



# Science and Technology Daily

VOL.4-NO.171

DECEMBER 21-22, 2024

## Macao's Remarkable Development in 25 Years

By LIANG Yilian

This year marks the 25th anniversary of Macao's return to the motherland. Over the past quarter century, Macao has been transformed into one of Asia's wealthiest cities, showcasing remarkable progress.

Since 1999, Macao has thrived under the "one country, two systems" policy. With robust support from the central government and the mainland, the special administrative region (SAR)'s economy has experienced unprecedented growth.

### Robust economic growth

In 1999, Macao's GDP stood at 51.9 billion Macao pataca (MOP). By 2023, it had skyrocketed to nearly 379.5 billion MOP. By the end of last year, the total savings of Macao residents surpassed 700 billion MOP, an eightfold increase compared to 1999. This year, *Forbes* magazine ranked Macao the second richest place on Earth, trailing only Luxembourg.

Since the launch of the Guangdong-Macao In-Depth Cooperation Zone in Hengqin in 2021, the integration between Hengqin and Macao has accelerated. This development continues to inject new momentum and expand opportunities for Macao's future.

A milestone in Macao's regional integration was the opening of the Hengqin line of the Macao Light Rapid Transit in December. The 2.2-kilometer line connects Macao's Lotus Station with Hengqin Station, linking Macao to the one-hour living circle of the Guangdong-Hong Kong-Macao Greater Bay Area.

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An aerial drone photo taken in Hengqin of Zhuhai city, south China's Guangdong province, shows a view of south China's Macao. (PHOTO: XINHUA)

## Editor's Pick

## BeiDou Navigates an Innovative Future

By LIN Yuchen

Epitomizing China's journey of innovation in satellite navigation, the BeiDou Navigation Satellite System (BDS) was officially launched in 1994, aiming to meet domestic navigation needs and support economic and societal development.

### From regional to global coverage

The journey began with BeiDou-1, a regional system providing limited services through a dual-satellite configuration. The next leap came in 2004 with BeiDou-2, which expanded coverage to the Asia-Pacific region. By 2012, BeiDou-2 operated with 14 satellites, utilizing a hybrid constellation design comprising geostationary, inclined geosynchronous and medium earth orbits.

This mixed constellation design improved service accuracy and reliability, supporting a range of applications from transportation to disaster relief. These advancements positioned BeiDou-2 as a critical regional navigation system.

The most significant leap came with BeiDou-3, which achieved global coverage in 2020. Consisting of 30 satellites, BeiDou-3 marked China's establishment

of an independent, globally operational navigation system on par with GPS, GLONASS and Galileo.

### Breaking technological barriers

One of BeiDou's defining features is its cutting-edge inter-satellite link technology. Unlike traditional systems that rely heavily on ground stations, BeiDou satellites communicate directly, ensuring robust real-time operations. This innovation was driven by researchers like Kang Chengbin, who led efforts to overcome the challenges of linking satellites up to 70,000 kilometers apart. The system ensures precise measurements, enabling seamless global connectivity.

Another hallmark is BeiDou's short message communication service, which sets it apart from other navigation systems. While GPS provides location data, BeiDou enables users to send location and status updates. This feature is very useful in disaster scenarios, such as earthquakes or maritime accidents, where traditional communication networks fail. For example, the system supports up to 1,000 Chinese characters in a single message, making it an indispensable tool for

emergency services.

Underpinning these breakthroughs is a commitment to innovation and risk-taking. One example is the first experimental BeiDou-3 satellite in 2015 integrating more new technologies than usual. This approach ensured that BeiDou-3's technology remained cutting-edge throughout its operational lifespan.

### Aiming for universal connectivity

As BeiDou-3 reached its final deployment in 2023 with the launch of its 59th and 60th satellites, the system's impact extended far beyond navigation.

BeiDou has become a critical infrastructure supporting diverse sectors, from transportation and agriculture to disaster management and urban planning.

More than 10 million shared bicycles equipped with BeiDou chips operate across China, and over 2,500 water reservoirs leverage BeiDou's short-message capabilities for hydrological monitoring.

Looking forward, China has set its sights on developing BeiDou-4, aiming for a more intelligent, integrated and ubiquitous positioning system by 2035.

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## Strengthening Sino-Swiss Aerospace Ties

### International Cooperation

By Staff Reporters

To enhance Sino-European and Sino-Swiss scientific dialogue and cultural exchange in the aerospace field, the China Science and Technology Exchange Center (CSTEC) and Swissnex jointly hosted a workshop on space sustainability and the second Sino-Swiss astronaut dialogue in Shanghai on December 9.

Nearly 100 representatives, including Chinese astronaut Jing Haipeng, Swiss astronaut Claude Nicollier, CSTEC Deputy Director General Yang Xuemei, and Swissnex Director Philippe Roesle attended the event.

CSTEC Director General Gao Xiang delivered a video address. Gao said that the aerospace field is a key area for Sino-Swiss cooperation, yielding outstanding scientific achievements. In November, China, Brazil, South Africa and the African Union jointly launched the Initiative on International Cooperation in Open Science. CSTEC is committed to working with Switzerland to uphold the spirit of "equality, innovation and mutual benefit," carry on the tradition of collaboration in the aerospace field, and promote sustainable sci-tech development.

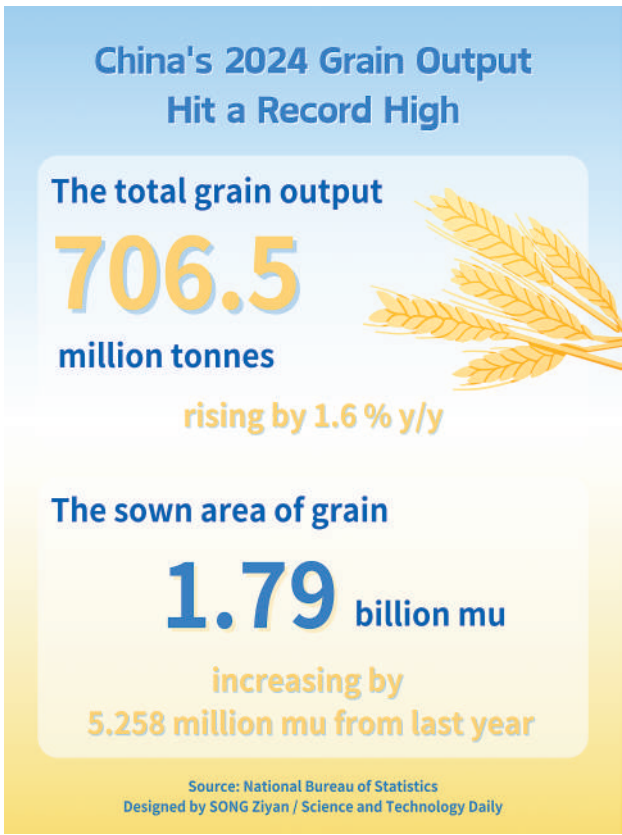
Roesle said that next year marks the 75th anniversary of diplomatic ties between China and Switzerland and expressed a willingness to strengthen collaboration with CSTEC to foster more outcomes in sci-tech cooperation.

Both Jing and Nicollier encouraged deeper Sino-Swiss and Sino-European collaboration in aerospace research and exchange to advance the sustainable utilization of space.

Experts and scholars from China and Switzerland shared the latest progress in fields such as astronomical observation, dark-sky preservation and space art exploration. They also discussed potential areas for future collaboration.

In July, CSTEC and Swissnex officially signed a memorandum of understanding on cooperation. The workshop will further advance Sino-Swiss and Sino-European scientific exchange and innovation collaboration.

## New Graphic



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