

DEVELOPMENTS IN CHINA'S GROUND SEGMENT INFRASTRUCTURE, SEPTEMBER 2024 TO PRESENT

1.0. Key Findings

- ▶ The recently completed Hainan Commercial Space Launch Center completed its first launch on 30 November 2024.
- ▶ The Western Commercial Spaceport in Mianning County, Sichuan Province is under construction, positioning the county as a prime location to support the greater commercial aerospace industrial chain.
- ▶ China's first commercial satellite-to-ground laser communication ground station was established in Xinjiang on 15 September 2024
- ▶ In September 2024 and January 2025, China achieved its first launches into a sun-synchronous orbit from a near-shore position using the same rocket.
- ▶ On 27 September 2024 Yunnan's first fixed satellite ground receiving station located in Lijiang went into full operation.

2.0 Introduction

In late 2024, several notable events took place in the development of China's ground segment infrastructure.

- ▶ The recently completed Hainan Commercial Space Launch Center completed its first launch on 30 November 2024.
- ▶ The Western Commercial Spaceport in Mianning County, Sichuan Province is under construction. With the addition of the spaceport in this area, where the Xichang Satellite Launch Center is already located and the development of a Vanadium-Titanium industrial cluster is planned, the county is positioned as a prime location to support the greater commercial aerospace industrial chain.

Additional advancements in the commercial sector include the establishment of China's first commercial satellite-to-ground laser communication ground station in Xinjiang on 15 September 2024 and Wuhan's push to leverage its "first-mover advantages" to consolidate its role as China's first commercial aerospace industry base.

Beyond the development of the commercial aerospace industry, China has made advancements in their launch capabilities and remote sensing satellite ground station network.

- ▶ In September 2024 and January 2025, China achieved its first launches into a sun-synchronous orbit from a near-shore position. Both launches took place in the Yellow Sea.

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- ▶ On 27 September 2024, a fixed satellite ground receiving station went into full operation in Lijiang, making it the first fixed ground station in Yunnan Province, and the latest in its remote sensing satellite ground station network, which includes four other stations across China.

3.0. Space Launch Sites

3.1. Jielong-3 (捷龙三号) Successfully Completes Near-Shore Sea-Based Launches

In September 2024 and January 2025, the Jielong-3 carrier rocket successfully completed near-shore launches in the Yellow Sea. The September launch was the first launch into a sun-synchronous orbit from a near-shore position. It was also its first launch of this specific rocket from the Oriental Spaceport special launch ship (东方航天港号专用发射船).



Figure 1: Jielong-3 Launches from Near-Shore Position in the Yellow Sea, 24 September 2024



Figure 2: Jielong-3 Launches from Near-Shore Position in the Yellow Sea, 13 January 2025

3.2. First Launch From No. 2 Station of the Hainan Commercial Space Launch Center

On 30 November 2024, the Long March-12 (长征十二号) carrier rocket was launched from the No. 2 Station of the Hainan Commercial Space Launch Center (海南商业航天发射场二号工位), representing the first launch from the newly completed facility. The Hainan launch site is China's first fully commercial launch facility. This launch closed the commercial aerospace industry loop, achieving domestic control of the entire industry chain including satellite and rocket manufacturing, commercial launch operations, and satellite data application services.



Figure 3: First Successful Launch from Hainan Commercial Space Launch Center, 30 November 2024

3.3. Commercial Space Launch Site and Aerospace Industrial Park in Sichuan Province

Reports from October 2024 discuss the construction of the Western Commercial Spaceport (西部商业航天港) in Mianning County, Sichuan, where the Xichang Satellite Launch Center (中国西昌卫星发射中心) is also located. The Sichuan Development International Commercial Spaceport Co., Ltd. (四川发展国际商业航天港有限公司), established on 3 September 2024, is the first provincial commercial aerospace company in Sichuan and is the organization responsible for the development and operation of the forthcoming spaceport. It is jointly owned by Sichuan Development (Holdings) Co., Ltd. (四川发展(控股)有限责任公司) and Liangshan Prefecture Development (Holdings) Group Co., Ltd. (凉山州发展(控股)集团有限责任公司), both government-backed enterprises. The construction of the spaceport consolidates the position of Mianning County as a prime location to support the greater commercial aerospace industrial chain.

Comments from Provincial party leadership note the importance of the space port and urged the construction to be accelerated with “extraordinary measures,” using it to establish supporting infrastructure and foster the development of a manufacturing cluster.” A 23 January 2025 report on proposals brought in front of the 13th National People’s Congress noted that the acceleration of the Western Commercial Spaceport’s construction is a priority.

4.0. AIT Facilities

4.1. Plans to Develop the Vanadium-Titanium Industrial Cluster in Sichuan

A 25 January 2025 news article announced plans to develop a Vanadium-Titanium industrial cluster in Xichang City within the context of developing the local aerospace industry and the Western Commercial Spaceport. Vanadium is used in high-performance titanium alloys, batteries, and as a chemical catalyst. There is no known direct substitute for vanadium.

4.2. Wuhan's Commercial Aerospace Industry Believed to Have "First-Mover Advantages"

An academic article from November 2024 claimed that Wuhan has "first-mover advantages" relative to other parts of China in terms of aerospace industry development. The article adds that Wuhan has been approved as China's first commercial aerospace industry base by the National Development and Reform Commission (国家发改委), alongside the existing industrial bases in Shanghai and Xi'an, both established for military and civilian research purposes. In addition to highlighting Wuhan's position within the industry, the article gives details on efforts in other areas of China working to make headway in the aerospace industry.

Beijing is spearheading the Beijing-Tianjin-Hebei industrial cluster of aerospace information and satellite rocket terminals, known as the "Southern Arrow and Northern Star, Two Cores and Multiple Parks, and Tianjin-Hebei Linkage (南箭北星、两核多园、津冀联动) development plan. Jiangsu Province is emerging as a leader in the industry. The Nanjing government has committed to construction of the Future Science and Technology City National Digital Aerospace Industry Cluster (未来科技城国家数字航天产业集聚区), Suzhou is building a high-end commercial aerospace cluster, and Wuxi has dedicated itself to the development of several industrial ecosystems focused on the construction of commercial rockets and satellite manufacturing, among other areas of the industry. Also mentioned were Ningbo, the Guangdong-Hong Kong-Macao Greater Bay Area, and Sichuan as regions and provinces that are continuing to grow their aerospace industrial footprint.

4.3. Wuhan National Aerospace Industry Base Begins Construction

A 24 November 2024 press release from the Hubei Provincial Government announced the beginning of construction on the Wuhan National Aerospace Industry Base Enterprise Service Center (武汉国家航天产业基地企业服务中心) in Xinzhou District (新洲区). Expected to be completed and operable in 2026, the facility will enhance the development of the "China Star Valley (中国星谷)", a complete commercial aerospace industry chain base that supports satellite design and development, whole satellite delivery, rocket launch, and chip development.

5.0. Ground Stations

5.1. A 500mm Aperture Laser Communication Ground System Deployed in Xinjiang

Several news articles from September 2024 announced the 15 September 2024 completion of a 500mm aperture laser communication ground system, marking the advancement of satellite-to-ground communications beyond microwave technology. The system, independently developed by the China Academy of Science's Institute of Space Information Innovation (中国科学院空天信息创

新研究院), has been deployed at the Muztagh Peak (慕士塔格峰) area on the Pamir Plateau (帕米尔高原) in Xinjiang. The system's operation officially establishes the location as China's first commercial satellite-to-ground laser communication ground station.

Another article from October 2024 mentions that a national satellite-to-ground laser communication ground station network is in the planning and demonstration stages. These types of ground stations are a means to resolve the various issues associated with the timely reception of large data sets from remote sensing satellites. Laser communications allow for high-speed data transmission, are compact, power efficient, and provide high-level data security.

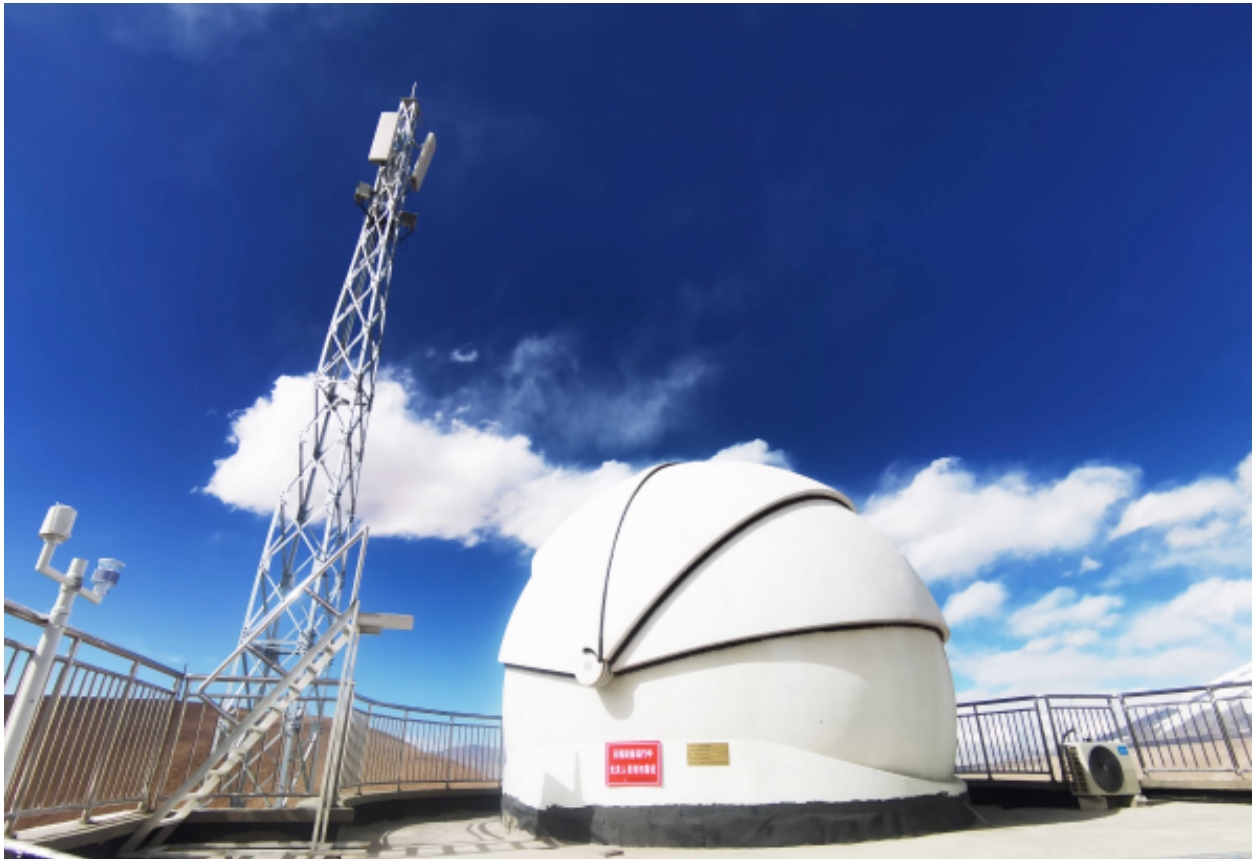


Figure 4: Satellite-to-Ground Laser Communication Ground Station on the Pamir Plateau in Xinjiang

5.2. Remote Sensing Satellite Ground Station in Lijiang Completed and Operating

On 27 September 2024, a fixed satellite ground receiving station went into full operation in Lijiang (丽江), making it the first fixed ground station in Yunnan Province. The station began construction in November 2022 and entered trial operation in March 2023. The Lijiang station is the latest remote sensing satellite ground station in a network which includes locations in Beijing, Xinjiang, Hainan, and Heilongjiang.

The Lijiang Station currently has four sets of satellite antenna receiving systems, with a channel downlink code rate of up to 2,000 megabits per second, and has the ability to transmit data in near real time. The network is composed of 38 large-caliber data receiving antennas and more than 10 high-speed optical fiber data transmission links. With the addition of the Lijiang station, China now has nation-wide real-time data reception.



Figure 5: Remote Sensing Satellite Ground Station in Lijiang, Yunnan



Figure 6: Lijiang Station Antenna

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