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Innovation Pathway Henan Manufactures A Smart Makeover

By QI Liming & ZHANG Yili

China recently entered a new technological era when it rolled out the world's largest diameter vertical shaft boring machine. "Qiming," the gigantic piece of equipment was jointly developed by the China Railway Tunnel Bureau Group Co., Ltd. and China Railway Engineering Equipment Group Co., Ltd. (CREG), and successfully launched in Zhengzhou, Henan province.

Equipment manufacturing is the central pillar of a country's manufacturing industry. Over the past 11 years, Henan has taken an innovation-focused approach to accelerate the development of new-quality productive forces, and promoted the transformation of manufacturing towards a distinctive path focused on intelligence, quality and branding.

From manufacturing to intelligent manufacturing

From comprehensive mining to intelligent mining, and from production-oriented enterprise to technology service-oriented enterprise, the innovation transformative path of Zhengzhou Coal Mining Machinery Group Co., Ltd. is clear.

In 2020, the first complete set of intelligent fully-mechanized mining face became operational, marking an equipment breakthrough. In 2021, China's first complete set of such equipment supplied by a single manufacturer reached full production capacity and was exported to Türkiye, opening up the international market. Meanwhile, in 2023, a super large 10-meter tall hydraulic support shielded by two protective columns was put into use, setting a global record.

Innovation knows no bounds. Zhengzhou Coal Mining Machinery Group Co., Ltd. officially announced its transformation from a traditional equipment manufacturer to a provider of intelligent industrial solutions in April.

The transformation of enterprises reflects the leap of cities. Zhengzhou, where the company's headquarters are based, has been focusing on its "Strong Manufacturing City" goal, laying out future industries, seizing the opportunity in emerging industries, integrating traditional industries, and building a modern industrial system.

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Chinese taikonauts Zhang Lu (C), Wu Fei (R) and Zhang Hongzhang (L) will carry out the Shenzhou-21 crewed spaceflight mission, with Zhang Lu as the commander, the China Manned Space Agency announced at a press conference on October 30. (PHOTO: XINHUA)

STI Frontier

Humanoid Robotics Industry Eyes Commercialization

By SUN Jin

China's humanoid robotics industry has been experiencing rapid growth during the 14th Five-Year Plan period (2021 — 2025). Empowered by large-scale AI models, humanoid robots are transitioning from a tech development phase to a large-scale commercial phase. This has seen the robots now used and operating in many daily scenarios, such as factories, hospitals and even homes.

According to a recent report, the humanoid robotics industry is expected to transition rapidly from the "technology validation phase" to the "large-scale commercialization phase" in 2025. It is projected that the scale of the global

embodied AI market could reach 19.525 billion RMB, with China accounting for nearly half of that total.

Breakthrough in core technology accelerated

Ke Zhendong, vice president of Leju Robotics Co., Ltd. explained that the development of humanoid robots is deeply rooted in breakthroughs in embodied intelligence. This concept refers to the integration of AI into physical entities such as robots, enabling them to perceive, learn and interact with the environment in human-like ways.

The architecture of embodied AI comprises three core components: large-scale AI models, motion control algorithms, and the physical robotic body. Large-scale AI models are responsible for

language interaction, environmental perception and task decisionmaking. Meanwhile, the motion control algorithms control the coordination of robot movements and body balance.

Zhong Xinlong, an AI expert at the China Center for Information Industry Development, noted that with rapid technological progress, humanoid robots are evolving from simple mechanical executors into AI-powered agents.

Currently, performing precise manipulation of irregularly shaped objects using low-cost hardware — including grasping, picking up and cutting, as well as more complex tasks such as folding clothes and preparing beverages — are possible.

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Observer

A Crucial Five-Year Innovation Journey

By Staff Reporters

China's 15th Five-Year Plan period (2026 — 2030) will be critical as the country works to reinforce the foundations and push ahead on all fronts toward basically achieving socialist modernization by 2035. It will serve as a key link between the past and the future.

At the fourth plenary session in Beijing from October 20 to 23, the 20th Central Committee of the Communist Party of China (CPC) deliberated the Recommendations of the CPC Central Committee for Formulating the 15th Five-Year Plan for Economic and Social Development and adopted the document, stressing greater self-reliance and strength in science and technology. The plenum also

steered the development of new-quality productive forces.

To better understand the significance of the upcoming plan for sci-tech innovation and socio-eco development, *Science and Technology Daily (S&T Daily)* interviewed related experts for their insights.

Independent innovation key driving force

Liu Dongmei, party secretary of the CPC Committee of the China Academy of Science and Technology for Development, told *S&T Daily* that guided by the Five-Year Plans, China has achieved a historic leap in sci-tech innovation, fostering new drivers for high-quality development.

China's ranking in the Global Inno-

vation Index has risen from 34th in 2012 to 10th in 2025. The number of high-level international journal papers and international patent applications from China has topped the world for five consecutive years.

China today has over 500,000 high-tech enterprises, and the added value of new industries, new business formats and new business models, dubbed the "three new" economy, contributes 18 percent of GDP.

Lu Wei, a researcher at the Development Research Center of the State Council, said the Five-Year Plans' long-term vision and sustained advancement set goals, directions and tasks for socio-eco development, including sci-tech innovation. See page 3

Satellite Application Boosts China-Africa Cooperation

International Cooperation

By LI Linxu

This year marks the 25th anniversary of the establishment of the Forum on China-Africa Cooperation (FOCAC). It is also the inaugural year for implementing the outcomes of the 2024 Beijing Summit of FOCAC.

In keeping with this, the China-Africa Cooperation Center on Satellite Remote Sensing Application (CACSA) Week 2025 was recently held in Deying county, east China's Zhejiang province, with the theme "Satellite Remote Sensing Application Cooperation, Empowering a New Future for China and Africa."

Wu Jun, deputy director general of the department of international cooperation, China's Ministry of Natural Resources (MNR), said, "Upholding the principles of strengthening cooperation through data sharing, breaking development bottlenecks through technology empowerment, and stimulating endogenous growth through talent cultivation, CACSA has become a vivid example of pragmatic China-Africa cooperation."

According to Wu, since its establishment in July 2023, CACSA has achieved fruitful results, aligning China's satellite remote sensing application technology with Africa's sustainable development needs.

In data sharing, the center has signed cooperation memorandums with the government departments of 16 African countries and the Regional Centre for Mapping of Resources for Development.

It has established 14 natural resources satellite remote sensing cloud service platform nodes, providing African partners free access to over 70,000 high-resolution remote sensing images, thereby offering robust spatial information support for the development planning of African nations.

The center has also developed a series of remote sensing products, atlases and software solutions in fields such as urban development, land use change and river basin monitoring. See page 2

WEEKLY REVIEW

Breakthrough in Production of Key Material for 'Artificial Sun' Achieved

A Chinese research team has achieved industrial-scale production of high-purity, ton-level Hastelloy (C276) metallic substrates through a self-developed purification technology. This breakthrough lays a crucial foundation for the supply of key materials for second-generation high-temperature superconducting tapes — a core component supporting China's "artificial sun" project.

Fendouzhe Submersible Completes Arctic Mission

A Chinese scientific expedition team has completed an Arctic survey supported by the research ship Tansuo-3 and the deep-sea manned submersible Fendouzhe. This makes China the first nation to carry out continuous manned deep-sea dives in the heavily ice-covered Arctic Ocean.

Fungal Networks Act as Living Memory Devices

Researchers at The Ohio State University have discovered that common edible fungi — such as shiitake mushrooms — can act as organic memristors, data-processing devices capable of "remembering" past electrical states. The study suggests that fungal networks could be a promising alternative to conventional metal-based components used for processing and storing digital information. The findings were recently published in the journal *PLOS One*.

'Super-Earth' Just 20 Light-Years Away Found

An international research team recently discovered a potential "super-Earth" less than 20 light-years from our planet. Named GJ 251 c, this newly identified exoplanet orbits in the habitable zone of a nearby star and could therefore have liquid water on its surface, if there is a suitable atmosphere. This discovery brings new hope to the search for extraterrestrial life.

New Graphic

PROFITS FROM JAN. TO SEP.

China's Major Industrial Firms

3.2%
y/y

High-tech Manufacturing

8.7%
y/y

Source: National Bureau of Statistics
Designed by Science and Technology Daily

WECHAT ACCOUNT



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