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WEEKLY EDITION

Strengthening Int'l Cooperation on Basic Research

To overcome common development challenges, humanity needs international cooperation, openness, and sharing more than ever before, said Xi Jinping, general secretary of the Communist Party of China (CPC) Central Committee, while presiding over the third group study session of the Political Bureau of the CPC Central Committee on strengthening basic research on February 21.

A platform should be built for international cooperation in basic research, setting up a global-oriented scientific research fund, and stepping up the opening-up of the national science and technology programs, said Xi.

Xi stressed to broaden and deepen joint scientific research between China and foreign countries on climate change, energy security, biosecurity, outer space utilization and other global issues.

China should have forward-looking plans and deeply participate in global science and technology governance, join or initiate the establishment of international science and technology organizations, and support domestic universities, research institutes, and science and technology organizations to establish connections with international counterparts, said Xi.

Xi emphasized further openness, trust and cooperation of the international science and technology community, make new and greater contributions to the progress of human civilization with more major original innovations and breakthroughs in key core technology, and at the same time effectively safeguard the interests of China's scientific and technological security.

Source: XINHUA

International Cooperation

CAS Joins Hands with ESA for Satellite Experiments

By LIN Yuchen

Solar - wind Magnetosphere Ionosphere Link Explorer (SMILE) scientists at the Chinese Academy of Sciences (CAS), conducted joint satellite experiments with the European Space Agency (ESA) in the Netherlands earlier this year, which is China's first on-site interactions with Europe since January 2020, when an assessment of the SMILE project took place.

SMILE is the first self-standing mission jointly initiated by CAS and ESA. It is dedicated to observing the solar wind to revolutionize magnetospheric physics.

Various organizations came together to conduct the experiments this time round, such as Microsatellite Innovation Institute at CAS, ESA, Arianespace, and Airbus, each of them contributing differently to assembling the explorer.

According to China National Space Administration, the experiments were successful, laying the foundation for SMILE's Mission-Critical Design Review, which is expected to take place this June.

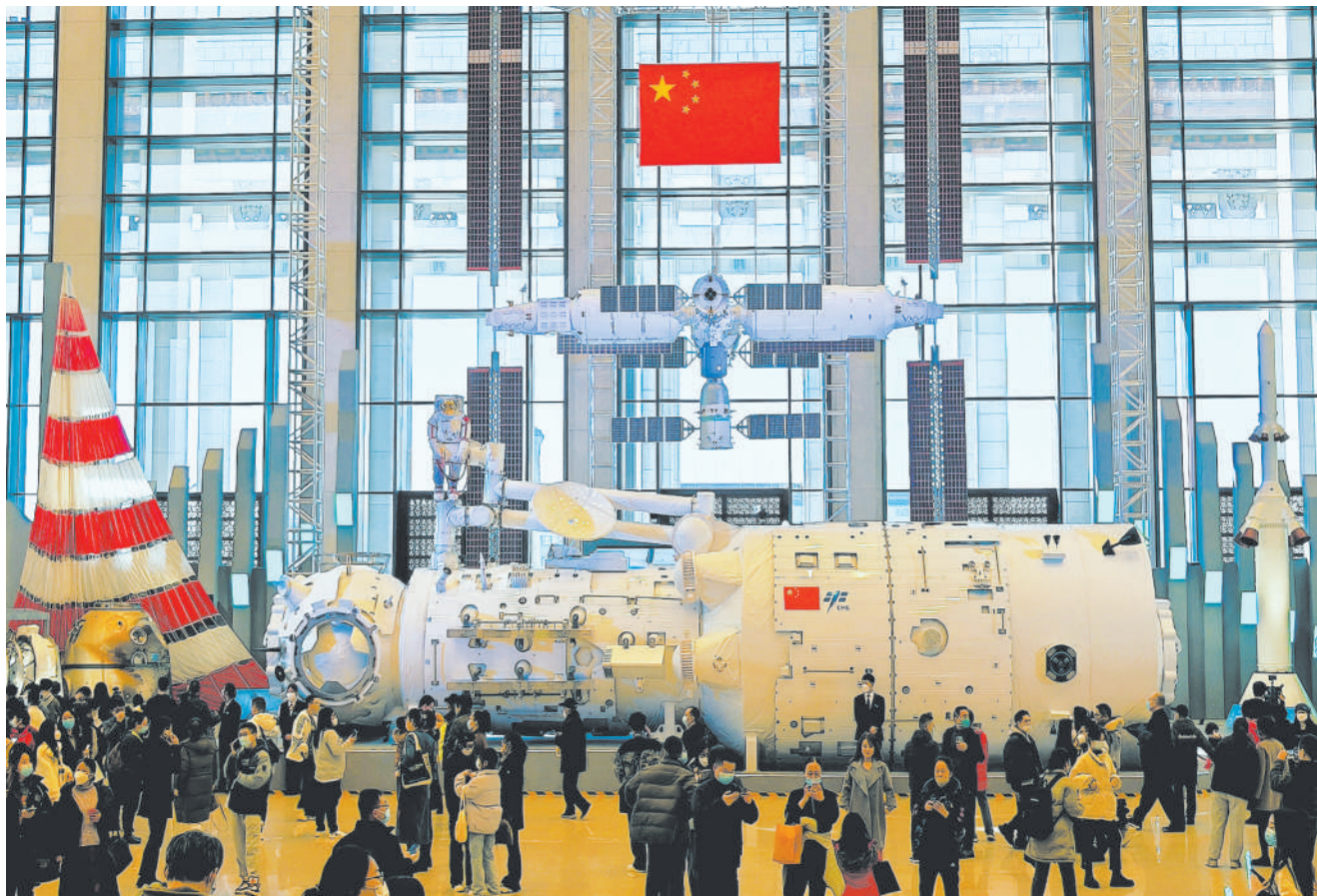
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New Graphic

CHINA'S TOTAL R&D EXPENDITURE

1^{tn}_{RMB} >>> 3^{tn}_{RMB}
2012 2022

SOURCE: MINISTRY OF SCIENCE AND TECHNOLOGY
DESIGNED BY LIN YUCHEN



30 Years of Manned Space Program

People visit an exhibition displaying China's achievements in manned spaceflight at the National Museum of China. The photo shows a model of the China Space Station. (PHOTO: HONG Xing/S&T Daily)

Editor's Pick

Shipbuilding in China Riding the Wave of Success

By LU Zijian

The *Dapeng Princess*, the largest fourth-generation Liquefied Natural Gas (LNG) carrier to sail in shallow water channels in the world, was delivered on February 18. Designed by Hudong-Zhonghua Shipbuilding (Group) Co. Ltd., and jointly built with China Shipbuilding Trading Co., Ltd., this vessel gives a glimpse of China's progress in becoming an important player in the global shipbuilding industry.

LNG vessel production boosted

Regarded as one of the jewels in the crown of global shipbuilding, LNG vessels are extremely difficult to construct and represent a country's capability of shipbuilding.

During long - distance transportation, LNG needs to be kept at low temperature (-163°C). Invar, the material in direct contact with LNG, is a steel containing 36 percent nickel, which will hardly shrink or deform when the normal temperature drops down to -163°C.

The difficulty is that the invar used on LNG vessels is only 0.7 mm thick for

the most part, about the thickness of paper. The total length of welds of a large LNG vessel's enclosure system could reach 150 kilometers, and 10 percent of the welds need to be done manually. All these require high standards in welding technology.

Though China arrived late to the LNG vessel market, it has rapidly grown into a key player. In 2008, Hudong-Zhonghua built China's first LNG vessel, *Dapeng Sun*, and it was the world's largest thin-film LNG vessel at the time. With its various components maintaining 40 years of fatigue resistance, *Dapeng Sun* is among the ranks of global "long-life" giant ships.

From the second generation of LNG vessels, Hudong-Zhonghua began to develop and design independently. In 2022, the shipyard began to build the fifth generation, the evaporation rate of which has dropped to 0.085 percent per day from 0.15 percent per day in the first generation, a huge leap forward in this important technical index of LNG vessels.

According to China Association of the National Shipbuilding Industry

(CANSI), China's international market share of new orders for large LNG vessels exceeded 30 percent for the first time in 2022.

Cruise in the making

Large LNG vessels have realized mass production in China, and the first large cruise ship built is to set sail at the end of May, according to China State Shipbuilding Corporation Limited.

The ship is as high as a 24-story building and 87 percent complete. The number of the components in its construction reached an incredible 25 million, five times that of C919, China's first homegrown large jetliner.

In order to control the weight of the hull, the ship used a large amount of steel plates that are a mere four to eight millimeters thin. A smart workshop was specifically built by Shanghai Waigaoqiao Shipbuilding Co., Ltd to make such thin plates, adopting technologies such as laser cutting and laser composite welding to improve the efficiency and precision of the transfer, cutting, processing and construction of the thin plates.

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More than Half of China's Farmland Upgraded

By LIN Yuchen

China's upgraded farmland surpassed 66 million hectares in 2022, accounting for more than half of the total cultivated land areas nationwide, which is producing over 500 billion kilograms of food a year.

Efforts will be made to gradually develop all permanent basic cropland into high-standard farmland, make real progress in the campaign to invigorate the seed industry, and keep major varieties firmly in our own hands, said President Xi Jinping at the annual central rural work conference in December 2022.

It is then expected in 2023 that China will cultivate new high-standard farmland of over three million hectares and further upgrade current cropland into high-standard farmland of over two million hectares.

After being transformed into high-standard farmland, a mu (equal to about 0.066 hectares) farmland can produce up to 20 percent more food than previously, said Wu Hongwei, official at the Ministry of Agriculture and Rural Affairs, adding that the enhanced capability of retaining soil, fertilizer and water in high-standard farmlands now require 13.8 percent fertilizer and 19.8 percent chemicals less than before.

In 2019 and 2020, the central funds arranged 85.9 billion and 86.7 billion RMB respectively to support the national annual construction of over 5.3 million hectares of high-standard farmland. In 2021 and 2022, they grew respectively to 100.8 billion and 109.6 billion RMB for over 6.6 million hectares of high-standard farmland.

Local governments are also innovating investment and fundraising channels for farmland upgrades.

Provinces like Jiangxi and Sichuan, for example, through measures like issuance of high - standard farmland special bonds, increased the investment threshold for high-standard farmland to 3,000 RMB per mu, while in Jiangsu, the average investment input per-mu already reached 3,000 RMB.

To optimally manage high-standard farmland, a variety of technologies have been employed. A QR code imprinted in an aluminum panel, for example, stores project data of farmland upgrades online, along with details of relevant supervising organizations.

WEEKLY REVIEW

Two - photon Microscope Obtains Cell Images of Tainan

The in - orbit Shenzhou-15 crew successfully captured the 3D structural images of their skin cells with China's self-developed two-photon microscope, which was the first of its kind in the world, providing a new tool for future health monitoring of in-orbit astronauts.

Total Length of Transportation Network Exceeds 6M km

The total length of the comprehensive transportation network within China surpassed 6 million km by the end of 2022. From 2018 to 2022, China built the world's largest high-speed railway networks, expressway networks and a world-class port cluster.

Academic Progress of TCM in 2022 Revealed

Ten achievements, including progress in clinical trials of Traditional Chinese Medicine (TCM) in COVID-19 treatment, were selected as the academic progress of TCM in 2022, according to China Association of Chinese Medicine on February 25.

Investment in Basic Research Soared

In 2022, China invested about 195.1 billion RMB in basic research, making up 6.3 percent of the total R&D spending that reached 3.09 trillion RMB and accounted for 2.55 percent of the country's GDP, according to a press conference held on February 25.

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