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WEEKLY EDITION

## Wentian Brings More Scientific Experiment Opportunities

By Staff Reporters

Launched on July 24, Wentian is the first lab module of the Tiangong space station, which gives astronauts in the station a better place to work and live in.

Wentian is more than a laboratory, and it shares the same key platform functions as that of Tianhe core module. In other words, Wentian can act as a backup for Tianhe when the latter needs rest.

Comprised of working cabin, air-lock cabin, and resource cabin, Wentian has become the world's heaviest single-module spacecraft in operation, and the working cabin is the largest single sealed module in China to date.

The number of sleeping zones increased to six after Wentian docked with the Tianhe core module on July 25, laying a foundation for the Shenzhou-15 astronauts to join the Shenzhou-14 crew later.

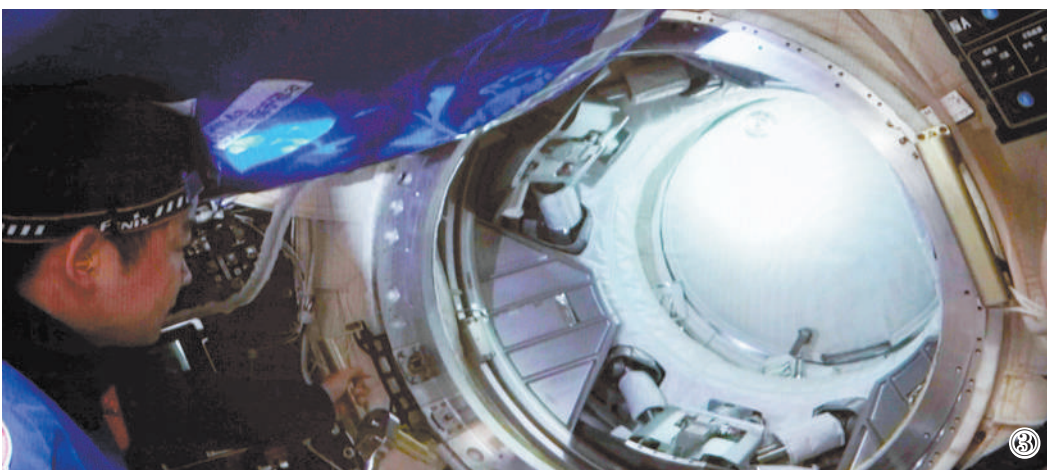
Several scientific experiment cabinets were also installed in Wentian, including a cabinet for life and ecological experiments. With samples of different types of plants and animals, the growth experiment in space could reveal the influence of microgravity on the growth, development and metabolism of individual organisms.

Such experiments will promote people's understanding the nature of biological phenomena, said Lv Congmin, researcher at Technology and Engineering Center for Space Utilization, Chinese Academy of Sciences, adding that they could also offer scientific evidence for the evaluation of in-orbit radiation damage to astronauts and the protection for them.

Outside the module, various equipment, including a set of small mechanical arms, was installed to facilitate more delicate extravehicular activities in the future. Lights and high-definition video cameras were also set so that staff on the ground could monitor extravehicular activities more clearly.



① Wentian, the first lab module of China's space station, blasts off from Wenchang in south China's Hainan province. ② Shenzhou-14 astronauts Chen Dong (C), Liu Yang (R) and Cai Xuzhe at Wentian lab module. ③ Chen Dong opening the hatch door of Wentian lab module after the docking. (PHOTO: XINHUA)



## Editor's Pick

## China's Space Station: New Home for Astronauts New Platform for Global Cooperation

By Staff Reporters

Since China first initiated its space station project back in 1992, steady progress has been made to realize the dream of accommodating its astronauts in space.

After years of preparation, Tiangong space station construction has entered the full implementation stage. Marked by Tianhe core module launched in April 2021, China formally embarked on establishing one of humanity's largest and most sophisticated orbiting facilities.

With all key technologies verified

as of the return of Shenzhou-13 crew, in-orbit construction of the space station began with the launching of Shenzhou-14 manned spacecraft in June, followed by the first lab module Wentian on July 24. The construction of China's Tiangong space station is expected to be completed this year.

### More functional

As China's most adventurous space endeavor, the Tiangong space station will be mainly composed of three components — a core module and two space laboratories, performing the role of a national space laboratory for cutting-edge scientific research.

Hao Chun, director of the China Manned Space Agency (CMSA), said the space station will assist scientists in advancing space science, technology and application, where scientists will be able to use the unique space environment to perform mutation breeding, produce special medicines and create new materials.

With its robotic arm and 3D printing facilities, the space station can support in-orbit manufacturing and installation of large equipment and in-orbit construction of space facilities, as well as assist astronauts to perform extravehicular activities.

In addition to its own components,

the station will also share the orbit with Xuntian space telescope. The high-performance telescope, with a field of view 350 times larger than Hubble, will be launched in 2023 and dock with the station for refueling and maintenance.

### Greener operation

Tiangong space station has a green energy support system that will realize more economical operation.

Flexible solar wings installed on the core module Tianhe, the first to be put into use in China's spacecraft, have been in operation for more than 400 days and providing energy for the construction of the space station. *See page 2*

## International Cooperation

## CAFOE Discusses Frontier Engineering

By Staff Reporters

The three day's 2022 China-America Frontiers of Engineering (CAFOE) symposium, which began on July 19, was jointly held by the Chinese Academy of Engineering (CAE) and the U.S. National Academy of Engineering (NAE) both on-line and offline.

Development at the cutting edge of four areas of engineering technology was discussed, namely wearable electronics and human health, additive manufacturing and beyond, water sustainability, and food security in the context of big data and genomics.

In his remarks at the opening ceremony, Li Xiaohong, president of CAE, said that the symposium needs to devel-

op into an important platform to lead academic development, be a crucial mechanism to discover and cultivate new generation leading talent in engineering, and serve as a vital bridge to promote communication in engineering between the two countries.

Li also expressed that CAE will continuously pay close attention to the symposium and actively support it by making contributions to jointly creating a better future and building a joint community for humankind.

John L. Anderson, president of NAE, said that the symposium has offered a good platform for the two parties to discuss frontier engineering and inspired deep thoughts on different fields influencing each other. *See page 3*

By Staff Reporters

China's national carbon market, the world's largest in terms of the amount of greenhouse gas emissions covered, has enjoyed a smooth operation over 12 months since its launch on July 16, 2021, and is expected to include more enterprises from emission-intensive sectors and see increasingly active trading as companies improve green awareness.

Carbon trading is the process of buying and selling permits to emit carbon dioxide or other greenhouse gases, and is restricted to designated emitters who have such rights.

In its first operating year, the na-

tional carbon market registered 2,162 power-generating enterprises, covering about 4.5 billion tons of CO<sub>2</sub> emissions. The market wrapped up its first compliance period on December 31, 2021, with the compliance rate reaching 99.5 percent.

Over the past year, the national carbon market has performed better than expected, said Zhang Xiliang, director of the Institute of Energy, Environment and Economy at Tsinghua University, who has participated in the construction and design of the national carbon market.

According to the Ministry of Ecology and Environment (MEE) plan, the national carbon market will include

eight carbon-intensive industries during the 14th Five-Year Plan period (2021 - 2025).

Apart from power generation, the market will cover iron and steel, construction materials, non-ferrous metals, petrochemicals, chemicals, paper manufacturing, and aviation, involving about 8,500 large carbon emitters upon completion, which will control about 70 percent of the country's total energy-related carbon emissions.

The MEE said that it will consider launching financial products on the basis of the stable and healthy operation of the national carbon market, and gradually improve the activity of carbon trading.

## Industrial Economy Resilient in First Half

By Staff Reporters

The added value of industrial enterprises above designated size witnessed a year-on-year increase of 3.4 percent in the first half of 2022, according to the press conference by the State Council Information Office on July 19.

Despite COVID's impact imposed on the industrial economy since March, it has gradually risen since May, said Tao Qing, a person in charge of the bureau of operation monitoring and coordination of the Ministry of Industry and Information Technology (MIIT), adding that of the 44 industry categories, there were 33 categories that realized growth in terms of industrial added value.

The manufacturing industry also saw the added value of enterprises above designated size rose by 2.8 percent compared with that of last year, and the proportion of the added value of the manufacturing industry in GDP reached 28.8 percent. *See page 3*

## WEEKLY REVIEW

### Tianwen Probe Captures HD Image of Mars' Satellite

China's Tianwen-1 probe sent back high-resolution images of Mars' natural satellite Phobos on July 23. It is China's first time conducting Phobos imaging exploration and obtaining first-hand scientific data at close range.

### FAST Telescope Detects over 660 New Pulsars

Scientists have identified over 660 new pulsars by the Five-hundred-meter Aperture Spherical Radio Telescope (FAST). Pulsars, with high density and fast rotation, are an ideal laboratory for studying the laws of physics in extreme environments.

### Underwater Robot Developed for Deep-Sea Surveys

The Wenhai-1, China's first autonomous unmanned deep-sea probe that can dive as deep as 6,000 meters, has passed tests and been delivered to its user, according to the Shenyang Institute of Automation (SIA) of the Chinese Academy of Sciences. The probe is designed to serve deep-sea scientific research such as marine environment surveys and mineral resource surveys.

### Scientists Found Key Gene Affecting Crops Yield

Chinese scientists identified the key gene, OsDREB1C, that responds to both light and low nitrogen conditions, and improves the efficiency of photosynthesis and nitrogen utilization, thus significantly boosts grain yield. The discovery was published online in the academic journal *Science*.

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