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China's Robotic Industry Retains Global Edge

Edited by WANG Xiaoxia

The 2025 World Robot Conference (WRC), held from August 8 to 12 in Beijing, showcased more than 1,500 exhibits from over 200 domestic and foreign robot enterprises. Since the first conference was held in 2015, China's robot industry has achieved a series of major breakthroughs.

In 2024, China's sales volume of industrial robots reached 302,000 units, remaining the world's largest industrial robot market for 12 consecutive years.

Meanwhile, as the world's largest producer of robots, China's output of industrial robots soared from 33,000 units in 2015 to 556,000 units in 2024. In the first half of 2025, that output reached 369,300 units, up 35.6 percent year on year. The output of service robots exceeded 10.5 million units, representing a year-on-year growth of 34.3 percent.

Advancements have been made in robot technological innovation. In this field, the number of China's patent applications accounted for two-thirds of the global total in 2024, and the number of valid patents exceeded 190,000.

Core technologies such as large robot models, intelligent collaborative control, and human-computer interaction have been continuously improved. In the field of humanoid robots, emotional interaction and complex movements have been achieved.

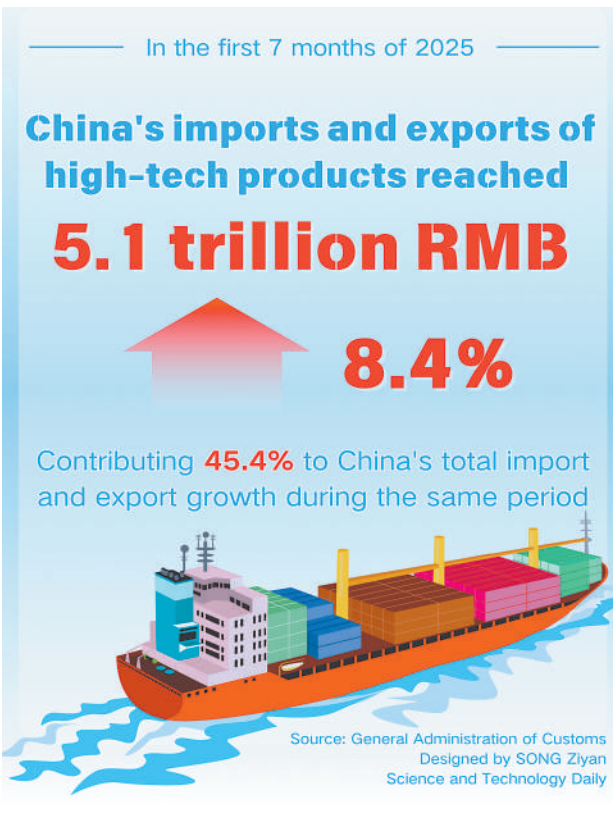
In application scenarios, industrial robots have been applied in 71 major industry categories and 236 medium industry categories of the national economy. The density of China's manufacturing robots has risen to the third place globally.

In the service sector, robots are more widely used in fields such as household services, warehousing and logistics, commercial services, elderly care and disability assistance, and medical rehabilitation.

In addition, China's robots perform well in the global market. In 2024, Chinese manufacturers dominated the global commercial service robot market, with a shipment share of 84.7 percent. According to China's General Administration of Customs, the country exported 94,200 industrial robots in the first half of this year, with a total value of 746 million USD, an increase of nearly 60 percent year on year.

See page 3 for Opinion article on WRC 2025

New Graphic



WECHAT ACCOUNT



E-PAPER



An aerial drone photo shows a view of the Daxiaojing scenic spot in Luodian county, southwest China's Guizhou province. (PHOTO: XINHUA)

STI Frontier

Lunar Soil Brick Maker Advances Building on Moon

By LIN Yuchen & HONG Jingpu

In a significant step toward sustainable lunar exploration, Chinese scientists have developed the country's first prototype machine capable of converting lunar soil into building bricks using concentrated solar energy. The lunar in-situ 3D printing device, developed by the Deep Space Exploration Laboratory (DSEL), is expected to play a key role in the construction of a future moon base.

The breakthrough addresses a long-standing challenge in space engineering: how to build on the moon using local resources rather than transporting materials from Earth. Given the high cost and complexity of cargo delivery to space, the ability to manufacture infrastructure

using in-situ materials like lunar regolith could dramatically reshape the feasibility of long-term human presence on the moon.

From concept to prototype

According to Yang Honglun, an engineer at the DSEL's future technologies division, the development process spanned two years, passing through three major stages — concept validation, prototype development and iterative process optimization.

In the conceptual phase, the team evaluated a range of solar concentration methods, eventually selecting Fresnel lenses and thin-film concentrators to achieve the desired energy focus. Two fabrication techniques — powder sintering and powder bed fusion — were chosen to shape the lunar soil simulant into

dense, brick-like structures.

The second stage addressed two major technical hurdles. The first was energy transmission: The system had to achieve a solar concentration ratio exceeding 3,000 times but conventional optical fiber bundles frequently suffered thermal damage in the process.

The team carried out nearly 100 rounds of tests to develop new energy-transmitting fiber bundles that resisted ablation and maintained high transmission efficiency.

The second problem was soil transport. There had to be a mechanism to evenly distribute and compact granular lunar soil. This led to the creation of a composite soil spreading unit capable of uniform deposition and compaction.

See page 3

Tech Empowers Resilient City Development

By Staff Reporters

Global warming and extreme weather pose challenges to city operations. Disaster prevention and mitigation have become a key issue of urban resilience, where technologies can play a crucial part.

The recent Central Urban Work Conference held in Beijing emphasized that measures should be taken to enhance urban safety and resilience. Cities should enhance their capacity for natural disaster prevention through integrated flood control systems and waterlogging management.

Resilient cities mean metros that can respond to and resolve outer strikes and disasters, with their major characteristics and functions not obviously affected, and revive quickly afterwards, according to Liu Kai, dean and professor of the School of National Safety and Emergency Management, Beijing Normal University.

Chai Fuxin, professor and senior engineer at the Research Center on Flood and Drought Prevention and Reduction of the Ministry of Water Resources, said smart cities provide powerful technological support for strengthening urban resilience.

The integration of emerging technologies such as big data, Internet of Things (IoT) and AI in building smart cities can improve urban resilience in disaster monitoring, risk evaluation, smart decision making, planning for resilience enhancement and coordinated government management, according to Wang Naiyu, director and researcher of the REN Center For Urban Resilience at Zhejiang University.

From the perspective of flood control and waterlogging management, IoT can be used to monitor rainfall, pipe network operation and rivers in real time. Big data analysis can then step in to realize waterlogging risk warning and emergency scheduling to effectively reinforce

a city's capability to deal with extreme weather like rainstorms, Chai said.

Based on rain forecast and historical rain data, AI analysis can be adopted to conduct traffic flow forecasting and evacuation route optimization, helping cities maintain basic traffic capacity in emergencies.

In terms of urban energy system, the combination of smart power grid and distributed energy can partly maintain energy supply when the main grid is damaged, thus increasing the system's stability and impact resistance capability.

Advanced technologies can also play a part in resilience enhancement planning. Big data and AI can be employed to generate smart algorithms that support the full life-cycle management of cities. Wang said smart designs can enhance the disaster resistant capability of buildings and infrastructure before disasters come. See page 2

Lancang-Mekong Cooperation Ushers in Next Golden Decade

International Cooperation

By LU Zijian

China and Myanmar took another step towards a new decade of deepening Lancang-Mekong Cooperation (LMC), with the signing of the 2025 LMC Special Fund project cooperation agreement on August 5.

The 14 projects in the agreement, signed in the Myanmar capital of Nay Pyi Taw, will continue to support Myanmar's development in agriculture, environmental protection, science and technology, culture, education and disaster prevention.

China is willing to strengthen cooperation with Myanmar, make good use of the funds, and promote the building of a China-Myanmar community with a shared future to bring more benefits to the two peoples, Chinese Ambassador to Myanmar Ma Jia said.

This year marks the 10th anniversary of the LMC mechanism, and the LMC Special Fund project cooperation is only part of the extensive exchange and cooperation among Lancang-Mekong countries (China, Myanmar, Thailand, Laos, Cambodia and Vietnam).

The six countries have established a high-level dialogue mechanism by holding regular leaders' meetings and foreign ministers' meetings. The Lancang-Mekong Economic Development Belt was proposed to promote the deep integration of regional industrial chains.

In 2024, the trade volume between China and Mekong countries exceeded 450 billion USD, twice the value of ten years ago. Goods transported via the China-Laos Railway have traveled through 31 provinces, autonomous regions and municipalities in China, and 19 countries and regions including Thailand and Vietnam.

See page 3

WEEKLY REVIEW

VIVIT Turns Bio Tissue into Ionic Glassy State

Researchers from Tsinghua University have developed a new method, named vitreous ionic-liquid-solvent-based volumetric inspection of trans-scale biostructure (VIVIT). VIVIT transforms biological tissue into an ionic glassy state, which enables optical clearing with minimal distortion and high transparency, preserves tissue from low-temperature crystal damage, and enables the revelation of trans-scale 3D biostructures.

AI Robot for Automated Cross-pollination Created

Researchers from the Institute of Genetics and Developmental Biology, Chinese Academy of Science have developed the world's first AI-based robot (GEAIR) that automates cross-pollination and streamlines robotic hybrid breeding. This innovation broke through the bottlenecks in hybrid breeding and seed production, significantly reducing breeding costs, shortening breeding cycles, and improving breeding efficiency.

Solid Oxide Fuel Cell with Lower Operating Temperature Developed

Kyushu University researchers in Japan have developed a solid oxide fuel cell (SOFC) with the high proton conductivity at 300°C. Ordinary SOFCs operate at around 700-800°C. The team expects the new findings will lead to the development of low-cost, low-temperature SOFCs and accelerate the practical application of these devices.

New Cancer Vaccine Extends Relapse-free Survival

According to a study led in part by investigators at the UCLA Health Jonsson Comprehensive Cancer Center, the U.S., a novel cancer vaccine, called ELI-002 2P, can trigger powerful and lasting immune responses. It may help prevent or delay cancer recurrence in high-risk patients whose tumors are driven by KRAS mutations.