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Onlookers watch a demonstration of the flying module component of XPeng AeroHT's Land Aircraft Carrier in Haikou, Hainan province, on Jan 21.

SU BIKUN / FOR CHINA DAILY



Flying cars: Redefining future of transport



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It was the third time in a month that He had mentioned publicly the upcoming arrival of the model at a high-profile event. But his repetition is understandable as the vehicle stands to revolutionize personal mobility and is an early attempt to tap into a potential trillion-dollar market.

He predicts that in the next 10 to 20 years, global flying-car sales could reach 20 percent of the automobile industry's yearly total revenue — an estimated \$2 trillion.

The potentially huge market explains XPeng's long-term investment in the sector. This year alone, XPeng AeroHT's budget is set at 3 billion yuan. Over the past decade, the company has raised over 10 billion yuan to invest in flying cars which are commonly known as eVTOLs (electric vertical takeoff and landing vehicle).

Entry into the sector is costly. According to a research report from the Lufthansa Innovation Hub, it costs eVTOL start-ups \$700 million to \$1 billion to progress from product development to airworthiness certification, to commercialization.

XPeng AeroHT's investment is expected to start paying off soon. Its Land Aircraft Carrier has already received nearly 5,000 orders, the company said.

"This flying car can be used for both sight-seeing and rescue purposes," said Zhao Deli, president of XPeng AeroHT.

Besides this split-body model, the company is working on a one-piece flying car for long-distance flights of up to 500 km. "If you drive from Guangzhou in Guangdong province to Changsha in Hunan province, it will take six or seven hours. The flying car will take you there in one hour or so," He said.

Domestic support

The rise of the low-altitude economy in China, which includes flying cars, has been elevated by domestic technological breakthroughs and policy support.

Battery manufacturing giants such as CATL are developing high-density batteries for both electric vehicles as well as robots and flying cars.

EVE, a battery maker headquartered in Guangdong, has been selected by XPeng AeroHT to provide low-voltage batteries for its projects. The company has also been offering batteries to parent company XPeng for its electric vehicles.

Huawei's AI-powered air-traffic management system, running on Ascend AI chips, can process millions of flight paths per second and has undergone city-scale simulation tests in Shenzhen, Guangdong.

Meanwhile, materials supplier Zhongfu Shenying has slashed the production cost of T1100-grade carbon fiber, making lightweight flying car frames more economically viable.

XPeng's He said a flying car may use up to 300 kilograms of carbon fiber compound materials. "When we start production in 2026, our plant will be the one that consumes the most carbon fiber in the auto sector," he said.

China's strategic elevation of the low-altitude economy to national priority status — included in the 2024 Government Work Report for the first time — has injected momentum into the sector.

The Civil Aviation Administration of China has forecast the sector will grow to 3.5 trillion yuan by 2035.

The financial prospects have attracted many players. In December 2024, Chinese automaker GAC Group unveiled its new fly-

ing car brand, GOVY, and plans to establish production lines this year.

In the same month, car manufacturer Changan announced a strategic cooperation agreement with EHang Holdings Limited to advance flying car development, manufacturing, sales, and operations, with their joint investment to reach 20 billion yuan in five years.

EHang, headquartered in Guangdong, is a global leader in the urban air mobility segment. Changan said it expects to finish its first flying-car test flight late this year.

In February, China's first privately funded aero-engine test facility began construction in Sichuan province.

Slated for completion by 2027, the 2.25 billion yuan facility, will provide critical research and development support for next-generation aircraft, including drones, flying cars, and low-altitude vehicles.

Two camps

The global flying car industry is divided into two competing camps, each shaped by distinct industrial paradigms.

Companies like XPeng represent the "automotive approach", extending ground transportation expertise into the skies.

XPeng's Land Aircraft Carrier features a range-extending hybrid ground module and a fully electric flying module, which can also autonomously return to a charging station after separation.

This design addresses both parking and charging issues. However, it must overcome two certification hurdles: the flying module must meet aviation standards, while the ground module must comply with motor vehicle regulations.

Aviation-focused firms like Joby Aviation and EHang are dedicated to developing only flying vehicles.

In late March, EHang's EH216-S autonomous air vehicle won an operation certificate from the Civil Aviation Administration of China, focusing on sightseeing and medical transport.

While the prospects for flying cars are promising, they must also overcome sig-



XPeng's Land Aircraft Carrier in Haikou. SUN SHIJIE / FOR CHINA DAILY



The low-altitude economy is also driven by planes such as the light sport aircraft CTLS. PROVIDED TO CHINA DAILY

nificant commercialization hurdles.

XPeng's Land Aircraft Carrier is priced below 2 million yuan, making it cheaper than helicopters, but still far from mass-market affordability.

For flying cars to reach Uber's target of "\$0.55 per seat-mile", annual production must reach the scale of 100,000 units — the same threshold Tesla electric vehicles crossed to achieve profitability.

To accelerate affordability, major industry players are exploring alternative business models.

Subscription-based services, similar to aircraft leasing models, may allow businesses and individuals to access flying cars without full ownership.

Companies like Volocopter and Archer Avi-

ation are already partnering with ride-hailing services to test per-trip pricing models, which could reduce upfront costs for users.

Regulatory delays present another major obstacle, as there is no global standard for flying car certification.

The US Federal Aviation Administration classifies eVTOLs as "special category aircraft", with Joby Aviation taking four years to obtain approval; the European Aviation Safety Agency mandates compliance with both aircraft and automobile standards, increasing Lilium Jet's certification costs by 40 percent.

'Invisible' roads

Air traffic control is another key challenge. While autonomous driving systems rely on sensors such as radar, cameras and AI perception, flying cars require dedicated low-altitude airspace coordination.

Chinese scientists are already working on the issue, by establishing "invisible roads" in the airspace below 3,000 meters to ensure orderly flight, Xinhua reported.

Qu Tengpeng, a researcher at Peking University's College of Engineering, and her team have developed a geospatial grid system to map low-altitude airspace.

The system converts three-dimensional spatial coordinates into binary codes, which create a real-time grid of airways. These invisible roads would help prevent collisions between low-altitude aircraft, and also let flying vehicles avoid buildings.

"With this air road network, we can design traffic rules and add 'traffic lights' to avoid accidents," Qu said.

To enhance air safety further, Li Zhongkui, a professor at the same college, developed an unmanned aircraft vehicle trajectory planning system.

Inspired by how birds in flocks coordinate with one another to avoid collisions, the system uses swarm intelligence to regulate the movement of low-altitude vehicles both online and in real-time, ensuring they maintain safe distances and fly in harmony.

Experts are also working to prevent noise pollution associated with flying cars. A 2022

Deloitte survey found that 58 percent of respondents were concerned about noise.

Lyu Benshuai, an assistant professor at Peking University's College of Engineering, and his team developed a rapid prediction model for rotor noise.

The model helps predict how different blade shapes and configurations affect noise levels, allowing for more efficient noise-reduction designs.

"We can do quite a lot in aeroacoustic optimization. For example, rotors mounted at the rear of the fuselage are often much noisier than those at the front, while blades with suitable geometry and serration designs generate less noise," Lyu said.

The team is collaborating with Chinese tech companies like Huawei and Ecovacs to implement these noise-reducing innovations. "We hope to bring these scientific advances to market soon," Lyu added.

Public acceptance is another barrier. Sixty-one percent of the respondents to the Deloitte survey said they fear severe consequences from mid-air accidents.

To build trust, EHang has focused on "low-altitude tourism" in provinces including Anhui and Guangdong. Analysts at Soochow Securities said China's low-altitude tourism market is worth 6 billion yuan a year.

XPeng AeroHT demonstrated automated separation and docking technology in Shanghai's financial center Lujiazui late last year, while assuring the spectators about the ease of flying.

In late March, its flying car performed a trans-lake flight in Changde, Hunan province. Flying to a height of 40 meters, it landed at the original location safely after circling over Liuye Lake, a scenic spot in the city.

Aerial route

Earlier this year, XPeng AeroHT joined forces with Hainan to introduce the "aerial round-the-island scenic highway" in the tropical province.

The nearly 1,000-km aerial route, the first of its kind, will feature 42 observation decks, 24 parking spots and 40 stations, offering immersive flying car journeys, enabling "flying while playing, and flying across the entire island".

The venture also aims to complete over 20 flying car campsites from 2026 to 2027, achieving full coverage of scenic spots along the route.

Hainan's tropical island appeal and abundant natural resources are prime drivers for low-altitude economic development, said Jiang Hong, deputy director of the Hainan Provincial Development and Reform Commission.

Qiu Mingquan, vice-president of XPeng AeroHT, said that flying car excursions are poised to redefine self-driving tours and become a distinctive feature of tourism in Hainan.

The flying car sector will progress through three different stages, said Zhang Yangjun, a professor at the School of Vehicle and Mobility at Tsinghua University.

The first is expected to start this year, with cargo eVTOLs being commercially deployed and passenger eVTOLs beginning demonstration applications in specific scenarios.

In 10 years, both cargo and passenger eVTOLs will become the primary transportation vehicles for low-altitude travel, revolutionizing urban and regional mobility.

The third stage, around 2050, is expected to see flying cars reach mass-market maturity, said Zhang.



GAC Group's flying car GOVY on display during the 15th China International Aviation and Aerospace Exhibition in Zhuhai, Guangdong province, in November. CHEN CHUHONG / CHINA NEWS SERVICE