

The China AI and Autonomy Report

A biweekly newsletter on AI and autonomy developments in China

Welcome to the inaugural edition of the *China AI and Autonomy Report*, a biweekly newsletter published by CNA. In this and future editions, we will keep you informed of important news, developments, and policies regarding artificial intelligence (AI) and autonomy in the People's Republic of China (PRC). We welcome your questions, comments, or subscription requests at chinaai@cna.org.

In our first issue, we spotlight the 13th Zhuhai Airshow, which dominated much of the AI and autonomy news over the past two weeks. We also cover the PRC government's issuing of new regulations on algorithms, standardization, and the export of "core data," and the setup of new "intelligent social governance experimentation bases," which signal the Chinese Communist Party's (CCP's) further tightening of regulations on the tech industry. We also report on such topics as the PRC's AI market share and upcoming AI conferences and events.

We would also like to use this inaugural issue to promote a new CNA report by researchers Kevin Pollpeter and Amanda Kerrigan titled "[The PLA and Intelligent Warfare: A Preliminary Analysis](#)." The report presents PRC perspectives on the integration of AI and autonomy in future warfare activity.

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SPOTLIGHT: ZHUHAI AIRSHOW

The PRC held its 13th Zhuhai Airshow, formally known as Airshow China, from September 8 to October 3. According to [media reports](#), more than 100 aircraft were on exhibit as well as displays of the PRC's next-generation crewed rocket and heavy-lift launch vehicles, unmanned boats, and unmanned ground vehicles (UGVs).¹ The airshow featured a growing number of unmanned aerial vehicles (UAVs), demonstrating the PRC's commitment to becoming a leader in unmanned systems for both domestic use and export. Quoting People's Liberation Army (PLA) Air Force experts, the CCP's official newspaper, [People's Daily](#), stated that the large number of PRC aircraft displayed at the airshow demonstrates that the PLA Air Force is "crossing the threshold" to becoming a "strategic air force" [capable](#) of strategic deterrence, air and space defense, long-range strike, air control, strategic transport, and supporting land and naval operations.²

A new line of drones called "Feihong" (飞鸿) caught Western media attention.³ The Feihong series of drones is manufactured by the Ninth Academy of the China Aerospace Science and Technology Corporation (CASC), also known as the China Academy of Aerospace Electronics Technology (中国航天电子技术研究院). CASC is one of two large state-owned conglomerates normally involved in the development and manufacture of missiles, space-launch vehicles, and satellites. The expansion of CASC into the UAV field that would normally be dominated by PRC aviation giant Aviation Industry Corporation of China (AVIC) likely indicates the importance placed upon unmanned systems by the PLA and at least a tacit policy to allow competition in an emerging field.

According to a [CASC representative](#), the Feihong series of drones is a line of "highly autonomous" reconnaissance and strike UAVs that began to be developed in 2005 and has won the first prize of the National Defense Science and Technology Progress Award.⁴ The Feihong series of seven drones includes the [FH-901 "airborne swarm system,"](#) a loitering missile that may have been previously known as the CH-901; the [FH-902 "single soldier fixed wing UAV,"](#) which appears similar to the US Army's [RQ-11 Raven](#) lightweight unmanned aerial system; the FH-91 reconnaissance UAV; the FH-96 long-range UAV; the FH-92A reconnaissance/strike UAV; and the FH-95 medium/long-range UAV.⁵ According to Zhang Zhongyang, a vice president of CASC, the company plans to market the Feihong series internationally. According to another source, the FH-92A has been exported to 10 countries, including Serbia.⁶

The Feihong drone receiving the most attention is the FH-97. Many [observers](#) have pointed out the similar appearance of the FH-97 to the [Kratos XQ-58A Valkyrie](#), "an experimental stealthy unmanned combat aerial vehicle designed and built for the US Air Force" as part of a "[loyal wingman concept](#)" in which effective but lower-cost and attritable UAVs escort crewed aircraft.⁷

According to [PRC press reporting](#) articles, the FH-97 "adopts a fusion stealth layout" with a distributed synthetic aperture radar (SAR) and "intelligent skin antenna technology" that provide 360-degree optical and electronic reconnaissance coverage.⁸ The FH-97 is advertised as being able to operate fully autonomously in denied environments. The FH-97 has a [1,000-kilometer combat radius](#) and a 6-hour loitering capability.⁹ According to a [CASC representative](#), the FH-97 "can carry different types of weapons, and has swarm and electronic warfare capabilities."¹⁰

In an apparent comparison to the FH-97, Hong Kong's [South China Morning Post](#) reports that PRC engineers have assessed that the XQ-58A lacks sufficient aerial combat capabilities and can only withstand 1.7 gs. They note that maneuverability may have been sacrificed for weapons carriage and surveillance capabilities.¹¹

CASC's commitment to UAVs was also demonstrated by the static display of the Caihong (Rainbow) 6.

This was the first time that a full-scale mockup of the CH-6 was displayed at the airshow. [The Drive](#) carried extensive analysis of the CH-6, describing it as “a long-endurance, twin-jet engine, multirole drone” intended for reconnaissance and strike roles.¹²

In addition to listing the performance capabilities of the CH-6, the [China-Arms.com website](#) states that the CH-6 “can conduct high-altitude reconnaissance and strike, maritime anti-submarine and patrol, long-range early warning and detection, and close air support” with a “variety of loads such as electro-optical, SAR, early warning radar, electronic reconnaissance, air-to-ground missiles, air-to-ground bombs, anti-radiation missiles, and small- and medium-sized cruise bombs.”¹³

AVIC was also represented at the airshow with its line of “Wuzhen” (unmanned reconnaissance/无侦) UAVs. Drawing attention was the WZ-8. According to the [China-Arms.com website](#), AVIC describes the WZ-8 as “a high-altitude, high-speed unmanned reconnaissance aircraft’ used for reconnaissance and battle damage assessment that can also conduct ‘suicide’ attacks against targets.” The WZ-8 can be carried by HN-6 bombers and is powered by two rocket engines that enable it to reach speeds up to Mach 3 and operate at “near-space” altitudes.¹⁴

AVIC also displayed a mockup of the GJ-11 (Strike/攻击)-11 UAV. According to [Defense News](#), the GJ-11 “is believed to have been derived from AVIC’s Lijian (“Sharp Sword”) demonstrator project but featuring a whole host of low-observable improvements such as a blended fuselage and triangular air intake with shielded exhaust nozzles.” The mockup displayed two weapons bays that “were shown carrying four small bombs in the class of the GBU-39/53 Small Diameter Bombs in one of the bays, with the other incorporating what appears to be a 454-kilogram or 1,000-lb class weapon.”¹⁵

CETC Laisi Information System Co. Ltd. (中电莱斯信息系统有限公司) exhibited the “Airborne Formation Intelligent Operation Management and Command and Control System” (空中编队智能作战管理与指挥控制系统). The company, also known as the CETC 28th Research Institute, is a subsidiary of the PRC state-owned electronics conglomerate, China Electronics Technology Corporation (CETC). According to a [lead researcher](#), the company developed the military’s first command automation system during the “two bombs, one satellite” program that produced the PRC’s first nuclear weapons, ballistic missile, and satellite. The company is now involved in the development, production, maintenance, and service of command information systems for all services. Described as an “R2D2”-type system for pilot commanders, it provides decision support to pilots during air-to-air combat and can self-learn to adapt to new situations.¹⁶

Aircraft were not the only platforms displayed at the airshow. Unmanned boat manufacturer [Zhuhai Yunzhou Intelligent Science and Technology Co. Ltd. \(珠海云洲智能科技股份有限公司\)](#) displayed a number of its unmanned boats. They included the L30 unmanned patrol boat, the M75C unmanned training boat, the L85A unmanned general purpose boat, and the L90 unmanned underwater detection boat.¹⁷ The boats are designed to work in clusters and are described as being able to engage in autonomous decision-making and operate using distributed situational awareness. Zhuhai Yunzhou Intelligent Science and Technology Co. Ltd. [is described](#) as a private company founded in 2010 to pursue the unmanned boat market and is said to have formed the world’s largest unmanned boat R&D team. They have reportedly sold boats to more than 30 countries and regions.¹⁸

China North Industries Group Corporation Ltd. (NORINCO) [displayed](#) a number of tracked UGVs designed for ground assault and air defense. They included the UV-T10, which can be equipped with a 30mm cannon or a machine gun and two anti-tank missiles, and the ZDW01 reconnaissance vehicle armed with two Red Arrow-73C anti-tank missiles. NORINCO is a PRC state-owned defense conglomerate focusing on ground systems.¹⁹

OTHER NEWS

MILITARY AND NATIONAL SECURITY

The US Naval Institute (USNI) reports that the PLA Navy is testing uncrewed surface vessels (USVs) at a new base near Dalian. Based on an analysis of commercial satellite imagery, USNI identified two suspected USVs moored at the base. One appeared to be a larger version of the “JARI” USV, a 50-foot USV that was [reported](#) to have conducted sea trials in 2020. The new version is 70 feet long. The second USV is a catamaran, also approximately 70 feet long.²⁰

The director of the PRC Office of the National Border and Coastal Defense Commission, Wang Bin, wrote an article in the CCP’s official newspaper, *People’s Daily*, on his office’s intentions to build a smart border and coastal defense system through the use of 5G technology, the Internet of Things, cloud computing, and AI. Wang called for the establishment of new policies, the creation of think tanks, and the construction of transportation, power, and communications infrastructure to support the effort.²¹

AI POLICY AND GOVERNANCE

On September 26, the PRC published its first guidelines on AI ethics, which emphasize user rights and data control (see original document in Chinese from the MOST website [here](#)).²² One of the stated goals of the guidelines is to ensure that AI is “always under the control of humans.” According to the [South China Morning Post](#), the guidelines are part of the PRC’s effort to become the global AI leader by 2030, but they also align with Beijing’s efforts to crack down on Big Tech influence.²³ The guidelines were issued by the National Expert Committee for AI Governance of China, [which was established in 2019](#).²⁴

On September 29, the Cyberspace Administration of China (CAC) and seven other departments jointly announced a list of “national intelligent social governance experimentation bases.”²⁵ The bases have been established to carry out social governance experiments using AI. The announcement identifies various PRC provinces, municipalities, and districts to serve as “intelligent social governance experimental bases” on a variety of issues, including city administration, elder care, education, community governance, environmental governance, health and sanitation, and sports. The PRC often uses policy experimentation to test out a policy or initiative’s effectiveness in a local setting prior to wider adoption.

On September 29, national and municipal officials held a press conference about Shanghai’s 14th Five-Year Plan to build a science and technology innovation center with global influence.²⁶ The plan highlights AI as one of the core technologies of focus for Shanghai. In addition, during this period Shanghai is expected to facilitate the deployment of several strategic frontier technologies such as brain-computer interfaces and brain-like photonic chips.

On September 29, the CAC and eight other departments announced a plan to establish governance rules for algorithms over the next three years (see original document in Chinese [here](#)).²⁷ The announcement highlights that, despite the contributions of algorithms to China’s social development and digital economy, algorithms also affect “the normal communication order, market order, and social order” and “pose challenges to safeguarding ideological security, social fairness and justice, and the legitimate rights and interests of netizens.” As part of the plan, companies will be supervised to disclose the basic principles of algorithms and their optimization goals. The plan also seeks “open and transparent” algorithms and establishes technical teams to evaluate algorithm design. This announcement follows [an August announcement](#) of draft guidelines for algorithm regulations, which included proposals to allow users to easily turn off algorithm recommendation services and bar companies from setting up algorithm models that tempt users into spending large amounts of money (see original document in Chinese [here](#)).²⁸ [Parallels](#) have been drawn between the PRC’s desire to regulate algorithms and US deliberations to regulate companies like Facebook.²⁹

On September 30, China’s Ministry of Industry and Information Technology (MIIT) published draft data security regulations that would ban the export of data classified as “core data” (original Chinese text can be found on the MIIT website [here](#)).³⁰ The draft regulations, titled “Opinions on Industrial and Information Technology Data Security Management (工业和信息化领域数据安全管理办法), categorize data into three categories: 1) general data, which has limited social impact; 2) vital data, which could threaten the PRC’s territorial, military, economic, societal, cultural, scientific, technological, cyber, ecological, resource, and nuclear safety and China’s overseas interests; and 3) core data, whose loss could seriously threaten national security and could have major social and economic impacts. Data related to AI would be classified as vital or core, depending on the data. The draft regulations require that all data from the industrial and information technology sectors be stored within the PRC, and they also ban core data from leaving the country (summary in English from Global Times [here](#)).

On October 10, the Central Committee of the CCP and the State Council issued the “Outline for the Development of National Standardization” (国家标准化发展纲), which aims to develop and strengthen standards across a variety of industries and fields, including AI. The Outline calls for establishing research standardization in the fields of AI, information technology, and biotech. It also emphasizes the application of AI, big data, and Blockchain to improve infrastructure quality and management.³¹

On October 13, the general offices of the Central Committee of the CCP and the State Council released an opinion on promoting the development of modern vocational education, with AI specified as a priority area (main content of guidelines can be found in Chinese [here](#)).³² The document, titled “Promoting the High Quality Development of Modern Vocational Education” (推动现代职业教育高质量发展), states that a modern vocational education system should be established in the PRC by 2025, and should be ranked among the best globally by 2035. The article adds that priority should be given to training talent for emerging industries, including advanced manufacturing, renewable energy, modern agriculture, and AI, and that schools should be encouraged to set up majors that meet market demand. A limited English summary of the article can be found [here](#).³³

INDUSTRY

The PRC’s AI market increased 24.43 percent to 160.69 billion yuan (\$24.955 billion) in 2020. The market is expected to increase 26.68 percent to 203.56 billion yuan (US \$31.61 billion) by the end of 2021, according to [a member of the PRC’s State Council](#) speaking at the Chinese Congress on Artificial Intelligence (CCAI) 2021 held in Chengdu. The PRC also leads in the number of AI patent applications filed globally. More than 480,000 patent applications were filed in the PRC out of 910,000 patent filings globally. The majority of patent filings focused on electronic equipment, big data, robots, neural networks, computers, deep learning, and databases. The top 10 patent applicants in the PRC are Tencent Technology, Ping An Technology, Beijing Baidu Netcom Technology, Huawei Technologies, Guangdong OPPO Mobile Communications, Baidu Online Network Technology (Beijing), State Grid Corporation of China, BOE Technology Group, Zhejiang University, and Tsinghua University.

Zhejiang leads the PRC’s smart security, smart retail, smart manufacturing, and smart computing sectors and also is a leader in AI chips, AI software, and Blockchain technology, according to the “2021 Zhejiang Artificial Intelligence Industry Development Report.” The report was issued jointly by the Zhejiang Provincial Development and Reform Commission and the Provincial Department of Science and Technology (see original version in Chinese [here](#)). Contradicting the figures from the CCAI, cited above, the report shows that the total revenue of the AI industry in Zhejiang Province in 2020 was 269.343 billion yuan (USD\$41.900 billion), an increase of 11.99 percent year on year; the total profit was 33.741 billion yuan (USD\$5.25 billion), an increase of 14.84 percent year on year. The report further states that Zhejiang seeks to accelerate the construction of major AI-related projects such as the Alibaba Yangtze River Delta Intelligent Data Center and a batch of projects from video surveillance company Hikvision. Zhejiang province is an important PRC tech hub, as it is the home of tech giants such as Alibaba and NetEase.³⁴

A Megvii driver was sentenced to four years in prison for attempting to extort Megvii CEO Yin Qi.³⁵

The driver wanted RMB 3 million yuan (USD\$465,860) in exchange for not selling sensitive recordings to competitors. Known as a leader in facial recognition, Megvii is one of the PRC's "four AI dragons" and [last month was approved to list on Shanghai's Star market](#).³⁶ Megvii was [added to the US Commerce Department's trade blacklist in October 2019](#).³⁷

Leading AI company SenseTime Group Inc. states that only one of its subsidiaries is covered by the US blacklist. SenseTime is the second most valuable AI startup in the world and was put on the US Commerce Department's blacklist in 2019—a move that denied the company access to US technology. The company is preparing for an IPO in Hong Kong. According to a [Bloomberg article](#), the company's IPO prospectus states that only one of its subsidiaries is covered by the blacklist—a much narrower interpretation of the Commerce Department's blacklist than is generally understood.³⁸

AI AND AUTONOMY WORKFORCE

Enrollment in AI postgraduate programs has reportedly increased this year.³⁹ Past figures from the PRC's Ministry of Industry and Technology have shown that the supply of AI talent in areas such as computer vision and voice recognition has been unable to meet the demand for these skills. To address these issues, many colleges and universities have changed their postgraduate enrollment plans for AI to include new majors with specific AI subfields and to introduce entirely new AI academic programs. Increasing the science and technology talent pool has been a continuing priority for Beijing that President [Xi Jinping emphasized in his speech](#) in late September at the Central Talent Work Conference.⁴⁰

SELF-DRIVING CARS

PRC carmaker Geely is building a satellite system to guide its self-driving cars. According to [Nikkei](#), the company plans to orbit a constellation of 500 satellites to provide positioning data to its self-driving cars.⁴¹

German company Continental AG signed an agreement with the PRC company Horizon Robotics to integrate its smart cameras and control units with Horizon's AI-enabled processors and algorithms for advanced driver-assistance systems and automated driving.⁴²

OTHER UNMANNED VEHICLES

Beihang University sets world record for endurance. The PRC press reports that a student team from the Beijing University of Aeronautics and Astronautics (Beihang) set a world record for flight endurance with a UAV. The Fengru-3-100 remained aloft for 80 hours, 46 minutes, and 35 seconds, breaking the previous world record of 80 hours, 2 minutes, and 52 seconds set by the US company Aurora Flight Sciences.⁴³

DATA

A group of industry professionals discussed difficulties in data collection for PRC autonomous driving companies at the 11th Luzjiazui Finance Industry Forum. *The Observer* [reported](#) that PRC companies are not like Tesla (which is both a car factory and an autonomous driving company), making obtaining large amounts of data difficult for PRC autonomous driving companies. Autonomous driving company representatives made some proposals to alleviate this issue, such as establishing a simulation scenario library and sharing datasets between car manufactures and autonomous driving companies.⁴⁴

EVENTS

The Chengdu High-Tech Zone Management Committee and the Chinese Congress on Artificial Intelligence (CCAI) signed an agreement to jointly build the China Artificial Intelligence Joint Innovation Center. The agreement was signed at [the CCAI in Chengdu](#); PRC and foreign academics and technical elites were in attendance. The center seeks to be an important platform for academic exchanges, technical cooperation, talent training, and other scientific and technological innovation services. The Sichuan Shengteng Artificial Intelligence Ecological Innovation Center was also officially inaugurated at the opening ceremony of the congress. This center will provide innovation and talent training, offer incubation for application innovation, and jointly develop the AI industry with Sichuan colleges, universities, and high-tech enterprises. The congress reportedly included academic research presentations on AI, as well as the latest achievements in technological innovation and industry applications.⁴⁵

On October 12, the Sixth Design Intelligence Award ceremony was held in Shaoxing City, Zhejiang province. Two projects received the gold award (the highest). They are: 1) the “Mobile Fire Eye Laboratory Series” designed by the China Shanghai Yituobang Construction Technology Company, the Shenzhen-based Beijing Genomics Institute, and the School of Design and Innovation at Shanghai’s Tongji University; and 2) the “Centralized Oil Fume Emission System” from Hangzhou Robam Appliances. The latter project integrates an intelligent cloud platform network and AI algorithms into the design of kitchen oil fume exhaust systems. The awards were sponsored by the China Academy of Art, Economy and Information Technology Department of Zhejiang Province, and the Shaoxing City government in cooperation with the China Industrial Design Association and the Ministry of Education’s Industrial Design Teaching Guidance Subcommittee.⁴⁶

NOTES

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