PRC and is a MCF demonstration enterprise in the fields of modernization and intelligentization of national defense science and technology."

Lycon e Tech was founded in 2014 by Duan Xiaojun [段晓军], who studied flight control and worked on UAVs for two decades at NWPU.[1145] In his 2018 remarks to the 17th China Economic Forum organized by *People's Daily*, Duan stressed that military civil fusion (MCF) has created excellent opportunities for private enterprises such as Lycon e Tech to enter the defense market and gain market share from the major SOEs.[1146] He also emphasized that UAVs present a particularly good opportunity for private enterprises seeking to benefit from military civil fusion, stating that "the demand for military drones is more vigorous than before. In the past, military drones were mainly used for reconnaissance, but now they have a wide range of uses, including electronic countermeasures, interference, and special purposes. This brought more diversified demand for drones in the military market, which is a huge business opportunity."

According to Duan, advances in intelligence and energy technology create new opportunities for the kinds of vertical-takeoff-and-landing (VTOL) and swarm UAVs that Lycon e Tech is developing. Some of the company's swarm UAV systems have participated in PLA exercises to practice autonomous strikes, defense, and control. Duan emphasized that the company has developed "core technologies in flight control, vertical take-off and landing, and UAV swarms."[1147]

Notable UAV Products

- ZFD-10[1148]
  - Tubular launched, foldable wing series drone used for reconnaissance and combat
- ZFD-60/ZFD-56[1149]
  - The ZFD-60 product is the largest integrated drone system for tube launch, patrol, and swarm inspection in China
- Deep-sea fish/FCD-15[1150]
  - The deep-sea fish drone platform is equipped with an industrial-grade vertical take-off and landing fixed-wing flight control and navigation system, as well as professional visible and infrared imaging pods and ground station software (this setup allows the drone to complete all stages of flight—autonomous takeoff, flight phase transitions, autonomous cruising, and autonomous landing—without operator intervention)

- FCD-20[1151]
    - The FCD-20 composite wing vertical takeoff and landing drone is an electric long endurance composite wing vertical takeoff and landing drone independently developed by Lycon e Tech
- FCDH-36(S)A/FCD-36[1152]
    - The FCDH-36 (S) a winged UAV with retractable rotors for vertical takeoff and landing
- FCM-40[1153]
    - The FCM-40 drone adopts a modular design, which can be quickly disassembled and assembled, has strong maneuverability, is convenient to use, and has extended endurance time
- FCM-50[1154]
    - Medium-sized gas-powered long endurance composite wing VTOL UAV
- FCM-80[1155]
    - Fixed wing/ quadcopter VTOL drone
- FCD-90[1156]
    - The FCD-90 drone is a pure electric composite wing drone
- GHQ-1520[1157]
    - GHQ-1520 is a special aircraft based used for weather monitoring
- GHQ-600[1158]
    - Heavy-duty, long endurance, fully autonomous UAV
- FCDH-36(S)A[1159]
    - Vertical fixed wing honeycomb drone
- LK2000[1160]
    - The LK2000 is a specialized aircraft that has been from a piloted aircraft to a UAV, used for meteorological modification and detection operations
- GHQ-500[1161]
    - The GHQ-500 fixed-wing drone is a long-endurance aircraft developed internally, featuring an autonomous landing gear system for both takeoff and landing

- HCE-25[1162]
    - This coaxial dual-rotor drone is a rapidly deployable unmanned aerial vehicle that can be launched from a rocket. It is designed for quick assembly within the limited space of a rocket payload
        - Single-use UAV provides real-time feedback on flight attitude and mission payload information to the ground station throughout its operational cycle
- HCE-12[1163]
    - This drone can perform multi-drone formation flights, allowing for rapid deployment of localized aerial fire support to neutralize enemy forces
- XCD-35B[1164]
    - This military-grade tethered drone features an all-aluminum alloy fuselage, offering high reliability, excellent electromagnetic compatibility, and broad environmental adaptability
        - With a maximum takeoff weight of 50 kg and a maximum payload capacity of 25 kg, it can carry various payloads
- XCD-35A
    - Military-grade tethered drone has a maximum payload capacity of 10 kg and can carry various types of equipment
- XCD-25A[1165]
    - Electrically powered quadcopter with eight propellers, and an airframe is made from high-strength carbon fiber, with foldable arms and fixed landing gear
- XCD-45A[1166]
    - Military-grade tethered drone
- XCD-18[1167]
    - Multi-rotor battery-powered drone capable of carrying a variety of detection devices
- Zhihang Intelligent Hive Drone System[1168]
    - Shandong Zhihang, a subsidiary of Lingkong Technology, independently developed this vertical takeoff and landing fixed-wing drone hive system[1169]
- "Sentinel" Composite Wing Automatic Airport System[1170]
    - System enables automated drone takeoff, autonomous inspections, automatic recovery, and self-charging[1171]

Other UAV-related products:

- Has developed models/products, likely drones, for various PLA services/branches[1172]
- Vertical takeoff and landing fixed wing unmanned aerial vehicle automatic airport system[1173]

Notable Relationships:

- The following entities are listed as partners listed on the homepage of Xi'an Lyncon's website:[1174]
  - CASC [航天科技集团]
  - CASIC [航天科工集团]
  - CSSC [船舶工业集团]
  - AVIC [中航工业]
  - PetroChina [中国石油]
  - COMAC [中国商飞]
  - China Tower [中国铁塔]
  - CETC [中国电科]
  - Norinco [兵器集团]
  - NWPU [西北工业大学]
  - PLAAF Engineering University [空军工程大学]
  - PLARF Engineering University [火箭军工程大学]
- Hubei Sanjiang Astronautics Hongfeng Control Co., Ltd.[湖北三江航天红峰控制有限公司] (part of CASIC 4th Academy) and NWPU's Defense S&T Key Laboratory of UAV Special Technology: Strategic Cooperation Agreement[1175]
  - Under the agreement, the three parties will cooperate with each other to leverage their respective strengths to cooperate in the development of flight control systems, server systems, and fiberoptic inertial navigation systems.[1176]
- Worked on an AI weather remote sensing UAV system for two years with CAS Aerospace Information Research Institute [中国科学院空天信息创新研究院] as the lead and CASC 9th Academy 704th Research Institute [中国航天科技集团九院七〇四所] and various other entities[1177]
- Provided UAVs(s) for Henan Provincial Fire Rescue Corps' "Natural Disaster Emergency Capability Enhancement Project" Sanmenxia City Branch Team Equipment Construction Project (possibly in 2024 based on the program number [项目编号]: SGZ [2024]304-ZC192)[1178]

- AVIC Xi'an Aircraft Design and Research Institute [西安飞机设计研究所] (also known as the AVIC First Aircraft Institute [中航工业第一飞机设计研究院])
    - won bid in 2021 for what appears to be a carrier landing simulator [着舰导引机舰艇交联仿真系统][1179]
    - Won bid in 2018 for what appears to be a carrier landing guidance simulator [着舰导引机仿真系统][1180]
- AVIC Leihua Electronic Technology Research Institute [雷华电子技术研究所]
    - Won bid in 2016 for Terrain Surveillance Subsystem Testing System [地形监视子系统测试系统][1181]
    - Won bid in 2016 for Integrated Surveillance System Flight Simulation and Alarm Display Platform [综合监视系统飞行仿真及告警显示平台][1182]
    - Won a bid in 2016 for a Terrain Surveillance Subsystem Testing System [地形监视子系统测试系统][1183]
- CASC CALT's Beijing Mechanical and Electrical Research Institute Co., Ltd. [北京精密机电控制设备研究所][1184]
    - Won a bid in 2020 for a Servo System Pressure Equalization and Environmental Impact Comprehensive Evaluation Test System [伺服系统均压环境影响综合评价试验系统][1185]
    - Won a bid in 2020 for a Software and Hardware Joint Debugging Platform [软硬件联合调试平台][1186]
    - Won a bid in 2020 for a Complex Logic Design Technology Research System [复杂逻辑设计技术研究系统][1187]
- CASC's Beijing Aerospace Control Instruments Research Institute [北京航天控制仪器研究所] – won a bid in 2019 for a Reaction Torque Test Rig [反力矩测试仪][1188]

Known Subsidiaries

- Shandong Intellectual Aviation Equipment Co., Ltd. [山东智航智能装备有限公司][1189]
    - 100% ownership[1190]; listed on website[1191]
- Suzhou Lingkong Intelligent Equipment Technology Co., Ltd.[苏州羚控智能装备科技有限公司][1192]
    - 70% ownership[1193]; listed on website[1194]
- Xi'an Aerospace Innovation and Technology Co., Ltd. [西安航宇创科航空科技有限公司]
    - 58% ownership[1195]
    - Not listed on website, but shares same address (see below for details)[1196]

Unclear if subsidiary or just invested in (not listed or otherwise present on website):

- Shaanxi Dexin Intelligent Technology Co., Ltd. – 34% ownership[1197]

Directly Subordinate Organizations

- Beijing Branch [北京分公司][1198]

Year established: 2014[1199]

Key Personnel

- Duan Xiaojun[段晓军]: Legal representative, Chairman and General Manager, Actual controller, Beneficial owner, largest shareholder (24.78%) and founder;[1200] Doctor, Associate Researcher, Northwestern Polytechnical University[1201]
- Xu Bin [徐斌]: director[1202]
- Sun Youbin [孙友彬]: director[1203]
- Wu Bo [吴波]: director[1204]
- Wang Cheng [王宬]: director[1205]
- Deng Xiutao [邓修涛]: director[1206]
- Dong Chuan [董川]: director[1207]
- Cheng Su [陈溯]: director, also a founder[1208]
- Zou Yunli [邹云丽]: director[1209]
- Xue Fei [薛绯]: director[1210]
- Wang Chen[王晨]: director[1211]
- Ma Lei [马蕾]: director[1212]
- Huang Qian[黄倩]: financial manager[1213]

Aliases

- Xi'an Lingkong Electronic Technology Co., Ltd[1214]
- Lingkong Technology [羚控科技][1215]
- Lyncon eTech[1216]
- Xi'an Lingkong [西安羚控][1217]

Website

- http://www.lyncon.cn/
- http://en.lyncon.cn/
- http://uavlyncon.com/ (this site is not currently accessible)[1218]

Subordinate to

- NWPU's Defense S&T Key Laboratory of UAV Special Technology
  - Spun out of this lab [转化成立];[1219] current relationship is unknown
- Duan Xiaojun [段晓军] is the largest shareholder (24.78%)[1220] all others appear to have less than 10% stakes, and some investors appear to be government and defense SOE entities

Addresses

- 11th Floor, Aerospace Technology Application Innovation Center, No. 32 Tuanjie South Road, Xi'an High-tech Zone [西安高新区团结南路 32 号航天技术应用创新中心 11 层][1221]

DJI / SZ DJI TECHNOLOGY CO., LTD.

Overview: Shenzhen DJI Sciences and Technologies Ltd.[深圳市大疆创新科技有限公司] is the world's largest manufacturer of commercial drones, accounting for 90% of the global consumer market as of mid-2024.[1222] Based in Shenzhen, Guangdong, the company has business operations in more than 100 countries and regions.

Nominally private, DJI / SZ DJI Technology Co., Ltd. has received major investments from state firms, including Shanghai Venture Capital Co., SDIC Unity Capital, an investment entity under the State Development & Investment Corporation, and China Chengtong Holdings Group, which is owned by the State Council's State-owned Assets Supervision and Administration Commission (SASAC).[1223] The company also receives extensive government subsidies. In 2020, the National Resources Development Commission (NRDC) named DJI a "National Technology Enterprise Center" [国家企业技术中心] entitling the company to 5-15 million yuan ($711,000-2.13 million) in cash grants from provinces and cities. DJI also received financial support and special dispensations from the Guangdong Provincial Government and the Shenzhen Municipal Science and Technology Committee [深圳市科技创新委员会], which provides the company with corporate R+D funding.

In October 2022, the U.S. Department of Defense added DJI to a list of firms with ties to the PLA involved in MCF.[1224] In mid-2023, DJI sought to dispel several rumors, including that it was on the verge of exiting the U.S. market due to increased scrutiny.[1225] In response, a company spokesperson stressed that the "United States is one of our important markets. We have no plans to withdraw from the U.S. market." At the same time, DJI denied speculation that it planned to move its global headquarters from Shenzhen to Xi'an in Central China. Finally, the company rejected reports that a major UAV order with the Indian Ministry of National Defense had fallen through, stating that "since our inception, we have always firmly opposed the use of our products and technologies for any military or war purposes. We have never designed and manufactured products and equipment for military use, nor have we ever promoted or sold our products for use in military conflicts or wars in any country."[1226]

While DJI is primarily focused on the commercial UAV market, several of its commercially produced drones appear to have been adapted for use by the PLA despite the company's assurances it does not produce military-use UAVs. Forces in the PLA's Xinjiang Military District have used DJI Matrix 300 RTK UAVs for reconnaissance, surveillance, and damage assessment.[1227] The quadcopter Mavic UAV produced by DJI was spotted during the PLA's August 2022 joint exercises around Taiwan.[1228]

Notable UAV Products

Camera drone series (various models of each series exist):[1229]

- Mavic [御] Series
    - Small quadcopter UAV equipped with three cameras, maximum flight time of 45 minutes, potentially used by PLA for tactical reconnaissance, sold commercially[1230]
- Air
- Mini
- Avata
- FPV
- Inspire [悟]

Industrial drone series (various models of each series):[1231]

- Matrice [经纬]
- Phantom [精灵]
- Spreading Wings [筋斗云]
- Flame Wheel [风火轮]
- P4 Multispectral

Agras agricultural drones [农业植保机] series (various models of each):

- MG-1[1232]
- T [1233]

Notable Relationships:

- National Resources Development Commission "National Technology Enterprise Center" [国家企业技术中心][1234]
- Guangdong Provincial Government: Financial Support and Special Dispensation[1235]
- Shenzhen Municipality, Multiple Entities:[1236]
    - Shenzhen Municipal Science and Technology Committee [深圳市科技创新委员会]: R+D Funding
    - Shenzhen Municipal Administration for Market Administration [深圳市市场监督管理局]: Funding Award
        - Selected DJI for China Gold Design Award, a special intellectual property fund subsidy
    - Shenzhen Municipal Bureau of Industry and Information Technology [深圳市工业和信息化局]
        - Key link in Digital Economy Industry Support Plan [数字经济产业扶持计划]

- Nanshan District Independent Innovation Industry Development Special Fund [南山区自主创新产业发展专项资金]
  - Received five grants from district for "independent industry innovation development," the highest of which was 12 million RMB (about 1.75 million)

Known Subsidiaries

- Nanshan Branch Company [深圳市大疆创新科技有限公司南山分公司][1237]
- Xi'an DJI Innovation Technology Co., Ltd. [西安大疆创新科技有限公司][1238]
  - 100% ownership[1239]
- Shenzhen Ruichi Technology Co., Ltd. [深圳市睿炽科技有限公司][1240]
  - 100% ownership[1241]

Key Personnel

- Wang Tao [汪滔]: Chairman[1242] / CEO (possibly same role),[1243] beneficial owner [受益所有人],[1244] and founder[1245]
- Lu Di [陆地]: Vice Chairman [副董事长] [1246]
- Wang Gong [王茹]: Board member [董事] [1247]
- Chen Sumeng [陈甦萌]: Supervisor [监事] [1248]
- Luo Zhenhua [罗镇华]: General manager,[1249] legal representative[1250]

Year founded: 2006[1251]

- Employees: 4785 (2023) [1252]

Aliases

- Da Jiang Innovation [大疆创新][1253]
- Da Jiang [大疆][1254]

Website:

- https://www.dji.com/

Subordinate to

- iFlight Technology Company Limited [智翔科技有限公司][1255]
  - 100% ownership[1256]
  - Room 915-916, 9/F, Block 16W, Science and Technology Avenue West, Phase 3, Hong Kong Science Park, Pak Shek Kok, New Territories, Hong Kong [香港新界白石角香港科学园第三期科技大道西 16W 座 9 楼 915-916 室][1257]

Addresses

- DJI Sky City, No. 55, Xianyuan Road, Nanshan District, Shenzhen, Guangdong Province [广东省深圳市南山区仙元路 55 号大疆天空之城][1258]
- Lobby T2, DJI Sky City, No. 53, Xianyuan Road, Xili Community, Xili Street, Nanshan District, Shenzhen [深圳市南山区西丽街道西丽社区仙元路 53 号大疆天空之城 T2 大堂][1259]

NORTH TIANTU AVIATION TECHNOLOGY CO. LTD

Overview: North Tiantu Aviation Technology Co. Ltd. [北方天途航空技术发展（北京）有限公司], also known as TT Aviation, is focused on the technical research and development of industrial drones and unmanned aerial systems.[1260] The company mainly produces VTOL UAVs and some fixed-wing UAVs using commercial-off-the-shelf technology airframes that integrate its core flight control, AI algorithm, and sensing technologies.[1261] North Tiantu Aviation is a state enterprise under the Beijing State-owned Assets Supervision and Administration Commission and Yizhuang State Investment Corporation [亦庄国投投资企业].[1262]

Tiantu is the regional examination center for the Civil Aviation Administration of China's drone license and the China Civil Aviation Pilots Association (ChALPA) and is one of the only domestic training institutions with full licenses for large, medium, and small aircraft. The company is also a gold partner of DJI and can issue pilot, captain, and instructor licenses, as well as human resources and social security and UTC drone certificates for a full range of drones including multi-rotor, fixed-wing, helicopter, and VTOL fixed-wing models, etc.[1263]

North Tiantu Aviation is headquartered in Yuantantou Industrial Park, Changping District, Zhongguancun Science Park, and has branches and offices in Xinjiang, Guangdong, Chengdu, and Henan. Its products are exported to many countries and regions including the United States, Japan, New Zealand, India, Uganda, and Mexico. It is a national high-tech enterprise and a Zhongguancun high-tech enterprise, with over 150 patents and more than 20 software copyrights.

North Tiantu Aviation participated in the national 11th Five-Year Plan, 12th Five-Year Plan, the Ministry of Science and Technology 863 and 973 programs' UAV projects and is a member unit of the Aviation Branch of the Chinese Society of Agricultural Engineering. The company is listed as a key national defense laboratory of Beihang University and is a strategic partner of the Automation Department of Tsinghua University.

Notable UAV Products[1264]

- SP11-Plus vertical fixed-wing drone [SP11-Plus 垂起固定翼无人机]
    - Can be used for reconnaissance, delivery, search and rescue, and command[1265]
- M10 multi-purpose connected drone [M10 多用途网联无人机]
    - Can be used for reconnaissance, delivery, search and rescue, and command[1266]
- M50 multi-purpose connected drone [M50 多用途网联无人机]
    - Can be used for reconnaissance, delivery, search and rescue, and command[1267]
- T100 compound drone [T100 复合式无人机]

- G300 agricultural drone [G300 农用无人机]
- Tiantu G200 plant protection drone [天途 G200 植保机]
- M6E-EDU training drone [M6E-EDU 训练机]
- M4E training drone [M4E 训练机]
- F550 disassembly and assembly training drone [F550 拆装训练机]
- Tiantu GP7 traversing drone [天途 GP7 穿越机]
- Tiantu GP10 traversing drone [天途 GP10 穿越机]
- M6FC six-rotor drone [M6FC 六旋翼无人机]
- M6FA multi-rotor drone [M6FA 多旋翼无人机]
- M8FA traffic law enforcement multi-rotor drone [M8FA 交通执法多旋翼无人机]
- M8FD eight-rotor drone [M8FD 八旋翼无人机]
- Virtual Reality (VR) Training System: Tactical Flight
    - This product utilizes VR (Virtual Reality) technology to simulate tactical flight scenarios for police drones, focusing on pinpoint reconnaissance tasks against terrorists or specific surveillance targets; offers an efficient training model for public safety departments and police drones
    - Users can freely edit scenes or allow the system to randomly generate reconnaissance targets. The system supports both GPS and attitude modes, enabling users to operate drones in various environments such as mountainous areas, residential buildings, and at sea, completing photo capture tasks within a specified time frame[1268]

Notable Relationships

- Beihang University: the company has been listed as a National Defense Key Laboratory of the University [北航国防重点实验室][1269]
    - The director of National Defense Key Lab of Beihang University spoke at a Tiantu company event[1270]
- Tsinghua University Automation Department - strategic partner[1271]
- PLA:
    - UAVs used in national military exercise(s) and China-Mongolia military exercise[1272]
    - PLA Academy of Military Science provided UAV products and services in 2011[1273]
    - PLA General Armaments Department (former CMC department) procured UAVs in 2015[1274]
    - Provided military UAVs to a Jilin-bases unit 2015[1275]
    - PLA GSD Chemical Defense Academy (former organization) acquired military UAVs in 2015[1276]
    - 2016 – provided military UAVs to multiple PLA units[1277]

    - PLAAF Equipment Research Academy Air Force Radar and Electronic Countermeasures Research Institute [空军装备研究院雷达与电子对抗研究所] obtained UAVs in 2016[1278]
    - Provided platforms to the Qinghuangdao Civil Air Defense Bureau [秦皇岛人民防空办公室] in 2018[1279]
- Tsinghua University 973 Program and NWPU – provided UAV products and services in 2010[1280]
- DJI gold-medal dealer [大疆金牌经销商][1281]

Other cooperative relationships with schools and other entities, some for UAVs/services, others only for UAV training:[1282]

- Beijing Changping Vocational School [北京交通职业技术学院]: Training cooperation
    - Appear to have recently co-established a UAV Training Room [无人机实训室] to teach basic UAV technical and construction skills[1283]

Directly Subordinate Organizations

- Tiantu UAV training base [天途无人机培训基地][1284]
    - Many branch schools across China[1285]
- TTA Tiantu Aviation Flight Academy [TTA 天途航空飞行学院][1286]
    - Might be same as above
- Drone training room [无人机实训室] / drone skills training center [无人机技能实训中心][1287]

Key Personnel

- Yang Yi [杨苡] - Executive Director, legal representative, major shareholder (60.4%), actual controller, and beneficial owner;[1288] founder[1289]
- Du Yuhou [杜玉厚]: manager[1290]
- Bao Shi [鲍石]: supervisor [1291]

Year Established: 2008[1292]

Aliases

- North Tiantu Aviation [北方天途航空][1293]
- TTAviation [天途][1294]
- Beijing TT Aviation Technology[1295]
- TTA[1296]

Website

- www.ttaviation.com

- http://www.ttaviation.com/en/ (defunct English site; archived here: https://web.archive.org/web/20180911083544/http://www.ttaviation.com/en/)

Subordinate to

- Yang Yi [杨苡] (Executive Director [执行董事], legal representative [法定代表人], actual controller [实际控制人], and beneficial owner [受益所有人]) – owns 60.4%[1297]
- Has relationship with but no evidence of subordination to Beihang University
- It is invested in by the Beijing State-owned Assets Supervision and Administration Commission [北京市国资委] and Yizhuang State Investment Corporation [亦庄国投投资企业][1298]

Addresses

- Tiantu Aviation Building, Building 1, Nitou Industrial Park, Machikou Town, Changping District, Beijing [北京市昌平区马池口镇埝头工业园 1 号楼天途航空大厦][1299]
- Tiantu Base, No. 19, Ming Tombs Tai Cemetery, Changping District, Beijing [北京昌平区十三陵泰陵园 19 号天途基地][1300]
- Building 1, Nitou Incubator, Machikou Town, Changping District, Beijing [北京市昌平区马池口镇埝头孵化器 1 号楼][1301]

CIVILIAN ACADEMIC AND RESEARCH INSTITUTIONS

Academic universities with an aerospace focus have been integral to the development of UAVs in the PRC China since the 1950s. According to Wang Yingxun [王英勋], Dean of the Institute of Unmanned Aerial Systems of Beijing University of Aeronautics and Astronautics: "the development of UAVs in China originated at three aviation-focused colleges and universities: Beijing University of Aeronautics and Astronautics, Nanjing University of Aeronautics and Astronautics, and Northwestern Polytechnical University."[1302]

NORTHWESTERN POLYTECHNICAL UNIVERSITY

Overview: As the parent institution of an array of PLA-affiliated research institutions and companies, Northwestern Polytechnical University (NWPU) [西北工业大学] has historically been a locus of UAV research and development in China. According to NWPU's website, the university "pioneered the development" of UAVs in China, achieving the country's first UAV systems, technologies, production lines, and exports. NWPU is the host institution for the only national key laboratory of UAV technology, under which is the National Engineering Research Center for UAV systems.[1303] Moreover, NWPU's website states that it "has built the only specialized UAV flight test base in Chinese universities." The university's entire UAV team, along with UAVs developed by NWPU, marched in the parades to mark the 60th anniversary of the PRC's founding in 2009 and the 90th anniversary of the PLA's founding in 2017.[1304]

NWPU is in Xi'an, Shaanxi province, and has a population of roughly 37,000 students. NWPU is a member of the MIIT University Alliance (G7 Alliance), comprising seven leading defense-focused universities, more commonly known as the "Seven Sons of National Defense." NWPU hosts eight national key laboratories, six Defense Science and Technology Key Laboratories (DSTKL), four national engineering research centers, and four national international science and technology cooperation bases.[1305]

Notable UAV Products

- See below individual entries and Xi'an Aisheng group section for UAVs produced by NWPU

Notable Relationships

- Strategic cooperation agreement with AVIC's Chengdu Aircraft Industry Group (CAIG) that produces Wing-Loong series UAVs signed in January 2024[1306]
- "Belt and Road Initiative" Aerospace Innovation Alliance [一带一路" 航天创新联盟]: Sponsor and Executive Director Unit[1307]
    - 69 universities, research institutes, academic organizations and enterprises from 22 countries (China, Pakistan, Malaysia, Bangladesh, Nepal, Russia, Ukraine, Belgium, Poland, France, Spain, Italy, the United Kingdom, Egypt, Algeria, Cameroon, Nigeria, Tunisia, the United States, Mexico, Argentina and Australia) from six

continents (Asia, Europe, Africa, North America, South America and Oceania) have joined the initiative per NWPU[1308]

- On the Chinese side of the alliance, the Chinese Society of Aeronautics [中国宇航学会] is also a sponsor and executive director unit of the alliance, other PRC units involved include:[1309]
  - Beihang University [北京航空航天大学] (executive director unit)
  - Landspace [蓝箭空间科技有限公司] (executive director unit)
  - Beijing Institute of Technology [北京理工大学]
  - Nanjing University of Aeronautics and Astronautics [南京航空航天大学]
  - CASC China Academy of Launch Vehicle Technology (CALT) [中国运载火箭技术研究院]
- Appears to be more aerospace focused but does some UAV-related activities, e.g., its Young Scholars Seminar has included discussions of "Civil Unmanned Aerial Systems" [民用无人飞行系统][1310]

Known Subsidiaries

- Xi'an Aisheng Group Co, Ltd. (former subsidiary) [西安爱生技术集团有限公司]
  - Established out of the NWPU 365th Institute (UAV Research Institute) in 1992,
  - Restructured from an SOE to a limited liability company in late 2021, NORINCO acquired majority stake in late 2023[1311]

Directly Subordinate Organizations

- NWPU School of Aeronautics [西北工业大学航空学院][1312]
  - State Key Laboratory of UAV Special Technology [无人机特种技术国防科技重点实验室]
    - National Engineering Research Center for UAV Systems [无人机系统国家工程研究中心]
- Future Aerospace Vehicle Collaborative Innovation Center [未来飞行器协同创新中心] (MIIT collaborative research center)[1313]
- National Key Laboratory of Aviation Science and Technology for Advanced Aerodynamic Layout and Control of UAVs [无人机先进气动布局与控制航空科技重点实验室][1314]
  - May work with Xi'an Aisheng Group on UAV production

Key Personnel

- Li Yanrong [李言荣]: Party Secretary[1315]
  - Chinese Academy of Engineering Academician

Year Established: 1938 (as State Northwest Institute of Engineering in Hanzhong)[1316]

Website

- www.nwpu.edu.cn

Subordinate to

- MIIT

Addresses

- Youyi Campus Address: No. 127 West Youyi Road, Xi'an City, Postal Code: 710072 [友谊校区地址：西安市友谊西路 127 号　邮编:710072][1317]
- Chang'an Campus Address: No. 1 Dongxiang Road, Chang'an District, Xi'an City, Postal Code: 710129 [长安校区地址：西安市长安区东祥路 1 号 邮编:710129]

State Key Laboratory of Unmanned Aerial Vehicle Technology

Overview: The State Key Laboratory of Unmanned Aerial Vehicle Technology [无人飞行器技术全国重点实验] is based in NWPU's School of Aeronautics [航空学院] and is the only National Key laboratory primarily dedicated to UAV research. The lab was built by Northwestern Polytechnical University, AVIC Chengdu Aircraft Design Institute, and Air Force Engineering University.[1318] "

The total investment in the lab exceeds 300 million yuan ($42.4 million).[1319] The lab uses virtual simulation software, as well as research on hardware. Areas of research include UAV materials, UAV control and navigation, guidance systems, takeoff and landing verification, wide-band high-power RF simulation capabilities, high-precision ultra-wideband antenna and stealth testing capabilities, complex electronic warfare environment simulation, and data link simulation testing capabilities.

The NWPU Special UAV Technology Research Institute [特种无人机技术研究所] is established on the basis of this laboratory.[1320] The Institute mainly conducts basic technology research on the concepts and mechanisms of future UAVs, comprehensive testing and evaluation methods of UAV systems, and application technologies of UAVs, focusing on clean energy UAVs, bionic UAVs, and new concept vertical take-off and landing UAVs.[1321] As one of the earliest teams in China to undertake research on near-space aircraft, the institute has been a national pioneer in undertaking research on near-space long-flight, fixed-wing layout UAVs with outstanding aerodynamic/stealth performance and safe and stable flight. The institute has been part of the MOST 863 program to boost China's indigenous technological capabilities. It has 46 personnel.[1322]

Notable UAV Products

- UAV take-off and landing simulation platform [无人机起降模拟平台]
- Anti-radiation ASN-301 (possibly a clone of the Israeli Harpy imported by China in the 1990s and 2000s)[1323]

- Solar Powered Wifi UAV [太阳能 Wi-Fi 无人机]

Notable Relationships

- CASIC Hubei Sanjiang Astronautics Hongfeng Control Co., Ltd.[湖北三江航天红峰控制有限公司] and Xi'an Lyncon Co. [西安羚控电子科技有限公司]: tripartite cooperation agreement to work together to develop flight control, server, and fiberoptic inertial navigation systems[1324]
- AVIC Chengdu Aircraft Design Institute (CADI) [成都飞机设计研究所]: Founding institution
    - Leaders and experts from CADI participated in the lab's first academic committee inauguration and first plenary meeting in April 2024
- Air Force Engineering University [空军工程大学]
    - Leaders and experts from CADI participated in the lab's first academic committee inauguration and first plenary meeting in April 2024
- Collaborates with CASC, AVIC, COMAC, and other prominent aerospace SOEs, as well as CARDC (PLASSF Base 29) as part of the Collaborative Innovation Center of Future Aerospace Vehicle (*sic*)[1325]
- This lab co-sponsors the NWPU Special UAV Technology Research Institute [特种无人机技术研究所], along with the First-Class State Key Discipline of Aeronautics and Astronautics [航空宇航学科与技术一级国家重点学科]
- Conducts research on new concepts for clean energy UAVs, bionic UAVs, and new concepts for VTOL UAVs; has been responsible for projects related to the 9th, 10th, and 11th Five Year Plans[1326]
- Participated in the China Aero Weaponry Conference, along with AVIC. Conference topics included UAV reconnaissance, strike, air combat, anti-sub, and anti-carrier operations, as well as drone swarms and manned-unmanned aircraft cooperation.[1327]
- Per searches of two scientific databases, this lab has cooperated with PLA units 63961 (multiple projects), 93975, 91503, 93861, 91599, and 69296
- The lab claims to have a "long-term cooperative relationship" with Kingston University in the U.K., and possibly other unnamed institutions[1328]
- The 2016 China-International UAV System Conference and Exhibition [中国国际无人驾驶航空器系统大会暨展览] featured this lab as a cooperating party, and featured support from the American Institute of Aeronautics and Astronautics (AIAA) and U.K. Royal Aeronautical Society[1329]

Directly Subordinate Organizations

- National Engineering Research Center for UAV Systems [无人机系统国家工程研究中心][1330]
- NWPU UAV Special Technology Research Institute [特种无人机技术研究所]

- Not to be confused with the Special UAV Equipment Technology Research Institute [特种无人机装备技术研究院] co-founded by Xi'an Aisheng Group, also known as NWPU's 365th Research Institute

Key Personnel

- Tang Changhong [唐长红]: Director of the Academic Committee of the National Key Laboratory of Unmanned Aerial Vehicle Technology [1331]
  - Academician, CMC S&T advisor also affiliated with NWPU's Future Aerospace Vehicle Collaborative Innovation Center [未来飞行器协同创新中心][1332]
- Zhang Kaifu [张开富]: A Director of the Laboratory Management Committee[1333]
- Gu Yunfeng [谷云峰]: Deputy Director[1334]
- Wei Chengkai [魏成凯]: Deputy Director[1335]
- Zhu Xiaoping [祝小平]: Chief Engineer, Chief Model Designer, and Doctoral Supervisor, UAV Institute[1336]
  - Awarded a 2nd Class National Defense S&T Progress Award in 2010 for his project "(REDACTED) System General Requirements Series of National Military Standards" [1337]
  - Administers the NWPU Unmanned Navigation Technology Research Center [无人航行技术研究中心] in Ningbo[1338]
- Zhou Zhou [周洲]: Previous Director, NWPU School of Aeronautics Professor
  - She was also Deputy Chief Engineer of NWPU's UAV Special Technology Research Institute[1339]
  - Led anti-radiation UAV project completed in 2004
  - Leader of the solar powered wi-fi UAV [太阳能 Wi-Fi 无人机] project[1340]
  - Married to Zhu Xiaoping [祝小平], PRC state media has dubbed them the "'magic couple'" of the UAV world" [无人机世界的"神雕侠侣"][1341]

Figure 17: NWPU UAV Designer Zhou Zhou[1342]

Figure 18: Zhou Zhou and Zhu Xiaoping examine a solar powered UAV designed by that Zhou[1343]

- **Year Established:** 2001[1344] (operations officially began in 2003)

Aliases

- Defense S&T Key Laboratory of UAV Special Technology [无人机特种技术重点实验室][1345]
- Key Lab of UAV Special Technology [无人机特种技术重点实验室]
- National Key Lab of UAV Special Technology [无人机特种技术国家重点实验室]

- National Laboratory of UAV Special Technology
    - More common translation.
- National Key Laboratory of Science and Technology on UAV
- State Key Laboratory of UAV Special Technology
- Science and Technology of UAV Laboratory
- National Key Laboratory of Unmanned Aerial Vehicle Technology
- National Key Lab of Special Technology on UAV
- National Key Laboratory of Special Technology on UAV
- Laboratory of Science and Technology on UAV

Website

- http://kypt.nwpu.edu.cn/index.php?c=content&a=show&id=360

Subordinate to

- NWPU School of Aeronautics [西北工业大学航空学院][1346]

Address

- NWPU School of Aeronautics, Building #2, No. 127 Youyi West Road, Xi'an, Shaanxi Province [西北工业大学航空学院, 陕西省西安市碑林区友谊西路 127 号][1347]

National Engineering Research Center for UAS

Overview: The National Engineering Research Center for UAS [无人机系统国家工程研究中心] was established by NWPU's State Key Laboratory of UAV Special Technology [无人机特种技术国防科技重点实验室] in 2013.[1348] The stated objectives of this center are to promote the rapid growth of the UAV industry, strengthen development and engineering of key technologies, produce complete processes and equipment for UAV systems, develop relevant standards and specifications, promote and apply advanced UAV system engineering technologies, cultivate innovative technical talents and teams in the UAV systems field, and develop the national UAV production, learning, research, and application technology innovation system to provide technical support for ensuring national security and promoting the rapid development of the aerospace industry.[1349]

According to a university press release, the National Engineering Research Center for UAV Systems will be led by NWPU subsidiary and UAV manufacturer, Xi'an Aisheng (ASN) Technology Group Company Ltd. (also known as NWPU's 365th Research Institute).[1350]

According to the Shaanxi provincial government, the Center is the only National Engineering Research Center for UAV Systems in China approved by the National Development and Reform Commission (NDRC). In 2017 and 2018, the Center collaborated with the NWPU Unmanned Systems Research Institute [无人系统技术研究院] on the UAV Test Center (Shaanxi Jingbian General Airport) project [无人机试验测试中心（陕西靖边通用机场）项目] to establish the first professional UAV test center in China.[1351]

Notable UAV Products

- UAV Systems Technologies[1352]

Notable Relationships

- NWPU Unmanned Systems Research Institute [无人系统技术研究院]
  - Co-investors in UAV Test Center (Shaanxi Jingbian General Airport) project
- Nantong Institute of Technology [南通理工学院]: cooperation agreement with Nantong Jintian UAV Technology Co., Ltd.[南通锦添无人机科技有限公司] to build a UAV Laboratory [无人机实验室] at Nantong Institute's School of Electrical and Energy Engineering [电气与能源工程学院][1353]

Known Subsidiaries

- Supports NWPU's Unmanned Navigation Technology Innovation Research Center [无人航行技术创新研究中心] in cooperation with DSTKL for UAV special technology[1354]

Directly Subordinate Organizations

- "UAV System Xi'an's next generation open AI innovation platform" ["无人机系统"西安市新一代人工智能开放创新平台"][1355]

Key Personnel

- He Yong [何勇]: Former Deputy Director, head of the preparatory Group from 2004-through late 2017[1356]
  - Currently Master Supervisor Institute of Engineering Thermophysics, Chinese Academy of Sciences
- Zhu Xiaoping [祝小平]: Director of NWPU SKL of UAV is also associated with this Center[1357]

Year Established: 2013[1358]

Aliases

- NWPU National Engineering Research Center for UAV Systems [西北工业大学无人机系统国家工程研究中心][1359]

Website

- N/A

Subordinate to

- NWPU (possibly the Xi'an Aisheng Technology Group[西安爱生技术集团公司], also known as NWPU's 365th Research Institute [西北工业大学第三六五研究所], in which NORINCO recently took a controlling stake[1360]

Addresses

- Building C, Aviation Building, Northwestern Polytechnical University, No. 127 West Youyi Road, Xi'an, Shaanxi Province [陕西省西安市友谊西路 127 号西北工业大学航空楼 C 座] [1361]

NWPU Unmanned System Research Institute

Overview: The NWPU Unmanned Systems Research Institute [无人系统技术研究院] was opened in April 2017.[1362] At the launch, NWPU stated that the institute would serve as "an important base for interdisciplinary integration and unmanned systems talent training."[1363] In addition to medium-sized unmanned aerial vehicles, the institute's research areas include tactical missiles, deep-sea unmanned equipment, and ground robots.[1364]

In addition to research, the institute's mandate includes talent development, as it seeks to produce graduates in interdisciplinary majors that meet the needs of intelligent unmanned system technical talents, build a long-term mechanism for school-enterprise cooperation in education, and cultivate application-oriented, compound and industry-leading talents.[1365]

Notable Relationships

- AVIC Lanzhou Flight Control Co., Ltd. [航空工业兰州飞行控制有限责任公司]: UAV project cooperation agreement [无人机项目合作协议] signed in 2018[1366]
- Xi'an Kewei Aerospace Science and Technology Group Co., Ltd. [西安科为航天科技集团有限公司]
  - The institute's Distributed Collaborative Intelligent Autonomous Technology Postgraduate Tutoring Team [分布协同智能自主技术研究生导学团队] collaborated with this enterprise on NWPU's "Lijian-I Unmanned Aerial Vehicle["砺剑-I"无人飞行器][1367]
  - Also collaborated with Kewei and NWPU's joint subsidiary Xi'an Kewei Industrial Development Co., Ltd. [西安科为实业发展有限责任公司] to-co-found the Intelligent Aircraft Engineering Research Center of Shaanxi Universities [智能飞行器陕西省高校工程研究中心][1368]
- China Shipbuilding Industry Corporation 365th Research Institute [中国船舶重工集团第七一六研究所]: Talent Development and Basic Research Agreement[1369]
  - Signed agreement to "cooperate the fields of joint talent training, basic research support, engineering technology research, and applications"
- DJI/ SZ DJI Technology Co., Ltd. [深圳大疆创新科技有限公司]: Created joint course
  - Undergraduate course on Intelligent UAV Design offered in 2022[1370]

- (AVIC) Avionics Institute of the Flight Test Institute [试飞院航电所]: visit, likely technical and talent training cooperation
  - On May 27, Chen Jingzhi [陈敬志], deputy director of the Avionics Institute of the Flight Test Institute, and a group of six people visited the Unmanned Systems Technology Research Institute
  - During the visit, the two sides referenced their solid foundation on technical and talent development cooperation[1371]
- NORINCO Xi'an Modern Control Technology Research Institute [西安现代控制技术研究所]: 2022 visit, possible past cooperation[1372]
- CASIC Conventional Warhead Research Institute [常规弹头研究所]: 2021 exchange visit[1373]
  - Both sides expressed desire to collaborate, institute has cooperated with NWPU in past
- Chengdu East New District Management Committee[成都东部新区管委会], Chengdu Xingcheng Investment Group[成都兴城投资集团]: 2021 visit[1374]
  - Meetings focused on advancing school-enterprise-local cooperation

Directly Subordinate Organizations

- Intelligent Materials and Structures Institute [智能材料与结构研究所][1375]
- Institute of Unmanned Ground Systems Institute [地面无人系统研究所][1376]
- Intelligent Space System Institute [空间智能系统研究所][1377]
- Cognitive Computing Institute [认知计算研究所][1378]
- Wireless Technology Innovation Institute [无线创新技术研究所][1379]
- Under Water Vehicles Institute [水下航行器研究所][1380]
- Unmanned Systems Guidance and Control Institute [无人系统制导与控制研究所][1381]
- Institute of Intelligent Aircraft [智能飞行器研究所][1382]
  - Established in 1995 this Institute is engaged in basic and applied research such as high-speed aircraft control and simulation, infrared detector anti-interference, intelligent guidance and control technology, and collaborative guidance and control[1383]
  - Hosts (or is) Shaanxi Provincial University Engineering Research Center for Intelligent Aerial Vehicles [智能飞行器陕西省高校工程研究中心][1384]
- UAV Frontier Technology Research Institute [无人机前沿技术研究所][1385]
- Unmanned Systems Battlefield Perception and Combat Application Research Institute [无人系统战场感知与作战运用研究所][1386]
- Intelligent Unmanned Systems Edge-Cloud Intelligence Innovation Laboratory [智能无人系统边云智能创新实验室][1387]/ Intelligent Unmanned Systems Edge-Cloud Intelligence Cross-Innovation Laboratory [智能无人系统边云智能交叉创新实验室][1388]

Key Personnel

- Tang Changhong [唐长红]: Honorary Dean[1389]
  - Former chief designer for AVIC's First Aircraft Design Institute and Chief Technical Expert of Aircraft Technology for AVIC
  - Member of PLA CMC Equipment Development Department's Science and Technology Committee and deputy leader of the overall technical expert group; a member of the Military Product Finalization Committee of the State Council and CMC
  - Executive Director, Chinese Society of Aeronautics
- Bai Junqiang [白俊强]: Dean and Professor[1390]
  - Previously executive vice president of the institute[1391]
  - Bai has been affiliated with NWPU since 1991, including earning his PhD in aircraft design and an MA in aerodynamics from the university
  - Bai holds a BA in aerodynamics from the National University of Defense Technology [NUDT][1392]
- Mao Zhaoyong [毛昭勇]: Party Secretary and Vice President[1393]
- Fu Wenxing [符文星]: Vice Dean[1394]
- Xu Xiaofeng [徐晓峰]: Deputy Party Secretary[1395]
- Chang Min [昌敏]: Vice Dean[1396]
  - Joined NWPU in 2017, previously affiliated with NORINCO's 203 institute
- Huang Hanqiao [黄汉桥]: Dean's Assistant[1397]
- Gu Xiaojun [谷小军]: Dean's Assistant[1398]
- Ji Bowen [吉博文]: Dean's Assistant[1399]
- Fu Bin [付斌]: Dean's Assistant[1400]

Selected expert-level researchers by field (as of May 2019):[1401]

Intelligent collaborative design of unmanned systems [无人系统智能化协同设计]:

- Qiu Zhiming [邱志明]: Professor, doctoral supervisor, academician of the Chinese Academy of Engineering
  - Qiu is also a PLAN Technical Major General [技术少将][1402]

Intelligent perception and cognition of unmanned systems [无人系统智能感知与认知]:

- Liang Xiaogeng [梁晓庚]: 研究员, 博士生导师, chief designer for a certain air-to-air missile [某型空空导弹总计师]
  - An AVIC Chief Weapons Guidance & Control Technology Expert [中航工业"武器制导控制技术"首席专家] (one of various)[1403] and former deputy chief designer of China Airborne Missile Academy[1404]

Year Established: 2017[1405]

Aliases

- NWPU UAV Institute [西工大无人院][1406]
- USRI[1407]

Website

- https://wurenxitong.nwpu.edu.cn/
- https://enwurenxitong.nwpu.edu.cn/ (English site)

Subordinate to

- NWPU

Addresses

- No. 127 West Youyi Road, Beilin District, Xi'an, Shaanxi [陕西省西安市友谊西路 127 号][1408]
- Room 201, 2nd Floor, Material Building, No. 127 West Youyi Road, Beilin District, Xi'an, Shaanxi [陕西省西安市碑林区友谊西路 127 号物资楼二层 201 室][1409]

Future Aerospace Vehicle Collaborative Innovation Center

Overview: The Future Aerospace Vehicle Collaborative Innovation Center [未来飞行器协同创新中心] focuses on the development of next-generation aerospace vehicles. The Center is led by NWPU and was jointly established with AVIC, CASC, China Aerodynamics Research and Development Center, Beihang University, Nanjing University of Aeronautics and Astronautics, Peking University, Tsinghua University, and Shanghai Jiao Tong University.[1410] The center has 26 major research tasks with total funding of 630 million RMB ($89.3 million). The center's research directions are as follows: New concept aircraft principle and overall integrated design method; vibration noise and sonic boom suppression; airworthiness and health management; stealth and informationization and electronic countermeasures; composite lattice structures; and laminar drag reduction and airfoil spectrum and flow mechanism.[1411] The center employs nearly 200 researchers.[1412]

In 2014, the MIIT included NWPU's Future Aerospace Vehicle Collaborative Innovation Center among the first group of seven ministry-wide "collaborative innovation centers" [协同创新中心].[1413]

In 2022, the institute's Director, Song Bifeng [宋笔锋], who is also Dean of NWPU's School of Aeronautics, led a team that set a record for flight time by a flapping wing UAV. The "Clouded Owl" flapping-wing drone that broke the world record this time uses key technologies such as high-lift and high-thrust flexible flapping wing design, efficient bionic drive system design, and integrated micro-flight control navigation.[1414]

Notable UAV Products

- "Hot Wheels VTOL UAV [滚翼机"风火轮"] gyroplane[1415]
  - Design team for this platform that developed in the early 2010s was led by Associate Professor Hu Yu [胡峪]
- Clouded Owl [云鸮]: Flapping wing UAV[1416]

Notable Relationships

Members units of the center (also co-founders):[1417]

- NWPU (leading unit)
  - NWPU's National Engineering Research Center for UAV Systems [无人机系统国家工程研究中心] is also involved[1418]
  - NWPU UAV Institute's "person in charge" [负责人] as well as its chief designer [无人机所总师] Zhu Xiaoping [祝小平] both spoke at the Center's founding, potentially indicating the Institute's involvement with the Center[1419]
- AVIC
  - Co-founded with five subsidiaries[1420]
  - In addition to the China Flight Test Research Institute [中国飞行试验研究院] also listed here below:[1421]
    - The First Aircraft Institute [第一飞机设计研究院]
    - Shenyang Aircraft Design Institute [沈阳飞机设计研究所]
    - Chengdu Aircraft Design and Research Institute [成都飞机设计研究所]
    - Chengdu Aircraft Industry Group Co., Ltd. [中航工业成都飞机工业(集团)有限责任公司]
- CASC
  - Co-founded with two subsidiaries[1422]
    - China Academy of Launch Vehicle Technology [中国运载火箭技术研究院][1423]
    - Shanghai Academy of Spaceflight Technology [上海航天技术研究院][1424]
- COMAC [中国商用飞机有限责任公司]
- China Aerodynamic Research and Development Center (PLA Base 29) [中国空气动力研究与发展中心]
- Beihang University School of Aeronautical Science and Engineering [北京航空航天大学航空科学与工程学院]
- NUAA School of Aeronautics and Astronautics [南京航空航天大学航空宇航学院]
- Tsinghua University School of Aeronautics and Astronautics [清华大学航天航空学院]
- Peking University School of Engineering [北京大学工学院]
- China Flight Test Research Institute [中国飞行试验研究院] (AVIC)

- Shanghai Jiao Tong University [上海交通大学] [1425]
    - Not a member unit but was a co-founder[1426]

Associated key labs:[1427]

- National Defense Science & Technology Key Laboratory of UAV Special Technology [无人机特种技术国防科技重点实验室]
- National Defense Key Laboratory of Aircraft Structural Mechanics and Strength Technology [飞行器结构力学与强度技术国防重点实验室]
- Ministry of Education Key Laboratory of Modern Design and Integrated Manufacturing Technology [现代设计与集成制造技术教育部重点实验室]
- Ministry of Education Key Laboratory of Aerospace Micro-Nano Systems [空天微纳系统教育部重点实验室]
- Key Laboratory of Aerospace Flight Dynamics Technology [航天飞行动力学技术重点实验室]
- Airfoil and Blade Aerodynamics Key Laboratory of National Defense Science and Technology [翼型、叶栅空气动力学国防科技重点实验室]
- State Key Laboratory of Mechanical Structural Strength and Vibration [机械结构强度与振动国家重点实验室]
- State Key Laboratory of Turbulence and Complex Systems [湍流与复杂系统国家重点实验室]
- State Key Laboratory of Aerodynamics [空气动力学国家重点实验室]

Directly Subordinate Organizations

- 12 research teams[1428]

Key Personnel

- Yuan Jianping [袁建平]: director[1429]
    - Leader of the 863 Program Aerospace Expert Group [863 计划航天航空领域专家组], convener of the Aerospace Discipline Review Group of the State Council Academic Degree Committee [国务院学位委员会航空宇航学科评议组], National Candidate of the Hundred Thousand Talents Project
    - NWPU vice president[1430]
- Song Bifeng [宋笔锋]: Executive deputy director of the institute; Dean, NWPU School of Aeronautics[1431]
    - Cheng Kong Scholars[长江学者][1432]
    - Listed as “person in charge” on an NWPU site from 2023, so may now be director[1433]

- Tang Changhong [唐长红][1434]
    - One of 11 Academicians involved with the Center[1435]
    - Tang is also an advisor with the CMC Science and Technology Committee
- Liu Yijun [刘轶军][1436]
    - One of eight Thousand Talents scholars involved with the Center[1437]
- Gao Zhenghong [高正红][1438]
    - One of 19 Cheng Kong Scholars and 36 national-level experts involved with the Center[1439]
- Yang Wei [杨伟][1440]
    - One of over 50 model (ex. aircraft) chief/deputy designers involved with the Center[1441]
- Wu Guanghui [吴光辉] [1442]
    - One of over 50 model (ex. aircraft) chief/deputy designers involved with the Center[1443]

Aliases

- Collaborative Innovation Center for Basic Technologies in Future Aircraft Design and Manufacturing [未来飞行器设计与制造共性基础技术协同创新中心][1444]
- CICAV[1445]
- MIIT Future Aerospace Vehicle Collaborative Innovation Center [工信部未来飞行器协同创新中心][1446]

Website

- http://hangkong.nwpu.edu.cn/cicav (defunct as of 2019/2020; archived here: https://web.archive.org/web/20191216175857/http://hangkong.nwpu.edu.cn/cicav/)
- http://cicav.nwpu.edu.cn/ (defunct)

Subordinate to

- NWPU[1447]

Addresses

- Building C, Aviation Building, Northwestern Polytechnical University, No. 127 Youyi West Road, Xi'an, Shaanxi Province [陕西省西安市友谊西路 127 号西北工业大学航空楼 C 座][1448]

UAV Industrialization Base

Overview: "Aoxiang Town" [翱翔小镇] and UAV Industrialization Base [无人机产业化基地] is a joint project launched by NWPU, Xixian New District Fengxi New Town, and Xi'an Kewei

Aerospace Science and Technology Group [西安科为航天科技集团有限公司], a private enterprise focusing on high-tech R+D, and industrial park investment and operation.[1449] On April 1, 2016, the parties signed a cooperation agreement to construct the UAV Industrialization Base intended to be China's largest high-end small and medium-sized industrialization base focused on drone production.[1450] Construction began in early 2017. At the time of the base's launch, plans stipulated that when completed in 2022 its yearly production capacity would be 1,000 small and medium-sized UAVs, 1,500 aircraft engines, 300 ground stations, and 1,100 sets of avionics equipment.[1451] The Base will also include a complete after-sales service, training and development system. The initial construction plan required a land area of 580 acres and had a planned investment of 13.5 billion yuan ($1.91 billion USD).[1452] The first phase of the base's construction was completed in September 2019.[1453]

The base appears to be subordinate to Xi'an Aisheng Group Co. Ltd [西安爱生技术集团], NWPU's 365th institute and a major producer of UAVs in China that invested considerably in the base's construction. In 2016, the company's wholly owned subsidiary, Aisheng UAV Xixian New Area Development Co., Ltd. announced it planned to invest $3 billion RMB (about $425.5 million) in the project.[1454]

The base is a national-level project jointly supported by the Ministry of Industry and Information Technology of China and the government of Shaanxi Province.[1455] Premier Li Qiang visited the base in early 2024.[1456]

Notable UAV Products

- Lijian-1 (LJ-1) Stealth Target UAV [砺剑-1][1457]
  - Co-produced with Kewei Industrial Development Co., Ltd. [西安科为实业发展有限责任公司] (see below for more details)[1458]
  - Displayed at NWPU's 2019 Moscow Airshow booth[1459]
  - High subsonic drone with stealth, high maneuverability and electronic jamming capabilities, and is said to be able to imitate some of the flight characteristics of fourth-generation fighters[1460]
- 70 kilogram, multipurpose UAV [多用途无人机][1461]
  - Possible producer

Notable Relationships

- Kewei Aerospace Science and Technology Group Co., Ltd. [西安科为航天科技集团有限公司]/ Kewei Industrial Development Co., Ltd. [西安科为实业发展有限责任公司], also known as Kewei Industry [科为实业]
  - Kewei Aerospace partnered with NWPU to establish the UAV industrial base
  - The base appears to serve as a headquarters and production center for Kewei Industry [科为实业], a mixed-ownership (public/private) "civilian-military" enterprise under

NWPU and Xi'an Kewei Aerospace Science and Technology Group Co., Ltd. [西安科为航天科技集团有限公司][1462]

Directly Subordinate Organizations

- Qin Chuangyuan (central unit) Innovation Promotion Center [秦创原（中直单位）创新促进中心]
  - Host unit, the Center strives to incubate advanced technologies
  - Signed a cooperation agreement for a project on the transformation of intelligent aircraft with Kewei Industry [科为实业][1463]
- The UAV industrialization base mainly comprises the following elements:[1464]
  - UAV design and development and administrative office area,
  - UAV use and maintenance training and related supporting industry incubation area,
  - Product trial production and integration test area,
  - Ground test facilities
  - Small aircraft engine R&D area
  - Civil UAV subsidiary area and Product after-sales maintenance service area
  - Base electrical equipment plant,
  - Final assembly plant,
  - Runway and joint debugging and testing plant
  - Base flight test station,
  - Final assembly plant and electrical equipment plant
  - Four major centers of R&D, pilot test, production and final assembly
  - Electrical equipment and electrical adjustment workshop and final assembly workshop

Key Personnel

- Zhou Shuguang [周曙光]: Chairman of Xi'an Kewei Aerospace Science and Technology Group Co., Ltd. since 2000[1465]
  - NWPU and Beihang University graduate

Year Established: 2016-2017

Aliases

- Aviation Science City - UAV Industrialization Base [航空科学城——无人机产业化基地][1466]
- Aviation Science City - UAV Industrialization Demonstration Base [航空科学城——无人机产业化示范基地][1467]
- Xi'an Aisheng Technology Group UAV Industrialization Demonstration Base [西安爱生技术集团无人机产业化示范基地][1468]

- Aisheng UAV Industrialization Base [爱生无人机产业化基地][1469]
- Aoxiang Town UAV Industrialization Base [翱翔小镇无人机产业化基地][1470]
- Xixian New District UAV Industrialization Base [西咸新区无人机产业化基地][1471]

Website

- N/A

Subordinate to

- NWPU; the Base appears to be formally part of Xi'an Aisheng,[1472] which invested heavily through its subsidiary Aisheng UAV Xixian New Area Development Co., Ltd. [爱生无人机西咸新区发展有限公司是西安爱生集团公司][1473]

Addresses

- Fengxi New Town, Xixian New District, Xianyang City, Xi'an [西安市咸阳市西咸新区沣西新城][1474]
- Kewei Industrial Development Co., Ltd. [西安科为实业发展有限责任公司]
  - No. 556, Aoxiang 3rd Road, Fengxi New Town, Xixian New District, Shaanxi[1475]

BEIHANG UNIVERSITY

Overview: Established in 1952 as the Beijing Aeronautics College [北京航空学院], Beihang University [北京航空航天大学] is one of the PRC's first aviation universities. Beihang has been a center of aviation development and innovation for nearly 75 years.[1476] The university, which was the site of China's first drone test flight in 1958, remains a center of UAV research and development today.[1477]

In April 1988, with the approval of the State Education Commission, Beijing Institute of Aeronautics was renamed Beijing University of Aeronautics and Astronautics, marking the development of Beihang University from a single engineering university to a comprehensive university combining engineering, science, management and liberal arts. As with the other Seven Sons of National Defense universities, Beihang University is administered directly by the Ministry of Industry and Information Technology (MIIT). [1478] It is part of the "Double First-Class Construction" [双一流建设] program to build a network of "world class universities."[1479]

Notable UAV Products:

- See Beihang University Unmanned Systems Research Institute section below

Figure 19: Campus of Beihang University in Haidian District, Beijing[1480]

Notable Relationships

- AVIC: Numerous "School-enterprise" cooperation relationships
  - For example, AVIC's Aerodynamics Research Institute [中国航空工业空气动力研究院] collaborates with Beihang University's School of Aerospace Science and

Engineering on an Aircraft Aerodynamics Collaborative Education Base (an MIIT School-Enterprise Demonstration Base)[1481]
    - (AVIC) Xi'an Flight Automatic Control Research Institute (FACRI) [西安飞行自动控制 研究所] - jointly lead Defense S&T Key Laboratory of Aircraft Control and Integration Technology [飞行器控制一体化技术国防科技重点实验室]
- NORINCO [兵器工业集团北方公司]: Investment Agreement, R+D cooperation
    - Under the agreement, which was signed on July 21, 2023, NORINCO acquires a majority stake in Beihang's subsidiary company, Beijing Beihang Tianyu Changying UAV Technology Co., Ltd. [北京北航天宇长鹰无人机科技有限公司] that manufactures the BZK-005E [长鹰] UAV and other platforms[1482]
    - Beihang Party Secetary Zhao Changlu [赵长禄] said the investment agreement seeks to combine and leverage Beihang's technological innovation capabilities, with NORINCO's expansive equipment production capacity. [1483]
- North Tiantu Aviation Technology Co. Ltd [北方天途航空技术发展（北京）有限公司]: Research and development cooperation
    - Listed as a National Defense Key Laboratory of Beihang University [被列为北航国防重点实验室][1484]
- ZFTX Aeroengine [中发天信（北京）航空发动机科技股份有限公司]
    - High-tech innovative enterprise founded by alumni of Beihang University in 2016
    - Per its website, the company produces various types of small aircraft engines, as well as the testing services of aircraft engine parts and accessories, aiming to provide power supporting services for domestic and foreign business aircraft, UAVs, cruise missiles, etc.
    - The site states that it currently produces developed and produced a certain type of aircraft engine that is the power unit of a certain type of a domestically produced UAV[1485]

Known Subsidiaries

- Beijing Beihang Tianyu Changying UAV Technology Co., Ltd. [北京北航天宇长鹰无人机科技有限公司] (see pp. 105-108)
    - Majority owned by NORINCO as of June 2023[1486]

Directly Subordinate Organizations

- School of Aerospace Science and Engineering [航空科学与工程学院][1487]
    - Ministry of Education Engineering Research Center for Advanced Long-Flight Unmanned Aerial Vehicle System Technology [先进长航时无人机系统技术教育部工程研究中心][1488]

- School of Automation Science and Electrical Engineering [自动化科学与电气工 程学院] thar hosts and manages the following DSTKL:
  - Defense S&T Key Laboratory of Aircraft Control and Integration Technology [飞行器控制一体化技术国防科技重点实验室] run jointly with AVIC 618th Research Institute i.e., Xi'an Flight Automatic Control Research Institute (FACRI)[1489]
- Beihang University Unmanned Systems Research Institute [北航无人系统研究院][1490]
- 26 postdoctoral research mobile stations

Key Personnel

- Zhao Changlu [赵长禄]: Party Secretary
- Wang Yunpeng [王云鹏]: President and Deputy Party Secretary

Aliases

- Beihang [北航]

Website

- https://www.buaa.edu.cn/

Subordinate to

- Ministry of Industry and Information Technology (MIIT)[1491]

Address

- No. 37, Xueyuan Road, Haidian District, Beijing [北京市海淀区学院路 37 号][1492]

Beihang University Unmanned Systems Research Institute

Overview: The Beihang University Unmanned Systems Research Institute [北航无人系统研究院] institute is founded based on Beihang University's tradition as the first academic institution to undertake research on UAVs in China. In 1959, the university achieved China's first successful automatic take-off and landing of an aerial drone at the Beijing Capital Airport.[1493] In 1962, Beihang University established the first UAV research laboratory in China. The institute was in the Ministry of Science and Technology's (MOST) 863 Program designed to promote indigenous production of advanced technologies in key areas that was absorbed, along with the parallel 973 Program, into the "National Key R&D Program" in 2016.[1494]

In February 2016, the Ministry of Industry and Information Technology's (MIIT) Key Laboratory of "Advanced Technology of Intelligent Unmanned Aerial Systems" was established with the Unmanned Systems Research Institute as the main body.[1495] Previously known as the Beihang University UAV Design Institute [北京航空航天大学无人机设计研究所], the institute was renamed the Beihang University Unmanned Systems Research Institute in June 2016.[1496] It has several hundred employees.[1497]

The institute develops and produces medium-altitude long-endurance (MALE) UAVs, notably the BZK-005 UAV system in conjunction with Harbin Aircraft Industry (Group) Co., Ltd, light aircraft, and airborne/ground equipment, and the TYW-1 strike-capable reconnaissance UAV.[1498] Production appears to have been taken over by its subsidiary and spin-off Beihang UAS.[1499]

Notable UAV Products

- BKZ-005
  - MALE reconnaissance UAV (designed with Harbin Aircraft Industry (Group) Co., Ltd, produced by Beijing UAS Technology Co. Ltd see pp 113-116 for details)[1500]
- BZK-007[1501]
  - MALE reconnaissance UAV co-produced and manufactured by China National Guizhou Aviation Industry (Group) Co., Ltd. [中国贵州航空 工业（集团）有限责任公司]; in PLA service
- WZ-5 [无侦-五]
  - Long-range, air-launched autonomous reconnaissance drone in operation since the 1980s
  - The UAV's airframe is modeled on the U.S. Northrop Grumman BQM-34A Firebee aerial target drone, and its overall design is based on the Teledyne Ryan Model 147H (AQM-34N) that was shot down over China before 1972[1502]
  - Fielded by the PLA[1503]

Notable Relationships

- China National Guizhou Aviation Industry (Group) Co., Ltd. [中国贵州航空 工业（集团）有限责任公司]
  - The institute cooperates with this AVIC subsidiary company to produce the BZK-007 MALE reconnaissance UAV
- Shenyang Aircraft Design Institute [沈阳飞机设计研究所]: agreement on party-building and talent exchanges[1504]
- Eagle Brother UAV Co., Ltd. [深圳天鹰兄弟无人机创新有限公司]: Research partner[1505]
  - Shenzhen-based company that produces and sells UAVs, including the TY-800 agricultural UAV, police and maritime patrol UAV; some members of the company's research team previously worked at NUDT, and the team works with AVIC

Known Subsidiaries

- Beihang UAS Technology Co., Ltd. [北京北航天宇长鹰无人机科技有限公司][1506] (see NORINCO section for full profile)
  - Majority-owned by NORINCO but Beihang University remains a major stakeholder

- The company is described as “the science and technology research industrialization platform of Beihang University” [北航无人机科研和科技成果转化的平台], undertaking production “of UAS and related systems R&D, manufacturing, sales and services”[1507]

Directly Subordinate Organizations

- MIIT Key Laboratory of "Advanced Technology of Intelligent Unmanned Aerial Systems [智能无人飞行系统先进技术工业和信息化部重点实验室][1508]
  - Officially approved by MIIT in October 2016, the lab draws on the key disciplines of Beihang University such as aircraft design, navigation, guidance and control, traffic information engineering and control, the resources of the Unmanned Systems Research Institute, the School of Automation Science and Electrical Engineering, the School of Electronic Information Engineering and Beihang/NORINCO subsidiary, Beijing Beihang Tianyu Changying UAV Technology Co., Ltd.
- UAV Research Institute [无人机研究所][1509]
  - appears to potentially still exist as a subordinate entity
- Engineering Research Center of Advanced Long-Flight Unmanned Aerial Vehicle System Technology, Ministry of Education [先进长航时无人机系统技术教育部工程研究中心][1510]
- New Concept Aircraft Integrated Design Center [新概念飞行器一体化设计中心][1511]
- Key Laboratory of Unmanned Aerial Systems of the Ministry of Industry and Information Technology [无人飞行系统工业和信息化部重点实验室][1512]
- Intelligent Control and Information Processing Technology Research Center [智能控制与信息处理技术研究中心][1513]
  - UAV systems engineering and operations [无人机系统工程和无人机运行]
- "Advanced Unmanned Aerial Vehicles" Beijing Higher Education High-Tech Discipline Center [“先进无人飞行器”北京高校高精尖学科中心][1514]
- The institute’s website includes an organization chart listing the following offices:[1515]
  - Party and Government Office [党政办公室]
  - Research and Teaching Office [研究教学办公室]
  - Project and Intellectual Property Office [项目与知识产权办公室]
- The organizations chart lists the following department under “System prototype development”
  - Systems Engineering Department [系统工程部门]

Key Personnel[1516]

- Wang Yingdong [王英勋]: Dean, Autonomous Control Technology Chief, Researcher[1517]
    - Member, CMC EDD Unmanned Systems Technology Specialist Group [无人系统技术专业组]; Leader of the Expert Advisory Group on Aviation Equipment Technology Application of the Armed Police Force [武警部队航空装备技术应用专家咨询组][1518]
- Liu Yuzhan [刘玉战]: Party secretary[1519]
- Zhang Qinling [张秦岭]: deputy dean[1520]
- Ma Tieling [马铁林]: deputy dean [1521]
- Xiang Jinwu [向锦武]: Director General Aircraft Design Chief Expert, Professor[1522]
    - Xiang is also an Academician with the Chinese Academy of Engineering
- Gao Xia [高遐]: Chief Systems Engineering Expert[1523]
    - Member, CMC EDD Unmanned Systems Technology Specialist Group [无人系统技术专业组]
- Wang Yanzhu [王养柱]: Navigation Technology Chief Expert, Researcher[1524]
- Guo Hong: [郭宏]: Energy Technology Chief Expert, Professor[1525]
- Ding Wenrui [丁文锐]: Intelligent Information Technology Chief Expert, Researcher[1526]
- Wang Yong [王勇]: Flight Control Technology Chief Expert, Researcher [1527]
- Gao Xinghai [高星海]: Systems Architecture Technology Chief Expert, Researcher [1528]

Year Established: 1962 (earlier incarnation)[1529]; 1964[1530]

Aliases

- Beihang University UAV Design Institute [北京航空航天大学无人机设计研究所]
- UAS Research Institute [无人系统研究院][1531]
- Former:
    - Beijing University of Aeronautics and Astronautics - Unmanned Aerial Vehicle Research Laboratory [北京航空航天大学 - 无人机研究室] (1962)[1532] / Beijing University of Aeronautics and Astronautics - Unmanned Aerial Vehicle Research Laboratory [北京航空学院第五研究室（无人驾驶控制设计研究室）][1533]
    - Beijing University of Aeronautics and Astronautics Unmanned Aerial Vehicle Design Institute [北京航空航天大学无人机设计研究所] (1964-2016) [1534]
    - Beijing University of Aeronautics and Astronautics Unmanned Aerial Vehicle Design Institute [北京航空航天大学无人驾驶飞行器设计研究所][1535] (apparently same as immediately above)
        - Beihang University Unmanned Aerial Vehicles Institute [北京航空航天大学无人机所/北航无人机所][1536]

- Unmanned Aerial Vehicle Institute of Beihang University[1537]
- UAVI[1538]

Website

- https://wrj.buaa.edu.cn/ (blocked intermittently but archived at: https://web.archive.org/web/20240606010404/https://wrj.buaa.edu.cn/)

Subordinate to

- Beihang University (directly under)[1539]

Addresses

- No. 37, Xueyuan Road, Haidian District, Beijing [北京市海淀区学院路 37 号][1540]
- 6th Floor, UAV Building, Beihang University, No. 37 Xueyuan Road, Haidian District, Beijing [北京市海淀区学院路 37 号北京航空航天大学无人机楼 6 层][1541]

Defense S&T Key Laboratory of Aircraft Control and Integration

Overview: The Defense S&T Key Laboratory of Aircraft Control and Integration Technology [飞行器控制一体化技术国防科技重点实验室], which is jointly overseen by Beihang University School of Automation Science and Electrical Engineering [自动化科学与电气工程学院] and AVIC's Xi'an Flight Automatic Control Research Institute (FACRI) [西安飞行自动控制研究所], undertakes research on control systems for aircraft, missiles, satellites, and UAVs.[1542] The laboratory provides basic research, applied research, and key technology and engineering research services for next-generation aircraft, and advanced control systems. The laboratory's main research areas include aircraft control systems research, flight control, aircraft decision management, and intelligent sensing and control integration.[1543] Other research areas include UAV swarming;[1544] and using low-cost "loyal wingman" UAVs in denied environments to protect high-cost manned combat aircraft from missiles.[1545]

Notable UAV Products

- Unmanned System Swarm Control

Notable Relationships

- China Electronics System Engineering Construction [中电系统建设工程有限公司]: worked on construction of lab[1546]
- Ministry of Science and Technology (MOST): Affiliated with lab's Aircraft Advanced Navigation and Control Systems Innovation Team[1547]
- In 2019, this lab partnered with other Beihang labs and the COMAC Shanghai Aeroplane Design & Research Institute [上海飞机设计研究院] to establish the Large Aircraft

Innovation Valley Joint Laboratory [大飞机创新谷联合实验室], focused on flight control, hydraulics, landing gear, and brake technology for large aircraft[1548]

- In 2019, this lab established an Intelligent Flight Technology Joint Innovation Center [智能飞行技术联合创新中心] with the Beihang University School of Astronautics, signing a strategic cooperation agreement[1549]
- This lab collaborated with the CASC Infrared Detection Technology R&D Center [红外探测技术研发中心] and Shanghai Institute of Spaceflight Control Technology [上海航天控制技术研究所] to research quadrotor aircraft attitude control[1550]
- This lab collaborated with the CETC 10th RI [中国电子科技集团公司第十研究所] on airborne refueling[1551]
- In 2017, this lab co-hosted the 2nd Summit on New Navigation Technology and Applications [第二届新型导航技术及应用研讨会]
    - Notable participants included personnel from CASC's 1st, 5th, 8th, and 9th Academies, CASIC's 2nd, 3rd, and 4th Academies, NUDT, Air Force Engineering University, and Rocket Force Engineering University. Another co-host was the Key Laboratory of Advanced Cruise Missile Guidance and Control Technology [巡航导弹先进制导控制技术重点实验室]
    - The conference discussed spacecraft flight control, guidance and control technology for hypersonic vehicles, and intelligent/autonomous aerospace systems[1552]
- In 2020, this lab collaborated on the 4th Chinese Conference on Swarm Intelligence and Cooperative Control with multiple organizations, including the Chinese Institute of Command and Control, the 2nd Department-Beihang Swarm Intelligent Control Joint Lab [二部-北航集群智能控制联合实验室], and other labs. Representatives from the PLAN and PLAAF Research Academies, CASC 5th Academy, and the National University of Defense Technology participated[1553]
- This lab co-hosts the annual International Conference on Guidance, Navigation and Control [国际制导、导航与控制学术会议]. International participants are not named, but a list of regional chairs includes several participants from U.S. universities[v] alongside PLA personnel. The conference included PLAAF and PLARF participants and discussed military topics. Another sponsor is the Chinese Institute of Command-and-Control [中国指挥与控制学会], an organization which supports military research[1554]
- This lab co-hosts an annual International Aerial Robotics Competition along with AVIC Shenyang Aircraft Design Institute, AVIC 631st RI, and others; U.S. university MIT has been among the participants[1555]
- The lab's parent institution, FACRI, signed a joint agreement with U.S. aerospace company Honeywell in 2018 to jointly develop a commercial flight control system. This includes building a 10,000 sqm research and production base in Xi'an. The venture will be called HonFei Flight Technology Co and will research and manufacture advanced flight control

[v] A full list of regional chairs, including international participants, is available upon request.

technologies, including fly-by-wire controls. HonFei also provides flight systems for the C919 passenger jet[1556]

Known Subsidiaries

- Beihang Space Intelligent and Autonomous Systems Research Center [空间智能自主系统研究中心][1557]

Directly Subordinate Organizations[1558]

- Bionic Autonomous Flight System Research Team [仿生自主飞行系统研究组] focused on autonomous unmanned system swarm control [无人系统集群自主控制], bionic vision and intelligent sensing [仿生视觉及智能感知], advanced flight control [先进飞行控制], and biological swarm intelligence [生物群体智能]
- Aircraft Anti-Jamming Control Innovation Team [飞行器抗干扰控制创新团队]
- Aircraft Advanced Navigation and Control Systems Innovation Team [飞行器先进导航与控制系统技术创新团队]

Key Personnel

- Wu Jian [吴江]: Lab leader
- Jiao Zongxia [焦宗夏]: director[1559] (possibly former)
- Deputy Directors:
    - Lu Zhengren [卢正人] [1560]
    - Ren Zhang [任章] [1561]
    - Guo Lei [郭雷][1562]
- Duan Haibin [段海滨][1563]
    - Part of first cohort of young talents with Ten Thousand Talents Plan [万人计划]
    - Research focuses on autonomous control of UAVs using bionic intelligence

Aliases

- Key Laboratory on Aircraft Control [飞行器控制一体化技术重点实验室][1564]

Website

- http://dept3.buaa.edu.cn/zdsys/gjzdsys.htm

Subordinate to

- Beihang University School of Automation Science and Electrical Engineering [自动化科学与电气工程学院][1565]
- Xi'an Flight Automatic Control Research Institute (FACRI) [西安飞行自动控制 研究所]

Addresses

- None found, possibly located on the Beihang campus

BEIJING INSTITUTE OF TECHNOLOGY

Overview: The Beijing Institute of Technology (BIT) [北京理工大学] traces its roots to 1940, when it was established as the Yan'an Research Academy of Natural Sciences [延安自然科学研究院] by the Chinese Communist Party (CCP) to train scientists and engineers. In 1949, the school moved to Beijing. In 1952, the university was named Beijing Institute of Technology (BIT) becoming the PRC's defense industry college. Today, BIT is part of the "Double First-Class Construction" [双一流建设] program to build a network of "world-class universities."

The school has a long-standing and close relationship with NORINCO. BIT and NORINCO have agreed to hold strategic cooperation agreements, and the defense giant also holds "exclusive job fairs" for BIT students.[1566]

The university's UAV research and development efforts appear to be centered around the BIT School of Mechanical Engineering [机电学院]. The BIT Intelligent Unmanned Systems Discipline Group [智能无人系统学科组] is affiliated with that school's Department of Mechanical and Electrical Systems Engineering.[1567] The BIT Intelligent Unmanned Systems Discipline Group primarily focuses on scientific research and technological development work such as intelligent unmanned system design, bionic cluster and collaborative navigation control, intelligent system safety control, micro-information processing, and integration.

Notable UAV Products

- Drone swarm [无人机群] systems[1568]

Notable Relationships

- NORINCO [中国北方工业公司]: Strategic Partner, multiple cooperation agreements[1569]
  - NORINCO is the sponsor of BIT's "Flying Eagle (UAV) Team" ["飞鹰队"][1570]
  - NORINCO Scholarship [北方工业奖学金章程] for master's and PhD students
    - 2023 scholarships of 20,000 RMB each (around $2,850) and a certificate were awarded to 26 master's students and 10 doctoral students[1571]

Directly Subordinate Organizations

- Beijing Institute of Technology School of Mechanical Engineering [北京理工大学机电学院][1572]
  - Department of Mechanical and Electrical Systems Engineering [电学院机电系统工程系]
    - Intelligent Unmanned Systems Discipline Group [智能无人系统学科组], formerly known as the 82nd Teaching and Research Section [82 教研室课题组]

- Beijing Institute of Technology School of Aeronautics and Astronautics [北京理工大学宇航学院]
    - This schools “Flying Eagle (UAV) Team” [“飞鹰队”] participates in international drone competitions such as the Mohammed bin Zayed International Drone Challenge (MBZIRC 2024) held in Abu Dhabi, UAE[1573]

Key Personnel

- Wang Bo [王博]: Vice President and Professor[1574]
- Wang Zhengjie [王正杰]: professor, doctoral supervisor, Intelligent Unmanned Systems Discipline Group [智能无人系统学科组], team leader, other members of the group are listed below[1575]
- Li Jie [李杰]: professor, doctoral supervisor, chief scientist of national key projects
- Shen Qiang [申强]: professor, doctoral supervisor
- Yang Chengwei [杨成伟]: special researcher, doctoral supervisor, deputy chief engineer of models)
- Li Juan [李娟]: special associate researcher
- Wu Yanxuan [吴炎烜]: associate researcher
- Liu Chang [刘畅]: senior engineer

Year Established: 1940

Website

- https://www.bit.edu.cn/

Subordinate to

- MIIT

Addresses

- Intelligent Unmanned Systems Discipline Group, Key Laboratory of Beijing Institute of Technology, No. 5 Zhongguancun South Street, Haidian District, Beijing [北京市海淀区中关村南大街 5 号北京理工大学重点实验室智能无人系统学科组][1576]

Beijing Key Laboratory of Autonomous Control Technology for UAVs

Overview: The Beijing Key Laboratory of Autonomous Control Technology for UAVs [无人机自主控制技术北京市重点实验室] was approved for construction in 2017.[1577] It is a professional UAV research institution established by the Beijing Institute of Technology in response to the national call for MCF and is organized based on the strategic needs of Beijing's construction of a "national science and technology innovation center."[1578]

The institute is also involved in international UAV research and development collaboration through the "China-UAE Intelligent Unmanned System 'Belt and Road' Joint Laboratory," which opened in 2022.[1579]

Notable Relationships

- United Arab Emirates: joint laboratory[1580]
  - China-UAE Intelligent Unmanned System "Belt and Road" Joint Laboratory [中国-阿联酋智能无人系统"一带一路"联合实验室] construction approved in 2022
  - 2023 "Unmanned Intelligent Group +" International Engineering Technology Strategy High-end Forum and China-UAE Intelligent Unmanned System Development Forum co-organized in 2023[1581]

Year Established: 2017

Subordinate to

- Beijing Institute of Technology School of Aeronautics and Astronautics [北京理工大学宇航学院]

Unmanned Aerial Vehicles Autonomous Control Research Institute

Overview: The Beijing Institute of Technology (BIT) and Beijing ZhongHangZhi Technology Co., Ltd. (ZHZ) [北京中航智科技有限公司] co-founded the Unmanned Aerial Vehicles Autonomous Control Research Institute [无人飞行器自主控制研究所] institute, located on the BIT campus, in October 2014.[1582] The Institute's initial director of the was ZHZ founder and CEO Tian Gangyin [田刚印], a BIT alumnus.[1583] The UAV Autonomous Control Research Institute seeks to facilitate scientific and technological support that improves China's UAV technology and equipment, and to prove test bases for universities and enterprises to form a long-term, close and in-depth "industry-university-research" cooperation complex.

Notable UAV Products

- The institute's research focuses on the following areas: [1584]
  - Ground simulation experiments of autonomous landing of rotorcraft
  - Autonomous planning and control of drones in denied environments
  - Laser radar positioning and mapping

Notable Relationships

- Beijing ZhongHangZhi Technology Co., Ltd. (ZHZ) [北京中航智科技有限公司]: co-founder, cooperation partner, Tian Gangyin led both the institute and ZHZ in its early days [1585]

Key Personnel

- Xia Kewei [夏克伟]: Team Leader[1586]
  - Member, Navigation, Guidance and Control Committee of the Chinese Automation Society, UAV Autonomous Control Committee of the Chinese Automation Society, and the Youth Work Committee of the Chinese Command and Control Society
  - Editorial board member of the *Journal of Vibration and Control*

Year Established: 2014

Subordinate to

- BIT

Addresses

- No. 5 Zhongguancun South Street, Haidian District, Beijing, close to Campus North Road, Campus Middle Road, Teaching North Road and Teaching West Road [北京理工大学(中关村校区)-无人飞行器自主控制研究所]

CHINESE ACADEMY OF SCIENCES (CAS) ENTITIES

CAS Institute of Engineering Thermophysics

Overview: The Chinese Academy of Sciences (CAS) Institute of Engineering Thermophysics [工程热物理研究所] appears to have several UAV focused entities: the Intelligent Unmanned Aerial System Laboratory [智能无人飞行系统实验室], the Qingdao Technology Test base [青岛航空技术试验基地] for aircraft engines and high-performance UAVs at Qingdao Institute of Aeronautical Technology [青岛航空技术研究院暨中科院];[1587] and the CAS Innovation Academy for Light-duty Gas Turbines [中国科学院轻型动力创新研究院]. General areas of the Institute's UAV-relevant research include:[1588]

- Advanced Power Equipment, including light turbine engines for UAVs
- Distributed energy systems and energy storage
- High-altitude and long-flight UAV technology and application
- Intelligent Network Patrol Systems

CAS Innovation Academy for Light-duty Gas Turbines

Overview: The CAS Innovation Academy for Light-duty Gas Turbines [中国科学院轻型动力创新研究院] has three major research fields, one of which is UAVs.[1589] The innovation academy was established in March 2019 with the CAS Institute of Engineering Thermophysics as its supporting unit.[1590]

Directly Subordinate Organizations

- Unmanned Aerial Systems General Department [无人机系统总体部][1591]

Key Personnel

- Zhang Zijian [张子健][1592]
    - Head (former) of CAS IET UAV Lab, but also listed / has a page with this Academy[1593]
- Xu Gang [徐纲][1594]
    - CAS IET researcher and PhD advisor[1595]
        - Xu has a biography webpage with this academy but lacks a specific position[1596]
    - Develop a series of small turbojet/turbofan engines suitable for high-altitude and high-speed UAVs and high-altitude and high-speed target drones and has worked on CAS UAV engine programs[1597]

Website

- http://ilgt.iet.cn/lyfx/

Subordinate to

- CAS Institute of Engineering Thermophysics [中国科学院工程热物理研究所][1598]
    - The main co-construction units include Changchun Institute of Optics and Mechanics [长春光机所], Shanghai Advanced Research Institute [上海高研院], Shenyang Institute of Automation, Institute of Automation, etc., as well as Institute of Metals, Shanghai Institute of Ceramics, Ningbo Institute of Materials, Xi'an Institute of Optics and Mechanics, Process Institute, Institute of Mechanics, and School of Mathematics[1599]

Addresses

- No. 11, North Fourth Ring West Road, Beijing [中国北京北四环西路 11 号] [1600]

Intelligent Unmanned Aerial System Laboratory

Overview: The stated purpose of the CAS Intelligent Unmanned Aerial System Laboratory [智能无人飞行系统实验室] is to apply the needs of intelligence and unmanned flight using innovation-driven development and MCF as its guiding ideology.[1601] The laboratory seeks to leverage the CAS Institute of Engineering Thermophysics [中国科学院工程热物理研究所] expertise in light turbine power engines to develop intelligent unmanned aerial systems.[1602] The lab also appears to have used this foundation to develop a niche in solar-powered UAVs such as the "Fire Phoenix" ["火凤"].[1603]

The laboratory has four main research directions: 1) Intelligent unmanned aerial platform technology [智能无人飞行平台技术]; 2) Intelligent UAV swarm collaboration and test technology [智能无人飞行器集群协同及试验技术]; 3) Intelligent UAV application and management technology [智能无人飞行器应用及管理技术]; Basic technologies for aerospace experimental systems and new structures and new materials [宇航实验系统及新结构新材料基础技术]. It has worked on CMC S&T Committee projects.[1604]

The lab employs 69 employees, including five senior staff, 16 deputy senior staff, and three postdoctoral fellows, as well as 71 graduate students.[1605]

Notable UAV Products

- "AT200" Large Cargo UAV [大型货运无人机][1606]
    - Developed by lab as the main unit along with Longstar UAV Company [朗星无人机公司]; AVIC 618th Institute, China Electronics 54th Institute, Aerospace 773rd Institute, and Northwestern Polytechnical University also helped develop this UAV
    - From October 26 to 31, 2017, AT200 completed its first flight, adjustment test flight, and public demonstration flight in 5 consecutive days, setting a record for the shortest interval between the first flight and subsequent flights of large UAVs[1607]
- "Fire Phoenix" Solar-Powered UAV ["火凤"太阳能无人机][1608]

    - On October 31, 2018, "Fire Phoenix" successfully completed its first flight completing development in under10 months
    - According to CAS, the “Fire Phoenix” is the world's first spherical solar-powered drone[1609]
- “Swift” UAV/ “Swift” Supersonic UAV [“雨燕”无人机][1610] / “雨燕”超音速无人机][1611]
    - Completed first flight in August 2021
- "Honghu" Special UAV Platform/ "Honghu" Special UAV "Fire Phoenix" [中科院“鸿鹄”专项无人机平台/中科院“鸿鹄”专项“火凤”无人机][1612]
    - It is unclear if this UAV is distinct from “Fire Phoenix” [“火凤”] or a different name for the same platform
- KT-1Solar Energy UAV [太阳能无人机][1613]
    - In progress, solar-powered but night-flight capable.[1614]
- “Cangluan” UAV [“苍鸾”无人机][1615]
    - In development, named for a mythical Chinese bird from classical Chinese tradition
- “Hummingbird” UAV [“蜂鸟”无人机][1616]
    - Developed
- KC-5 Hummingbird VTOL UAV/KC-5 UAV/KC-5 Composite VTOL UAV KC-5 [蜂鸟垂直起降无人机/KC-5 无人机[1617]/KC-5 复合式垂直起降型无人机][1618]
    - VTOL series designed for large-scale and long-flight missions. The cruising speed is not less than 150km/h, and the single-flight flight range is not less than 600 km
    - Had completed first verification flight of the preliminary prototype system in June 2019

Notable Relationships

- Qingdao Technology Test base [青岛航空技术试验基地]: Probable Test Base[1619]
    - Also subordinate to the CAS Institute of Engineering Thermophysics this base was put into operation in 2017 (see profile below)
    - Note its shared focus with the Intelligent Unmanned Aerial System Laboratory on small turbine engines

Key Personnel

- Zheng Huilong [郑会龙]: Director[1620]
- He Yong [何勇]: Deputy director[1621]
    - He is also Chief Designer of the Near-Space Solar UAV of CAS’s Strategic Priority Project A and a member of Chinese Society of Aeronautics’ UAV Special committee[1622]

- Former leadership:
    - Director: Zhang Zijian [张子健]: director[1623]
        - Appears to have previously been deputy director[1624]
        - Previously was affiliated with NWPU UAV Research Center [西北工业大学无人机所][1625]
        - Part of CSAA UAV and Micro Aerial Vehicle Specialized Branch [无人机及微型飞行器专业分会][1626]
        - Party secretaryat end of 2021
    - Zhang Jian [张健]: deputy director[1627] / scientific research deputy director[1628]
        - Researcher and PhD supervisor[1629]
        - Previously worked at AVIC subsidiary, FACRI[1630]
    - Wang Bo [王勃]: deputy director[1631]
- Team members (these 9 were the first, and worked on the AT200) [1632]
    - Ma Xiaoping [马晓平]
        - Appears to have been director and Party secretary [党支部书记] as of around 2022 (and potentially from the beginning)[1633]
        - Chief designer of several UAV series[1634]
    - Fang Xiao [方晓]
    - Zhao Dalin [赵大林]
    - Zhou Liyang [周礼洋]
    - Shen Siying [沈思颖]
    - Cao Huazhen [曹华振]
    - Zeng Guannan [曾冠南]
    - Yan Xiaopeng [闫晓鹏]
    - Li Chen [李晨]
- Possible team member: Zhang Guoxin [张国鑫][1635]
    - Appeared to be member of the Party group;[1636] profile does not mention any work or position, but the name of the lab is on the page[1637]
    - Senior aircraft design engineer [飞行器设计高级工程师] at CAS Institute of Engineering Thermophysics[1638]
    - Works on UAVs including swarms and led a project on high-speed UAV(s) ["某型高亚音速无人机方案设计"项目][1639]
    - Previously worked at several AVIC subsidiaries including Shaanxi Aircraft Industry Corporation (SAIC)[1640]

Year Established: 2016[1641] (may have unofficially begun work in 2015)[1642]

Aliases

- UAV Laboratory [无人飞行器实验室][1643]
- UAV Lab [无人机实验室][1644]
- CAS UAV Lab [中国科学院无人飞行器实验室][1645]

Website

- http://www.etp.ac.cn/org/ky/202109/t20210917_6204438.html
- http://www.iet.cas.cn/org/ky/202109/t20210917_6204438.html

Subordinate to:

- CAS Institute of Engineering Thermophysics [工程热物理研究所][1646]

Addresses

- No. 11 North Fourth Ring Road West, Beijing [中国北京北四环西路 11 号]

Qingdao Institute of Aeronautical Technology, Qingdao Test Base

Overview: The Qingdao Institute of Aeronautical Technology (QIAT) [青岛航空技术研究院暨中科院], which hosts the CAS Institute of Engineering Thermophysics Qingdao Test Base [青岛试验基地] Test Base, was established at the end of 2014 with the support of Shandong Province, Qingdao City, and West Coast New Area governments.[1647] The institute has a UAV research institute that focuses on drone testing and development.

Jointly built by the Institute of Engineering Thermophysics, Qingdao City and Huangdao District, the Qingdao Aviation Technology Test Base project began in the Guzhenkou Innovation Demonstration Zone [古镇口创新示范] in 2015.[1648] The total investment in the first phase of the project was 550 million yuan (about $78.2 million). The test base, which covers an area of 96.3 acres, was officially put into operation at the end of 2017.[1649]

Qingdao Aviation Technology Test Base is mainly engaged in the research and development, design and industrial transformation of light power engines. The base claims to be "the only test platform in China capable of independent R&D of light engines, the only test platform capable of high-altitude testing of light power complete aircraft at an altitude of 20,000 meters, and the only test base able to undertake high-altitude testing of aircraft engine components." [1650] In the future, it will focus on building a national "two-machine" special basic research high-altitude test base and serving as an important support platform in the field of energy and power of the Chinese Academy of Sciences.

Notable UAV Products

- UAV Testing Systems and Facilities

Notable Relationships

- Shandong Provincial People's Government [山东省人民政府]
  - QIAT was established with the support of Shandong Province and has received multiple awards including the Shandong Science and Technology Progress Award First Prize [山东省科学技术进步奖一等奖][1651]
- Qingdao Municipal Government [青岛市政府]
  - Strongly supported QIAT's establishment
  - Qingdao Science and Technology Bureau [青岛市科技局] officials make inspection visits
- Qingdao West Coast New Area [青岛西海岸新区]
  - Strong supported QIAT establishment, institute is in this area[1652]

Directly Subordinate Organizations

- High-performance UAV electromagnetic compatibility laboratory [高性能无人机电磁兼容实验室][1653]
- QIAT UAV Research Institute [无人机研究所][1654]
  - Construction began in 2018; the institute relies on the advanced power system and high-end UAV R&D technology of the CAS Institute of Engineering Thermophysics
  - MCF platform geared toward supporting the development needs of national defense unmanned equipment
  - The institute focuses on technical research such as UAV whole machine integration testing, ground test verification, simulation training and simulation, and comprehensive testing
  - The Research Institute has a 16,000-square-meter dedicated facility for UAV assembly and integration, experimental testing, simulation training, etc.
  - The institute has undertaken projects such as the Qingdao Science and Technology Plan and the construction of a certain test technology conditions of the Chinese Academy of Sciences, and has carried out full-system tests of multiple types of UAVs in complex mission domains
  - The UAV Research Institute includes the following facilities:
    - Electromagnetic Compatibility Test Room [电磁兼容试验室]: basic laboratory that provides services for complete drones, airborne electronic equipment, and mission equipment
    - Environmental Reliability Laboratory [环境可靠性实验室介绍]: basic laboratory that specializes in providing services for unmanned aerial vehicle body structures, airborne electronic equipment, and mission equipment[1655]
    - Semi-physical Simulation Laboratory [半物理仿真实验室] includes a large-scale ground test equipment, including a high-precision three-axis simulation turntable, a UAV ground comprehensive test bench, and a simulation training assessment

system. The lab uses a satellite navigation signal simulator, a high-precision three-axis simulation turntable, a load simulator for servo systems, a UAV ground integrated test platform and a simulation training assessment system[1656]

Key Personnel

- Zhen Xichao [赵汐潮]: Dean[1657]
  - From December 2011 to June 2019, he served as Party Secretary and Deputy Director of the CAS Institute of Engineering Thermophysics
- Zheng Huilong [郑会龙]: Vice President, QIAT; Director, UAV Research Institute[1658]
- Yu Hao [于浩]: Director, UAV Research Institute[1659]
- Shi Lei [石磊]: Director, UAV Research Institute[1660]

Year Established: 2017[1661]

Aliases

- QIAT

Website

- http://www.qd-iet.cn/

Subordinate to

- CAS Institute of Engineering Thermophysics [工程热物理研究所]

Addresses

- No. 288, Longnan Road, Huangdao District, Qingdao City, Shandong Province [山东省青岛市黄岛区陇南路 288 号][1662]

CAS Research Center for UAV Application and Regulation

Overview: The CAS Research Center for UAV Application and Regulation [中国科学院无人机应用与管控研究中心] provides scientific and technological support for the construction of a national UAV management platform by researching the standards, technical systems, data sharing, and other issues with the application of UAVs.[1663] The Center seeks to advance key technologies and build systems for the aggregation of large-scale, multi-source, and heterogeneous UAV remote sensing data across the country. It also explores accurate and efficient UAV application models for field agriculture, forestry, animal and plant protection, animal husbandry, and other fields; directly integrates relevant forces to serve the fields of land resources, agriculture and forestry, disaster reduction, security uses, and other fields according to needs.[1664]

The institute seeks to build a national UAV application network system, and put in place an instant, fast, high-frequency, ultra-high-resolution remote sensing data acquisition and aggregation

center. It has also established a system of field stations to create a network of national test platforms for UAV flight control and provided national-level scientific support for the formulation of UAV management policies and the construction of technical systems.[1665]

Notable UAV Products

- "AX-1" tail-mounted vertical take-off and landing fixed-wing remote sensing UAV
  - Benefits from aerodynamic performance of fixed wings combined with the vertical take-off and landing (VTOL) function, used for remote sensing data acquisition tasks
- "Network No. 1 UAV" ["组网一号"][1666]
  - Rapid maneuvering fixed-wing UAV carrier and dispatch vehicle

Notable Relationships

- China-Tajikistan Research Center for UAV Applications[1667] [中塔无人机研究中心][1668]
  - The center supports this outfit in neighboring Tajikistan, connects to its BRI work

Known Subsidiaries

- Jiangxi Aoxiang Xingyun Technology Co., Ltd. [江西翱翔星云科技有限公司]
  - Founded in 2020, this company relies on the research results of the UAV Application and Control Research Center and serves as its industrial platform

Directly Subordinate Organizations

- The center comprises headquarters and 5 co-construction units. The headquarters includes 3 research departments and 1 big data center:[1669]
  - UAV Application Research Department [无人机应用研究部]: examines applications of UAV remote sensing data in emergency management, law enforcement or military contingencies including:
    - Counterterrorism [反恐] and stability maintenance [维稳] operations
    - "Various sudden disasters" [各类突发灾害]
    - BRI work, geography
    - MCF integration
    - Application of UAVs in agriculture, forestry, meteorology and other related industries
  - UAV Research Control Department [无人机管控研究部]: research and development of institute's drone management and collaborative networking observation technology
  - UAV Big Data Center [无人机大数据中心]: Distributed storage, transmission, management, and security encryption technology for drone application data, assimilation and integrated processing technology for heterogeneous spatial data (images, maps, 3D models, point clouds, real scenes, industry data, etc.) for different terminals. Responsible for the Internet submission, database construction and management of national drone remote sensing data

- National UAV networking and remote sensing observation network [全国无人机组网遥感观测网络][1670]
    - Project to form a national UAV remote sensing observation network
- National UAV observation network and control platform [全国无人机组网观测与管控平台][1671]
- National drone remote sensing data aggregation management and application platform [全国无人机遥感数据汇聚管理与应用平台][1672]
- Homeland security emergency response system [国土安全应急响应体系][1673]
- Flood Disaster Emergency Monitoring System [洪涝灾害应急监测体系][1674]
- Ecological Monitoring System [生态应用监测体系][1675]
- China Geographic Information Industry Association UAV Application and Control Working Committee [中国地理信息产业协会无人机应用与管控工作委员会][1676]
    - Established in September 2018 with the center as its supporting unit
    - Its missions are to:
        - Build a UAV big data aerial carrier through the construction of a communication and resource sharing platform
        - Promote the construction of UAV systems control mechanisms
        - Establish a UAV low-altitude route system
        - Undertake UAV standardization research
        - Expand the applications of the UAV industry
        - Promote the integration of UAV application between the military, police and civilians
        - Explore international cooperation models

Key Personnel

- Liao Xiaohan [廖小罕]: director general (former,[1677] though the change appears to be recent since there are references to Liao in the position in 2024)[1678]
    - Professor in remote-sensing and UAV applications
    - deputy director general of the CAS Institute of Geographic Sciences and Natural Resources Research

Aliases

- UAV Center [无人机中心][1679]
- CAS UAV Center [中科院无人机中心][1680]
- UAV CAS[1681]
- CAS UAV Control Center [中国科学院无人机管控中心][1682]

Website

- http://uav-cas.ac.cn/ (not currently accessible, but a past version is archived here: https://web.archive.org/web/20240221122633/http://uav-cas.ac.cn/)

Subordinate to

- CAS[1683]

Addresses

- No. 11, Datun Road, Chaoyang District, Beijing [北京市朝阳区大屯路甲 11 号][1684]
- Subsidiary, Jiangxi Aoxiang Xingyun Technology Co., Ltd. [江西翱翔星云科技有限公司] is located at Shanshuiju, Fund Town, Gongqingcheng City, Jiujiang City, Jiangxi Province [江西省九江市共青城市基金镇山水居][1685]

CHANGCHUN INSTITUTE OF OPTICS, PRECISION MECHANICS AND PHYSICS

Overview: The Changchun Institute of Optics, Precision Mechanics and Physics (CIOMP) [春光学精密机械与物理研究所] dates to 1952, with the current entity formed in 1999 with the integration of CIOMP and Changchun Institute of Physics.[1686] The institute is based in the Changchun Economic and Technological Development Zone in Changchun, capital of Jilin province in Northeast China. Occupying a total area of 700,000 square meters, CIOMP currently has 18 research departments, six national key laboratories/engineering centers, five Chinese Academy of Sciences key laboratories and engineering laboratories, and two international joint laboratories.

The institute has made several contributions to the development of UAVs in China. CIOMP developed the TW-12 UAV, which is reportedly the world's first dual-wing vertical take-off and landing fixed-wing UAV [双飞翼垂直起降固定翼无人机], has a maximum take-off weight of 200 kg, and can achieve a flight time of more than 12 hours under the hybrid power of gasoline and electricity.[1687] A hex-rotor multi-rotor drone [Hex-rotor 多旋翼无人机] of its participated in a UAV competition in 2015. Used for agricultural purposes, development began in 2008, was the first domestic coaxial twin-blade twelve-rotor UAV with a unique tilt layout [采用独特倾斜布局的共轴双桨十二旋翼无人机], and has heavy load carrying capabilities, long flight time, good operability, strong wind resistance, and high reliability.[1688] In 2015, it unveiled stealth reconnaissance UAVs [隐形侦查无人机][1689] worth tens of millions of yuan, which are fuel-powered and can fly for four hours, can be used for the military, commercial usage, and scientific research, and with one model's wing spreads about 2 meters and the other about 3 meters.[1690]

The institute had a 2019 smart UAV [智能无人机] project approved for Ministry of Industry and Information Technology's new generation of artificial intelligence industry innovation key tasks [新一代人工智能产业创新重点任务].[1691]

The institute has a subsidiary company, Changchun Changguang Boxiang UAV Co., Ltd. [长春长光博翔无人机有限公司/长光博翔], which was founded in 2021 to focus on research, development, and production of advanced drone technology.[1692] It has produced the B-24 vector multi-rotor drone [矢量多旋翼无人机], and has had achievements in research, development, and

application of multi-vector coaxial multi-rotor UAVs [多矢量共轴多旋翼无人机] and vertical take-off and landing fixed-wing UAVs [垂直起降固定翼无人机] in the military, civil, and industrial fields.[1693]

The institute has an Unmanned Aerial Vehicle Research Department [无人飞行器研究部] with a UAV research laboratory [无人机研究室]. This laboratory focuses on advanced drone technology research, system development, application promotion, special UAV overall technology, and advanced flight control technology and produces fixed-wing UAVs, vertical take-off and landing UAVs, tethered UAVs, and flight control systems.[1694]

It also has a precision guidance research laboratory [精确制导研究室], which focuses on multi-purpose optical strapdown guidance systems [光学全捷联制导系统], guidance and control technology [制导与控制技术], and laser seeker technology [激光导引头技术], and features a picture of a missile being fired; and a UAV technology innovation research laboratory [无人飞行器技术创新研究室], which focuses on optical technology and developing advanced optical systems for precise guidance, tracking and imaging [精确制导、跟踪及成像].[1695]

Its specialties include overall aircraft design, aerodynamics, power, navigation guidance and control, system simulation technology, optics, mechanics, electronics, software and reliability [飞行器总体设计、气动、动力、导航制导与控制、系统仿真技术、光学、机械、电子学、软件及可靠性].[1696] It has command of the overall demonstration and design of unmanned aircraft, semi-physical simulation analysis and flight test [无人飞行器总体论证与设计、半物理仿真分析及飞行试验] and other technologies, and has the ability to develop key components of aircraft.[1697]

The lab has undertaken various national, provincial, and ministerial level scientific research projects including CAS important direction projects [中科院重要方向项目], CAS major equipment development projects [中科院重大装备研制项目], PLA CMC General Armaments Department (now EDD) pre-research [总装预研], and national defense basic pre-research [国防基础预研].[1698]

It has established cooperative relationships with NORINCO, major universities, aerospace research institutes, and private companies.[1699]

It has an 800m2 aircraft semi-physical simulation laboratory [飞行器半物理仿真实验室], avionics debugging and testing comprehensive laboratory [航空电子学调试与测试综合实验室], full digital simulation and system testing comprehensive laboratory [全数字仿真及系统测试综合实验室], mechanical assembly and testing comprehensive laboratory [机械装配与测试综合实验室], a 600m×20m runway, high performance simulation computer(s) and high-performance computing server(s).[1700]

In 2019, CIOMP participated in the Changchun Air Show to celebrate the 70th Anniversary of the PLA Air Force's (PLAAF) founding. As part of the Air Show, CIOMP organized exhibits of UAVs developed by the institute.[1701]

Notable UAV Products

- Rotary-wing UAV CQ8
  - Smaller VTOL UAV (maximum take-off weight of 85 kg) with a hybrid oil-electric engine, can be used in surveying and mapping, power line inspection, target drones[1702]
  - Shown at 2019 Changchun Airshow[1703]
  - Appears to be also manufactured by HWA Create [北京华力创通科技股份有限公司] aka "Huali Chuantong" [华力创通][1704] a listed, private company specializing in defense technology, possible relationship with CIOMP[1705]
- CH-12 Hex-rotor UAV[1706]
  - Marketed for disaster relief or high-altitude border patrol due to ability to operate in extreme conditions[1707]
- B-24 vector multi-rotor drone [矢量多旋翼无人机]

Notable Relationships

- NORINCO: Cooperative relationship
  - The institute's UAV research department has a cooperative relationship with the company[1708]
- CAS Innovation Academy for Light-duty Gas Turbines [中国科学院轻型动力创新研究院]
  - CIOMP was a co-construction unit for this CAS Institute of Themophysics entity[1709]

Known Subsidiaries

- Changchun Changguang Boxiang UAV Co., Ltd. [长春长光博翔无人机有限公司/长光博翔] [1710]
  - Founded in 2021 with a focus on UAV development and production

Directly Subordinate Organizations

- Basic Research Management Office [基础科研管理处部门职责][1711]
  - Responsible for resource acquisition and process management of basic and forward-looking scientific research projects; innovation planning, and supervision; academic exchange work and operation and management of national key laboratories and provincial and ministerial laboratories
  - The main external contacts the department liaises with are:
    - National Natural Science Foundation of China
    - MOST

        - Chinese Academy of Sciences Frontier Bureau and Bureau of Important Tasks (civilian part),
        - MIIT (basic research part), Key Laboratory Division of the Planning Bureau, and the Jilin Provincial Department of Science and Technology.
- Unmanned Aerial Vehicle Research Department [无人飞行器研究部] (see above for details)
    - UAV Research Laboratory [无人机研究室][1712]
    - Precision Guidance Laboratory [精确制导研究室]

Key Personnel

- Zhang Xuejun [张学军]: Director and Doctoral Supervisor[1713]
- Jin Hong [金宏]: Deputy Director and Party Secretary[1714]

Aliases

- CIOMP

Website

- https://ciomp.cas.cn/

Subordinate to

- CAS

Addresses

- Changchun Institute of Optics, Fine Mechanics and Physics, No. 3888, Dongnan Huda Road, Changchun, Jilin [吉林长春 东南湖大路 3888 号 中国科学院长春光学精密机械与物理研究所][1715]

NANJING UNIVERSITY OF AERONAUTICS AND ASTRONAUTICS

Overview: Nanjing University of Aeronautics and Astronautics (NUAA) [南京航空航天大学] started to research UAVs in 1958, with UAV model development underway in 1968.[1716] In 1979, the NUAA UAV Research Institute, the first professional UAV research institute in China, was established with the approval of the former Third Ministry of Machinery Industry, codenamed the "362 Research Institute." In 1993, the institute was identified as a key aviation research institute by the National Defense Science and Technology Commission. In 2015, the NUAA was approved to construct the Ministry of Industry and Information Technology Key Laboratory of Advanced Technology for Small and Medium-sized UAVs.

Notable Relationships

- Low-altitude Economic Innovation and Development Alliance [低空经济创新发展联盟]: co-organized by NUAA
  - Launched in January 2024, the alliance comprises 12 universities, including Zhejiang University, Shanghai Jiaotong University, Southeast University, Xiamen University, and Shandong University, and 28 research institutes and enterprises including China Electronics Technology Group, AVIC, CASIC, and JD Logistics[1717]
- China Helicopter Research and Design Institute [中国直升机设计研究所]
  - Jointly manage DSTKL of Helicopter Rotor Dynamics [直升机旋翼动力学国防科技重点实验室][1718]

Known Subsidiaries

- Nanjing Changkong Technology Co., Ltd.[南京长空科技有限公司]
  - Wholly owned subsidiary, mainly engaged in the research and development, manufacturing, system integration, sales and social services of UAV systems, market capitalization of approximately 5 million RMB (about $713,000)
  - Produces two series of UAVs, civil drones "Hongyan" [鸿雁] and military drones "Sharp Eagle" [锐鹰], a total of seven types of drones[1719]
  - The company "shares the talent team, R&D platform and trial production conditions of Nanjing University of Aeronautics and Astronautics UAV Research Institute"[1720]

Directly Subordinate Organizations

- MIIT Key Laboratory of Advanced Technology for Small and Medium-sized UAVs [中小型无人机先进技术工信部重点实验室][1721]
- State Key Laboratory of Mechanics and Control for Aerospace Structures [机械结构力学及控制国家重点实验室]
  - Key Laboratory of Intelligent Materials and Structures in Aviation Science and Technology [智能材料与结构航空科技重点实验室]/Institute of Smart Materials and Science [智能材料与结构研究所][1722]

- Originally approved by AVIC in 1997; since 2011, it has been one of the five departments of the State Key Laboratory of Mechanics and Control for Aerospace Structures approved that same year

Key Personnel

- Xiong Ke [熊 克]: Professor, doctoral supervisor, director of the State Key Laboratory of Mechanics and Control for Aerospace Structures[1723]
  - Xiong is also a member of the CMC Equipment Development Department's Unmanned Systems Technology Specialist Group [无人系统技术专业组]
- Yuan Shenfang [袁慎芳]: Director, NUAA Institute of Smart Materials and Science[1724]
- Qiu Lei [邱 雷]: Deputy Director, NUAA Institute of Smart Materials and Science[1725]
- Wang Jing [王 婧]: Deputy Director, NUAA Institute of Smart Materials and Science[1726]
- Ji Hongli [季宏丽]: Branch Secretary, NUAA Institute of Smart Materials and Science[1727]

Year Established: 1952

Aliases

- Nanhang University [南航大学] [1728]
- Nanhang [南航]

Website

- https://www.nuaa.edu.cn/

Subordinate to

- MIIT

Addresses[1729]

- Ming Palace Campus: No. 29, Yudao Street, Qinhuai District, Nanjing, Jiangsu Province, Postal Code: 210016 [明故宫校区：江苏省南京市秦淮区御道街 29 号 邮政编码: 210016]
- Jiangjun Road Campus: No. 29, Jiangjun Avenue, Jiangning District, Nanjing, Jiangsu Province, Postal Code: 211106 [将军路校区：江苏省南京市江宁区将军大道 29 号 邮政编码: 211106]
- Tianmu Lake Campus: No. 29, Binhe East Road, Liyang, Jiangsu Province, Postal Code: 213300 [天目湖校区：江苏省溧阳市滨河东路 29 号 邮政编码: 213300]

Nanjing University of Aeronautics and Astronautics UAV Research Institute

Overview: The Nanjing University of Aeronautics and Astronautics (NUAA) UAV Research Institute [南京航空航天大学无人机研究院], also known as the 362 Research Institute [362 研究所], has successfully developed 29 different types of UAVs.[1730] As of late 2018, the UAV Research Institute had around 260 employees, including more than 100 professional and technical personnel, 50 senior-level professional, and 62 specialists with a master's degree or above.[1731]

Notable UAV Products

- Changkong Series [长空系列型号][1732]
  - Series of medium and high-altitude drones developed by Nanhang university from the 1950s through the 1980s used primarily as target UAVs.[1733]
    - Chang Kong Number Unmanned Sampling Machine［“长空一号”无人驾驶取样机][1734]
      - Used for nuclear testing sampling[1735]
- Eagle Series [飞鹰系列型号][1736]
- Foreign Trade Model Series [外贸系列型号][1737]
- Hongyan Model Series [鸿雁系列型号][1738]
- “Flying Bird [“翔鸟”] series[1739]
- Changjian [长箭] series[1740]
- Ruiying FX UAV Systems Series [锐鹰 FX 系列][1741]
- FX 70 UAV System [锐鹰 FX70 无人机系统]
  - Tactical reconnaissance UAV system that is the basis for a series of UAVs produced by NORINCO:
    - Used by PLA Ground Forces[1742]
    - Ruiying FX500 [锐鹰 FX500], aka “Sky Saker,” high speed UAV system intended for rapid reconnaissance and missile targeting.[1743] The UAV can quickly penetrate adversary airspace at speeds of up to 800 km/hour and transmit positioning of targets at a distance as far removed as 300 km in real-time.
      - Used by PLA Ground Forces[1744]
  - FX series military trade drone [锐鹰 FX 系列军贸无人机],
    - Includes FX70 military trade UAV system［锐鹰 FX70 军贸无人机系统],[1745] a possible version of Sky Saker [1746]
  - FX3/FX6 [锐鹰 FX3/FX6 单兵便携式无人机系统] [1747]
    - Possibly also known as “Sky Saker” [1748]
    - NORINCO is involved in production[1749]
    - Used by PLA Ground Forces[1750]

Notable Relationships

- NORINCO: UAV industry cooperation agreement
  - Signed in March 2021, but the two entities appear to have a long history of cooperation with NUAA designing FX UAV Systems Series produced and sold by NORINCO[1751]

- Zhejiang Provincial Party Committee, Military-Civil Fusion Office [浙江省委军民融合办]: participated in Jiangsu-Zhejiang low-altitude economic school-enterprise exchange meeting organized by the Institute[1752]
- Shandong Binzhou High-tech Zone [山东滨州高新区] – signed a UAV industry cooperation agreement with NUAA in December 2023[1753]
- AVIC Changfei［航空工业昌河飞机工业（集团）有限公司/昌飞公司］cooperated on projects
- PLA Nuclear Test Base, NUAA UAV institute donated a Changkong UAV [“长空一号”无人驾驶取样机/核试验取样机] to this base in August 2024[1754]
- Numerous contacts with PLA units/has participated in exercises, drills and flight support missions[1755]

Known Subsidiaries:

- Nanjing Changkong Technology Co., Ltd.[南京长空科技有限公司], commonly referred to as “Changkong Technology” [长空科技] works closely with NUAA UAV Research Institute to design and produce UAVs[1756]
  - A wholly owned subsidiary of NUAA, if not part of the Institute itself, Nanjing Changkong Technology Co., Ltd shares the talent team, R&D platform and trial facilities of the institute. [1757] The company bears the name of the first series of UAVs developed by NUAA.
  - Products:
    - Seven UAVs across two series: the miltary export Ruiying [锐鹰] and the civil “Hongyan”[1758]
  - Subsidiary/subordinate entities:
    - Pukou Civil UAV Base [南京市浦口民用无人机基地（含空域）]in Nanjing was built and maintained by the company. [1759]
    - Binzhou Changkong Technology Co., Ltd. [滨州长空科技有限公司][1760] (49%)
  - Year established: 2018[1761]
  - Pages on NUAA site:
    - https://zcgs.nuaa.edu.cn/2021/1025/c18328a317905/page.htm
    - https://zcgs.nuaa.edu.cn/njzkkjyxgs/list.htm
  - Other names:
    - Nanjing Changkong Technology Co., Ltd. [南京长空科技公司]
    - Changkong Technology [长空科技][1762]
    - Changkong Technology Company [长空科技有限公司][1763]
    - Nanjing Changkong Technology [南京长空科技][1764]
  - Address: 1st and 2nd Floor, Building 2, No. 88 Pubin Avenue, Jiangpu Street, Pukou District, Nanjing [南京市浦口区江浦街道浦滨大道 88 号 2 号楼一层二层][1765]

Directly Subordinate Organizations

- UAV Institute Research Laboratory [无人机研究院研究室][1766]
- Nanjing Civil Unmanned Aerial Vehicle Test Area/Nanjing Test Area [南京民用无人驾驶航空试验区/南京试验区] (operated by subsidiary Nanjing Changkong)
    - Since its establishment in 2005, the Test and Flight Center has participated in the joint test and test and flight work of various UAV platforms. It mainly includes the scientific research test flight, bidding, delivery and after-sales service of the Hongyan series, the target supply guarantee of the Changkong series, and the scientific research test flight, delivery flight and after-sales service of the Feiying series.
- MIIT Key Laboratory of Advanced Technology for Small and Medium-sized UAVs [中小型无人机先进技术工信部重点实验室][1767]
- UAV Research Institute Development Plant [无人机研究院研制厂][1768]
- UAV Research Institute Test and Flight Center [无人机研究院试验试飞中心/试验试飞中心][1769]

Key Personnel

- Gao Xiaoze [高小泽]: Party Secretary[1770]
- Yan Xuefeng [燕雪峰]: Deputy Party Secretary, Dean and Director[1771]
- Yang Bo [杨波]: Deputy Party Secretary, Vice President, Executive Deputy General Manager[1772]
- Wei Wei [魏威]: Vice President, Deputy General Manager
- Zhan Fengjiang [展凤江]: Chief Engineer (Deputy Division Level), Technical Director
- Deng Haiqiang [邓海强]: Vice President, Deputy General Manager, Director of Platform R&D Department
- Wang Yang [王阳]: Assistant to the Dean, Director of the Strategic Planning and Development Department
- Guo Jiandong [郭剑东]: Assistant to the Dean, Director of the Strategic Planning and Development Department
- Cao Limin [操李敏]: Ruiying FX3/6 chief designer[1773]
- Deng Haiqiang [邓海强]: Model Chief Designer [型号总师] and Ruiying FX70 chief designer (the latter as of 2022 at least) [1774]

Year Established:

- 1979 (for the original Nanjing UAV Research Institute [南航无人机研究所])[1775]
- 2000 (for the UAV Research Institute [无人机研究院]) [1776]

Aliases

- 362 Research Institute [362 研究所][1777]
- UAV Research Institute[1778]
- UAV Institute [无人机院][1779]
- Nanjing UAV Research Institute [南航无人机研究所][1780] (1979-2000?)

Website

- https://uav.nuaa.edu.cn/

Subordinate to

- NUAA

Addresses

- Unmanned Aerial Vehicles Research Institute, No.8 Li Fu Street, Qin Huai District [南京市秦淮区李府街 8 号无人机研究院][1781]

TONGJI UNIVERSITY, SHANGHAI INTELLIGENT UNMANNED SYSTEMS SCIENCE CENTER

Overview: The Tongji University, Shanghai Intelligent Unmanned Systems Science Center [上海自主智能无人系统科学中心] seeks to accelerate the development of unmanned systems, including through the application of artificial intelligence. The Center, which was established with Tongji University as its foundation, opened on December 17, 2018.[1782] The Center undertakes research in areas such as using meta-material sensors, natural computing, biomechanical and electrical integration, and autonomous systems. Among the Center's objectives are to "build unmanned system application technology research and development platforms." The Center is primarily focused on AI and other emerging technology areas but has also developed prototypes of unmanned platforms.

Notable UAV Products

- Tongji Flying Fish [同济飞鱼]: flying submersible drone co-developed with Chinese University of Hong Kong[1783]
  - This prototype amphibious aircraft drone is designed to operate as both a UAV and an unmanned underwater vehicle (UUV), able to navigate freely between water and air domains. The cross-domain vehicle is intended for detection (surveillance) and disaster relief missions. The vehicle, which weighs only 1.6 kg (about 3.6 lbs) uses a quadcopter rotor system with a sea-air dual-purpose propulsion system and a rudder tilting mechanism[1784]

Notable Relationships:

- Chinese People's Political Consultative Conference, Education, Science, Health and Sports Committee: May 30, 2023, delegation visit[1785]
  - Focused on "improving the new national system for tackling key core technologies"

Directly Subordinate Organizations:

- The Center has three research directions:[1786]
  - Basic research
  - Key Technologies
    - Includes smart sensors, unmanned terminals, intelligent controllers and operating systems
  - Industrial Applications

Key Personnel

- Pan Yunhe [潘云鹤]: Director of Center academic steering committee, Academician, Chinese Academy of Engineering

Website

- https://srias.tongji.edu.cn/

Subordinate to

- Tongji University

Address

- Building 17, Lane 55, Chuanhe Road, Shanghai [上海市川和路 55 弄 17 号楼][1787]

HUZHOU INSTITUTE OF ZHEJIANG UNIVERSITY

The Huzhou Institute of Zhejiang University [浙江大学湖州研究院], which is also supported by the Huzhou City government, has an Intelligent Mobile Unmanned System Technology Zhejiang Engineering Research Center [智能移动无人系统技术浙江省工程研究中心] and a Huzhou Key Laboratory of Intelligent Unmanned Systems [湖州市智能无人系统重点实验室].[1788] The Institute's Intelligent Unmanned Systems section also has an Intelligent Aircraft Technology Research Center [智能飞行器技术研究中心] and an Aerospace Robotics Technology Research Center [空天机器人技术研究中心], among several other UAS research organizations.[1789]

The Intelligent Mobile Unmanned System Technology Zhejiang Engineering Research Center, which may have or be referred to as the Zhejiang University Huzhou Institute Intelligent Mobile Unmanned System Technology Zhejiang Engineering Research Center Laboratory [浙江大学湖州研究院智能无人系统省级工程研究中心实验室], developed the Rofly air-ground dual-mode mobile robot [Rofly(优飞)空地双模移动机器人], which does not rely on satellite guidance.[1790] The Institute also developed a folding portable UAV that can fit in a pocket.[1791]

The Institute's address is Building B2, Science and Technology Innovation Complex, South Taihu New District, No. 819 Xisaishan Road, Huzhou, Zhejiang [湖州市西塞山路 819 号南太湖新区科技创新综合体 B2 幢].[1792]

Zhejiang University's School of Aeronautics and Astronautics [浙江大学航空航天学院] has an Institute of Intelligent Unmanned Systems [智能无人系统研究所], as well as the following Zhenjiang provincial research platforms: Zhejiang Intelligent UAV System Collaborative Innovation Center [浙江省智能无人机系统协同创新中心], Zhejiang Provincial Key Laboratory of UAV Technology [浙江省无人机技术重点实验室], Zhejiang Engineering Research Center for Advanced UAV Technology [先进无人机技术浙江省工程研究中心] and Zhejiang New Aircraft Key Foundation and Major Application Collaborative Innovation Center [浙江省新型飞行器关键基础与重大应用协同创新中心].[1793] The School is located at No. 38, Zheda Road, Hangzhou, Zhejiang Province [浙江省杭州市浙大路 38 号].[1794]

PLA Academic Institutions

In June 2017, the PLA undertook a major consolidation of its academic institutions, reducing the total number from 67 to 37 institutions.[1795]

As with other military higher education institutions, these universities offer a wide range of technical and social science disciplines. Several, however, offer courses of study in UAV design, systems, engineering, training, testing and/or tactical application.

National University of Defense Technology

Overview: NUDT [国防科技大学] is the PLA's leading institution devoted to scientific research and learning. NUDT is the only military university selected for the Ministry of Education's 985 project [985 工程) project], launched in 1998 and its successor, the double first-class construction [双一流建设] program.[1796] In 1999, the CMC designated NUDT as a comprehensive university [综合大学] offering a full range of courses in engineering, military science, science, management, and the humanities.[1797]

Within NDUT, the two colleges seemingly most involved in research and testing of UAVs are the College of Intelligence Science and Technology [智能科学学院] and College of Aerospace Science [国防科大空天科学学院].

In addition to its research efforts, NUDT collaborates with other military universities, civilian institutions, societies, and enterprises to organize forums on defense technology issues.

Notable Relationships

- Hosts International Guidance, Navigation and Control Conference [国际制导、导航与控制学术会议] with the following partners:[1798]
  - Chinese Society of Aeronautics and Astronautics, Guidance, Navigation and Control Branch
  - Beihang University, National Key Laboratory of Integrated Aircraft Control [飞行器一体化控制全国重点实验]

Directly Subordinate Organizations

- Multiple "Colleges" [学院] the most relevant of which for UAV research and development are:
  - College of Intelligence Science and Technology [智能科学学院]
  - College of Aerospace Science [国防科大空天科学学院]

Key Personnel

- Fu Aiguo [傅爱国]: Political Commissar[1799]
- Niu Yifeng [牛轶峰]: College of Mechanical and Electrical Engineering

- Vice Chairman, International Conference on Unmanned Autonomous Systems (ICAUS) [国际自主无人系统大会][1800]

Year Established: 1953, 1978 (current iteration)

Aliases

- NUDT [国防科大]

Website

- www.nudt.edu.cn

Subordinate to

- PLA Central Military Commission[1801]

Addresses

- Main campus: No. 3 Courtyard, National University of Defense Technology, Changsha, Hunan Province (No. 1, Fuyuan Road, Kaifu District) [湖南省长沙市国防科技大学三号院(开福区福元路 1 号)][1802]

NUDT College of Intelligent Science

Overview: The NUDT College of Intelligent Science [国防科大智能科学学院] originated from the disciplines of winged missile automatic control, flight navigation, shooting and flight testing, and detonation control under the Harbin Military Engineering College, and then as a mechanical and instrument processing technology and equipment during the period of Changsha Institute of Technology. In 2006, the college was rated as an advanced unit for talent training for the whole PLA.[1803] The College has an Unmanned Systems Institute [无人系统研究所] that may focus on the development of autonomous intelligence and machine learning for UAVs.[1804]

Since 2017, the primary mission of the College of Intelligent Science is to "meet the major strategic needs of intelligent unmanned combat, with a focus on artificial intelligence, biological intelligence, and hybrid intelligence, and to be a pioneer in talent training and scientific research in these fields."[1805] The College currently offers five undergraduate majors, including unmanned equipment engineering, unmanned combat engineering, navigation engineering, mechanical engineering, and measurement and control technology and instruments.[1806] The College's Engineering Technology Training Course Group offers a drone design course in which NUDT students plan and create prototypes of their own UAVs.[1807] In addition to UAV technology, the college also carries out research on autonomous car technology.

In researching UAV technology, the school also appears to be involved in military applications and innovations of the technology, including the use of UAV "swarms through tests, student competitions, and exercises.[1808] For example, in 2017, then Dean of the College of Intelligent

Science Shen Lincheng stated that research team at the school performed over 100 flight tests per day for a nine-month experiment on autonomous UAV swarm flight and sensing under complex conditions.[1809]

Notable Relationships:

- International Conference on Unmanned Autonomous Systems (ICAUS) [国际自主无人系统大会]
  - NUDT's UAV Research Institute is one of several organizers of this event hosted by major players in the UAV industry including CASIC, NORINCO, and NWPU[1810]

Directly Subordinate Organizations

- Department of Intelligent Machinery and Instruments
- Unmanned Systems Research Institute [无人系统研究所]
  - This institute may focus on AI/ML development for unmanned systems
    - NUDT professor and former institute director Xu Xin's [徐昕] research focuses on autonomous control of unmanned systems and machine learning[1811]
    - In October 2020, Xu visited Guangxi University of Science and Technology and gave a talk on his research findings on "autonomous intelligence of unmanned systems, the intelligent perception of unmanned systems based on biological inspiration, and the traffic signals of unmanned systems based on deep networks and ultra-limited learning"[1812]
    - Another former institute director Zhu Huayong [朱华勇] has lectured on UAV swarms and collective intelligence
- Engineering Technology Training Course Group [《工程技术训练》课程组]
- UAV Systems Innovation Team [无人机系统创新团队][1813]

Key Personnel

- MG Shen Licheng [沈林成]: former Dean of School, now Dean of NUDT Graduate School
  - Group Leader, EDD Unmanned Systems Technology Specialist Group [无人系统技术专业组][1814]
  - Chairman, International Conference on Unmanned Autonomous Systems (ICAUS) [国际自主无人系统大会][1815]
- Xu Xiaojun [徐小军]: Director, Department of Intelligent Machinery and Instruments
- Xu Xin's [徐昕]: Professor, specializes in machine learning and unmanned systems
- Xian Xiaojia [相晓嘉]: Researcher
  - Teaches virtual course on "Intelligent Unmanned Combat" [智能无人作战] to the Eastern Theater Command, with over 700 participants[1816]

Website

- https://www.nudt.edu.cn/yssz/ktkxxy/index.htm

Subordinate to

- NUDT

Addresses

- No .1 Professor's Courtyard, No. 1, Fuyuan Road, Kaifu District, Changsha, Hunan, [1 号教学园区 ,开福区福元路 1 号][1817]

NUDT College of Aerospace Science

Overview: The NUDT College of Aerospace Science [国防科大空天科学学院] emerged out of the Missile Engineering Department of Harbin Institute of Technology that was founded in 1958.[1818]

The College has a UAV Combat Systems Innovation Team that performs UAV testing and simulations as well as directly supporting PLA units in the field. According to a January 2023 *PLA Daily* [解放军报] article, researchers from the school embedded with units during a live-fire exercise to orient research and development of intelligent systems to actual combat circumstances.[1819]

Notable Relationships

- PLA 74th Group Army, Southern Theater Command
  - Team participated in a combat exercise at the army's training ground in February 2023, during the drills team members instructed troops on operating "a certain type of intelligent combat unit," and monitored cloud data collected by UAVs[1820]

Figure 20: Members of the NUDT Unmanned Combat Systems Innovation Team participate in a field exercise[1821]

Directly Subordinate Organizations

- NUDT Unmanned Combat Systems Innovation Team [无人作战系统创新团队]
  - This team undertakes testing and simulation, as well as directly participating in combat training and exercises to support the use of UAVs for battlefield missions
  - Areas of focus may include assembly, repair and debugging, command and control of UAVs/UAV swarms, on the battlefield for reconnaissance, strike, and defense missions
  - A 2022 *PLA Daily* article notes the team supported 74th Group Army (Southern Theater Command) training exercises in February 2023[1822]
  - A 2023 *Science and Technology Daily* [科技日报] article describes the team as performing range testing for weapons, communication and surveillance equipment in the Gobi Desert[1823]

Key Personnel

- Hou Zhongxi [侯中喜]: Team Leader, NUDT Unmanned Combat Systems Innovation Team[1824]

NANJING RESEARCH INSTITUTE OF SIMULATION TECHNOLOGY

Overview: Historically, the Nanjing Research Institute of Simulation Technology (NRIST) [南京模拟技术研究所] reported directly to the Central Military Commission's (CMC) General Staff Department (GSD) and was also known as the 60th Research Institute of the CMC General Staff Department.[1825] Although the GSD was superseded by the Joint Staff Department in the 2016 reforms, the institute continues to use this name in its materials and remains "directly under the leadership of the general staff," perhaps under the CMC Joint Staff Department that superseded the GSD.[1826] NRIST has four main product pillars: UAV systems, live-fire training systems, simulation training systems, and target range systems.[1827] The institute has over 400 science and technology specialists from various fields, including nearly 100 experts with special allowances from the State Council.

Notable UAV Products

- Z-series of unmanned helicopters[1828]
  - Z-3[1829]
  - Z-5B/G Unmanned Helicopter
    - Displayed at Sixth China (Beijing) Military Intelligent Technology Expo, September 2020, marketed as usable in high-altitude or "plateau" conditions[1830]
- W-series of UAVs[1831]
  - W-50
  - W-60
- S-series[1832]
  - S-80 remote-controlled target drone
  - S-200 target drone
  - S-300 high-speed drone
- I-series[1833]
  - I-50 simulated target drone
  - II-70 remote-controlled target drone

Notable Relationships:

- NRIST has provided training for over 600 clients in the defense and public security sectors, including:[1834]
  - Ministry of Public Security [公安部]
  - People's Public Security University of China [中国人民公安大学]
  - Beijing Special Police Corps [北京特警总队]
  - Xinjiang Anti-Terrorism Corps [新疆反恐总队]
  - Beijing Police College [北京人民警察学院]
  - Jiangsu Police College [江苏警官学院]

- Shanghai Police [上海公安高专]
- PLA Chongqing Garrison [重 庆警备区]
- PLA Nanjing Garrison [南京警备区]
- Wuhan Public Security Bureau [武汉市公安局]
- Beijing Public Security Bureau [北京市公安局]
- Shanghai Public Security Bureau [上海市公安局]
- Kunshan [Jiangsu province] People's Armed Forces [昆山人民武装部]

- Zhengzhou Jinxuanfeng Aviation Sports Equipment Co., Ltd. [郑州劲旋风航空运动器材有限公司]
  - Company website states it has produced UAVs for NRIST and other military entities and defense universities[1835]

Directly Subordinate Organizations

- The institute has six departments, including:[1836]
  - Unmanned helicopters
    - Unmanned helicopter semi-physical simulation laboratory[1837]
  - Target drones
  - Aircraft engines
  - Live-fire training systems
  - Police shooting ranges
  - Light UAV flight test base[1838]

Key Personnel

- Liu Yangming [刘阳明]: business manager[1839]

Year Established: 1993 (current iteration)[1840]

Aliases

- PLA GSD 60th Research Institute [解放军总参谋部第六十研究所][1841]

Website

- nrist.com (defunct; archived here: https://web.archive.org/web/20240527054700/https://nrist.com/)

Subordinate to

- PLA CMC
  - CMC Training Management Department [中央军事委员会训练管理部][1842]

Address

- No. 766, Zhujiang Road, Nanjing, Jiangsu [江苏省南京市珠江路 766 号][1843]

AIR FORCE ENGINEERING UNIVERSITY

Air Force Engineering University, Equipment Management and UAV Engineering College

Overview: The Equipment Management and UAV Engineering College [装备管理与无人机工程学院] is a deputy division-level college under the Air Force Engineering University (AFEU) [空军工程大学]. The Equipment Management and UAV Engineering College focuses on training Air Force engineering and technical officers who are engaged in aviation maintenance quality control, safety supervision, maintenance, and plan management.[1844] The College has three major disciplines: engineering, management studies, and military science. The college seeks to serve the military as a leader in the fields of equipment support theory, equipment systems engineering, equipment information management, equipment procurement management, equipment economic management, and equipment safety engineering.[1845]

The College offers a specialty in Unmanned Equipment Engineering [无人装备工程] with a direction in UAV Maintenance Support Technology and Command [无人机维护保障技术与指挥].[1846]

Notable Relationships

- Northwestern Polytechnical University (NWPU): Co-founded UAV DSTKL
  - AFEU partnered with NWPU and AVIC Chengdu Aviation Design and Research Institute to establish the State Key Laboratory of Unmanned Aerial Vehicle Technology [无人飞行器技术全国重点实验] at NWPU[1847]
  - School of Management: Delegation Visit: two professors and a staff officer from the AFEU Equipment Management and UAV Engineering College visited the NWPU School of Management to exchange views on the construction of management science and engineering disciplines, and postgraduate training[1848]

Directly Subordinate Organizations

- Aerospace Combat and Equipment Application Research Center [科研部空天作战与装备运用研究中心][1849]
- Computer Teaching and Research Lab[1850]

Key Personnel

- Zhang Fengming [张凤鸣]: Professor, Control Science and Engineering [控制科学与工程][1851]
- Guo Jiansheng [郭建胜]: Professor, Control Science and Engineering
- Wang Ying [王瑛]: Professor, Control Science and Engineering
- Hu Jianbo [胡剑波: Professor, Control Science and Engineering
- Ru Le [茹 乐]: Professor, Control Science and Engineering
- Zhou Zhongliang [周中良]: Associate Professor, Control Science and Engineering
- Lian Xiaoan [梁小安]: Professor, Military Equipment Studies [军事装备学]

- Chen Yunxiang [陈云翔]: Professor, Management Science and Engineering
- Liu Xiaodong [刘晓东]: Professor, Management Science and Engineering
- Xu Jihui [徐吉辉]: Professor, Management Science and Engineering
- Wang Qiang [王强]: Professor, Management Science and Engineering
- Li Shanshan [李姗姗]: Staff Officer

Aliases

- AFEU [空工大]

Website

- https://www.afeu.cn/

Subordinate to

- Air Force Engineering University

Addresses

- Located on AFEU's main campus at Jiazi No. 1, Changle Dong (East) Road, Baqiao District, Xi'an, Shaanxi Province [陕西省西安市灞桥区长乐东路甲字 1 号][1852]

APPENDIX: OTHER MIXED OWNERSHIP OR PRIVATE CHINESE DEFENSE OR DUAL-USE UAV COMPANIES

The following list identifies companies encountered in the research for this project that are likely involved in or have been involved in military or dual-use UAV production. It is provided for reference only. Brief profiles of many of these entities can be found in Andrew W. Hull's and David R. Markov's June 2020 CASI report on "'Private' Chinese Aerospace Companies."[1853]

- Aerospace Hongtu [航天宏图]
- Baoan Enterprise Huaxun Ark Co., Ltd [宝安企业华迅方舟有限公司]
- Beijing Chunyi Aviation Technology Co., Ltd [北京淳一航空科技有限公司]
- Beijing Lizheng Technology Co., Ltd. [　北京历正科技有限责任公司]
- Beijing Ruixinfeng Technology Co., Ltd. (RINFON) [北京睿信丰科技有限公司]
- Beijing Zhengtang Technology Co., Ltd. [北京正唐科技有限责任公司]
- Chengdu Hermes Technology Co., Ltd [成都赫尔墨斯科技股份有限公司]
- Chengdu JOUAV Automation Co., Ltd. [成都纵横自动化技术有限公司]
- Chongqing Yifei Zhilian Technology Co., Ltd. [重庆市亿飞智联科技有限公司]
- Eagle Brother UAV Co., Ltd. [深圳天鹰兄弟无人机创新有限公司]
- Flying Eye Drone Technology Co., Ltd [飞眼无人机科技有限公司]
- GFA Aviation Technology Beijing Co. Ltd. /Beijing Jinpengda Aviation Technology Co., Ltd [航空科技北京有限公司 /北京金朋达航空科技有限公司]
- Guilin Hanglong Kexun Electronics Technology Co., Ltd. [桂林航龙科讯电子技术有限公司
- Guilin Xinying Electronic Technology Co., Ltd. [桂林鑫鹰电子科技有限公司]
- Jincheng Aviation [锦程航空]
- Keyuan Airplanes [科源飞机]
- Hangzhou Ruijie Intelligent Air Robot Technology Co., Ltd [杭州睿杰智能空中机器人科技有限公司]
- Hanhe Aviation [无锡汉和]
- Henan SunHawk Aviation Industry Co., Ltd. [河南三和航空工业有限公司]
- HWA Create [北京华力创通科技股份有限公司]
- Jiangsu TANYO Aviation Technology Group Co., Ltd [江苏天域航空科技集团股份有限公司]
- Kangde New Composite Material Group Co. Ltd. [康得新复合材料集团股份有限公司]
- Langxing UAV System Co., Ltd. /Star UAV System Co., Ltd [朗星无人机系统有限公司]
- Mugin UAV [麦金有限公司]

- Qinghang Equipment [清航装备]
- Qihang Launching Technology Co., Ltd. [启航弹射科技有限公司]
- Qingdao Hong Biachuan Metal Precision Products Co., Ltd. [青岛宏百川金属精密制品有限公司]
- Shanghai Terjin [上海特金]
- Shanghai UVS Intelligent System Co., Ltd. [上海优伟斯智能系统有限公司]
- Shenyang Woozoom Technology Co., Ltd. [沉阳 Woozoom 科技公司]
- Shenzhen Huaye Agricultural Aviation Technology Co., Ltd. [深圳市华业农业航空技术有限公司]
- Shenzhen Huimingjie Technology Co., Ltd. [深圳市慧明捷科技有限公司]
- Shenzhen Yidian Aviation Technology Co., Ltd. /AEE Aviation Technology Co., Ltd. [AEE 深圳一电航空技术有限公司
- Sichuan AOSSCI Technology Co., Ltd. [四川傲势科技有限公司]
- Sichuan Xinwanxing Carbon Fiber Composite Materials Co., Ltd [四川省新万兴碳纤维复合材料有限公司]
- Sichuan Zhonglian Hangtai Technology Co., Ltd [四川众联航泰科技有限公司]
- Suzhou Changfeng Instruments Company Ltd [苏州长风航空电子有限公司]
- Tianjin Aurora UAV Technology Co., Ltd. [天津曙光敬业科技有限公司]
- Wuhan AIbird UAV Co., Ltd. [武汉爱鸟无人机有限公司]
- Wuhan Global Sensor Technology Co., Ltd. (GST) [武汉高芯科技有限公司]
- Xiamen Origin Drones Technology Co., Ltd. [厦门天源欧瑞科技有限公司]
- X-Control System Co., Ltd [北京艾肯拓科技有限公司]
- Xi'an Binguo Intelligent Aviation Technology Co., Ltd [西安冰果智能航空科技有限公司]
- Xi'an Kewei Aerospace Science and Technology Group Co., Ltd. [西安科为航天科技集团有限公司]
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- Xi'an Zhongtian Feilong Intelligent Technology Co., Ltd. / Xi'an Zhongtian Guide Control Co., Ltd [西安中天飞龙智能科技有限公司 /中天引控科技股份有限公司]
- Yuandu Technology [远度科技]
- Zero Tech [零度智控 (北京) 智能科技有限公司]
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