

Spring Festival Feature

Technology Quietly Improving Lives

By Staff Reporters

In the days leading up to the Chinese New Year, as trains and highways fill with travelers heading home, technology is a quiet integral part of daily operations such as essential services to keep the work going without human presence. Today's working systems are built to solve problems and keep these services running. This is how China's sci-tech innovation story is being written with steady, practical steps.

Winter watermelons in the Taklamakan

In Shule, a county in Xinjiang in northwest China, winter temperatures often drop to minus 10 degrees Celsius. Yet in a local agriculture demonstration park, watermelon seedlings are thriving in greenhouses. By February, the first harvest will be ready, something unthinkable a few years ago.

The secret lies in self-heating greenhouses developed by Weifang Guopai Watermelon Agricultural Technology Co., Ltd., a company from Shandong province in the east that came to Shule in 2021 through a local investment drive. The structures use multi-layer composite insulation that absorbs solar heat during the day and releases it at night, requiring no extra heating.

Inside one greenhouse, technician Buhaliqi Sidike checks a water fertilizer integration system. She presses a button, and nutrient-rich water flows directly to each plant's roots through drip lines. "It saves water, reduces labor, and gives every melon the same sweetness," she said. After graduating from college, Buhaliqi joined an agricultural park. Within three years, she became skilled in climate control, plant grafting, pollination techniques, and automated greenhouse systems. She now oversees dozens of greenhouses.

To ensure consistent quality, the park uses a grafting machine. Workers place melon scions and pumpkin rootstocks into the device, and it fuses them with precision, eliminating the uneven results of manual grafting.

The melons sell for over 100 RMB each, several times the price of regular varieties, thanks to their thin rinds and uniform sweetness. The operation now provides stable jobs for more than 400 people and seasonal work for over 1,000 more.



The No.3 and No.4 main pier caps of the Chongqi Highway and Railway Yangtze River Bridge are both topped out on September 29, 2025. (PHOTO: XINHUA)

A local seed breeding company plans to move into the park to develop new watermelon varieties suited to Kashgar's intense sunlight and arid soil, aiming to build a full seed industry chain.

For Buhaliqi, the work is personal. "Growing melons is a sweet business," she said. "I want our fruit to reach markets around the world."

Crossing the Yangtze at full speed

More than 3,000 kilometers east, near where the Yangtze River meets the sea, two major projects are nearing completion: the Chongqi Highway Railway Yangtze River Bridge and the Chongming-Taicang Yangtze River Tunnel.

Together, they form the critical link of the Shanghai-Chongqing-Chengdu high-speed rail line. For the first time in China, trains will cross the Yangtze at 350 kilometers per hour without slowing down.

The bridge spans 4.09 kilometers, with a main span of 400 meters, the longest of its kind for ballastless track for high-speed rail. It carries a six-lane highway on top and, below, tracks for both 350 km/h high-speed trains and the 250 km/h intercity rail.

Building it was not easy. The riverbed here is soft silt. To anchor the piers, the teams drilled piles 142 meters deep, with alignment tolerance under 0.5 per mille. Steel trusses were then pushed into place using synchronized jacks, millimeter by millimeter.

Underneath the river, the challenge was even greater. The Chongming-Taicang Yangtze River Tunnel is 14.25 kilometers long, making it the world's longest high-speed rail tunnel built with single-direction excavation.

This not only precisely located areas of concrete porosity up to 10 meters deep in the large bridge at a section of the Xi'an-Hanzhong High-Speed Railway, but also realized the first 3D visualization of the bridge's inner defect, said Liu Zhanwen, a member of the research team and deputy director of Shenzhen Research Institute of CHU.

Now the system has been successfully applied in road and bridge engineer-

ing projects in many places.

At its deepest point, it lies 89 meters below the surface, under water pressure of 0.9 megapascals. Here, the Linghang, the world's largest diameter tunnel boring machine for high-speed rail, is carving its final stretch. Engineers describe its operation as "someone watches, no one steers." An automated system handles real-time geologic sensing, path adjustment, and safety controls.

To withstand extreme pressure, the team developed a new grouting material that forms a stabilizing layer around each concrete segment. They also added a sixth sealing ring to the shield tail, the first time in China, creating a strong waterproof barrier.

Every 500 meters, five color LED strips light the tunnel. When finished, this route will shorten travel time between Shanghai, Nantong, and Chongqing, making daily commutes and family visits easier for millions.

A mountain dam powers green future

Far southwest, in the steep valleys of Yunnan province, another transformation is underway at the Xiaowan Hydropower Station on the Lancang River.

Soaring 300 meters, it is the world's first concrete double curvature arch dam of this height. Completed in 2009 after a decade of construction, it generates an average of 19 billion kilowatt hours of clean electricity each year.

During construction, engineers faced near-vertical cliffs, fast currents, and unstable rocks. To stabilize the slopes, they installed 17,000 anchor cables into the canyon walls. Many contain sensors, so any movement in the dam is instantly known to technicians.

Today, the station is being reinvented through digital intelligence. Eighty-eight underground caverns and a powerhouse as deep as a 30-story building once made inspections slow and difficult. Now, drones equipped with AI,

high-resolution cameras, and 3D lasers scan the entire dam structure under four hours, a task impossible for humans on their own.

Last September, Xiaowan became China's first hydropower station with fully domestically produced control systems for all four core functions: computer monitoring, relay protection, turbine governors, and excitation systems. Each of its six units has a capacity of 700,000 kilowatts.

"This year, for the first time, we can run the central control room with no staff on site during holidays," said Ma Chunli, head of operations. "Smart systems handle everything."

Xiaowan's transformation does not stop at automation. On hillsides near the reservoir, rows of blue solar panels shimmer in the sun. Beneath them, lemon trees grow in the shade, heavy with fruit.

Zhang Xiaodong, who leads the station's new energy division, explained the idea: "Solar power is clean but intermittent. Our dam acts like a giant battery and it can start and stop quickly to smooth out solar fluctuations and keep the grid stable."

His team works nonstop, even during Spring Festival. Their vehicles log nearly 300 kilometers a day. Some colleagues have worked over 350 days this year.

Soon, six new solar farms will connect to Xiaowan, adding 490,000 kilowatts of clean power. Combined with the dam, the total clean energy capacity will reach 5.435 million kilowatts.

"The shift from hydropower alone to a hybrid water solar system is a complete renewal," Zhang said. "And when our power reaches families far away, that's why we stay."

These stories don't announce themselves. They simply make things work more reliably, more efficiently, more sustainably for people far beyond the sites where they begin.

pedestrians and extreme weathers, are incorporated via car networking communications, enabling limited physical space to simulate nearly limitless road conditions.

However, the initial simulator motion platform lacked sufficient precision, leading to severe distortion of the vehicle dynamics model. Inspired by the six-degree-of-freedom motion platform of the flying simulator, the research team redesigned the testing system.

On a 52-km all-feature test road in Shandong province in east China, the first of its kind nationwide, testing for scenarios is done in three days. With traditional methods, it would take half a year.

This integrated system has completed over 120,000 hours of equivalent testing, and some of its standards have been adopted by 16 domestic and international regulations.

Policy Express

2026 Rural and Agricultural Modernization Plan Activated

By LIN Yuchen

During the 14th Five-Year Plan period (2021-2025), China strengthened its overall agricultural production capacity, consolidated the gains of poverty alleviation, raised farmers' living standards, and made tangible progress in all-round rural revitalization.

On January 3, China released its 2026 "No. 1 Central Document," laying out a roadmap to advance agricultural and rural modernization and to promote all-round rural revitalization.

The document emphasizes that agricultural and rural modernization is fundamental to the overall quality and sustainability of China's modernization drive.

It comprises six parts, covering six key areas: enhancing overall production capacity, quality and performance of agriculture; implementing regular and targeted assistance measures; promoting stable income growth for farmers; building a beautiful and harmonious countryside desirable to live and work in, based on local conditions; strengthening institutional innovation; and continuing the Party's leadership over work related to agriculture, rural areas and farmers.

Agriculture and rural development are prioritized, with food security as the bottom line, and integrated urban-rural development.

Agriculture will be developed into a modern large-scale industry, ensuring that rural areas have modern living conditions, and farmers enjoy a more prosperous and fulfilling life.

Enhancing agricultural productivity and quality is central. The aim is to maintain total grain output at around 1.4 trillion jin (700 million tonnes), while promoting higher yields per unit

area through improved farmland, seed varieties, machinery and farming techniques.

This will be assisted by diversifying oilseed supplies, stabilizing key agricultural sectors such as cotton and sugar, and advancing food conservation efforts.

The "vegetable basket" industries will be upgraded by developing a diversified food supply system that integrates farming, forestry, animal husbandry and fisheries.

Measures for this include strengthening livestock capacity regulation, promoting modern facility agriculture, expanding deep-sea aquaculture, and tightening food safety supervision across the entire supply chain.

Technological innovation is a key driver, supporting breakthroughs in core agricultural technologies, the industrialization of biological breeding, and the development of smart and adaptive agricultural machinery.

It will also be harnessed to integrate AI, drones, the Internet of Things and robotics into agricultural production, while reforming agricultural research institutions and strengthening grassroots extension services.

Boosting farmers' incomes remains a primary objective. The document outlines measures to stabilize farm earnings through coordinated pricing, subsidies and insurance policies, cultivate county-level industries that enrich local communities, promote stable employment for migrant workers, and expand rural consumption.

Simultaneously, targeted, regular assistance policies will prevent a large-scale return to poverty. Monitoring mechanisms will be improved, enhancing industrial and employment support, and tailoring policies for underdeveloped regions.



Farmers tend to grapes in a greenhouse in the Tangshan Port economic development zone, north China's Hebei province. (PHOTO: XINHUA)

China Upgrades Digital Services for Overseas Visitors

By ZHONG Jianli

China has issued a set of new guidelines to make digital services for the entry of foreigners and people from outside the Chinese mainland more convenient and further promote high-level opening-up.

The guidelines, by 11 Chinese authorities including the Cyberspace Administration of China (CAC), the National Development and Reform Commission, and the Ministry of Culture and Tourism, aim to address bottlenecks in digital services for personnel from overseas to create a more internationalized and convenient digital service environment.

There are 14 measures in five key areas:

- Strengthening digital basic services: simplifying telecom business procedures for foreigners, enhancing foreign-language digital services and building integrated digital service platforms.

- Improving digital payment services: making digital payments more convenient and upgrading consumer digital services by better supporting the use of overseas e-wallet services.

- Optimizing digital tourism services: expanding online cultural and tourism channels, facilitating digital transport services and boosting digital residence management.

- Enriching digital public services: providing digital medical services, strengthening digital education services, optimizing services for investment and entrepreneurship, and improving government digital services.

- Enhancing network and data security: elevating the protection of cybersecurity, data security and personal information.

By widening the scope of digital services for overseas visitors, the measures are expected to make cross-border travel and exchanges smoother and encourage deeper international cooperation, injecting more momentum for higher-level, broader opening-up, a CAC official said.

The official also said the guidelines will provide essential support for attracting foreign investment, expanding domestic demand, and promoting growth, injecting new momentum into China's high-quality development.



Traffic Safety Test System Gets Smart

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In 2016, a 20-meter bridge pier on the Xi'an-Hanzhong High-Speed Railway developed cracks. Neither traditional method — core drilling nor ultrasonic testing — was suitable for tackling the urgent risk: the former would damage the structure, while the latter has a detection depth of only two to three meters.

A physical examination in hospital inspired Zhao: What if he conducted computed tomography (CT) on the bridge?

The first challenge was to create an effective detector. Traditional piezoelectric ceramic ultrasonic transducers have limited power, and their sound beams cannot penetrate steel concrete. The team therefore developed a new generation of transducers based on rare-earth

magnetostrictive materials.

After 18 months of hard work, the team developed a 24-channel testing system. Coupled with the improved ray-tracking algorithm and CT system, it reconstructs three-dimensional images like "building blocks," achieving a detection depth exceeding 10 meters.

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ing projects in many places.

Building a smart brain

Autonomous driving vehicles are developing rapidly, which brings a new challenge: How to ensure they are safe enough?

It is estimated that they have to drive billions of kilometers on open roads to experience all possible scenarios, Zhao said. Traditional testing cannot meet the demand of the fast iteration of technologies.

Here, Zhao's team proposed a virtual-real integration solution, i.e., building a smart and Internet-connected testing base integrating vehicles, roads and cloud technology.

During the test, vehicles driving on real roads, and virtual scenarios, such as