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Innovation Pathway

Xinjiang: Seventy Years of Development

By Staff Reporters

Chinese President Xi Jinping on Tuesday urged concerted efforts to better build a beautiful Xinjiang in the process of Chinese modernization, when he met with representatives from all ethnic groups and all walks of life in Xinjiang Uygur autonomous region in northwest China, as the region is marking its 70th founding anniversary.

Seventy years ago, a journey from Xinjiang Uygur autonomous region to Beijing could take months. Today, that same trip has been reduced to a matter of hours by air, symbolizing a profound leap into modernity. This dramatic shift, from camel caravans to high-speed rail, from isolation to global connectivity, shows the remarkable development of the Xinjiang Uygur autonomous region since its founding in 1955. Over the past seven decades, Xinjiang has evolved into a region marked by stability, prosperity, cultural vitality, ecological improvement and rapid development. Once constrained by geography and underdevelopment, it is now a dynamic frontier of China's westward opening and a vital hub along the silk road.

From isolation to infrastructure powerhouse

Xinjiang, accounting for one-sixth of China's land territory, was historically defined by its remoteness. In the early 1950s, most of the region's roads were unpaved and impassable in bad weather. Travelers endured days of grueling rides across deserts and mountains.

Today, that narrative has been rewritten. The region's highway network has grown from 165,900 km in 2012 to 230,000 km in 2024. All prefectures in Xinjiang are now accessible by highway, as are more than 90 percent of administrative regions at county level.

A landmark achievement came on December 30, 2024, with the completion of the Tianshan Shengli Tunnel, the world's longest expressway tunnel at over 22 km, boring through the Tianshan Mountain to slash travel time between southern and northern Xinjiang from three hours to just 20 minutes.

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WEEKLY REVIEW

'Nano-tagging Robot' Identifies Cancer Cells

Chinese researchers from the Center for Excellence in Molecular Cell Science at the Chinese Academy of Sciences have constructed a "nano-tagging robot" - an engineered nanozyme that responds to deep-red light or ultrasound and can precisely identify cancer cells. Through ultrasound, it clearly tags cancer cells, turning them into targets.

Faster Arctic Shipping Route to Europe Established

A container ship, the Istanbul Bridge, departed from the Jiangyin Port Area of Fuzhou Port in Fujian province, and is expected to reach Europe in only 19 days via the Arctic route. The service is about a week faster than the China-Europe rail service and more than 20 days faster than traditional routes.

3D Printed Fuel Cells Redefine Aerospace

According to the Technical University of Denmark, researchers have solved a key challenge in sustainable energy: creating fuel cells light powerful enough for aerospace. The team radically redesigned solid oxide cells using 3D printing and gyroid geometry. This mathematically optimized structure, found in butterfly wings and heat exchangers, is lightweight, robust, and has a large surface area.

Quantum Mechanical Effect of Squeezing Shown

Researchers from the University of Tokyo have demonstrated the quantum mechanical effect of squeezing in the motional state of a levitated silica microsphere, sacrificing precision in one aspect of a particle's motion (like its position) to gain greater precision in its conjugate aspect (like its momentum).



The Xinjiang Uygur autonomous region celebrates its 70th founding anniversary. The photo shows the Urumqi Cultural Center. (PHOTO: CMG)

STI Frontier

China's First IPS Observation Telescope Operates

By LU Zijian & LU Chengkuan

Standing in a vast prairie in Inner Mongolia autonomous region in north China, the main station of the country's first interplanetary scintillation (IPS) observation telescope closely watches the sun with high detection sensitivity.

Guarding against 'space bombs'

IPS refers to radio signals emitted by distant cosmic ray sources. As these signals traverse the solar system, their paths are disrupted by the uneven solar wind, causing rapid, irregular fluctuations in the signals received on Earth - much like stars blinking in space, Yan Yihua, chief scientist of the telescope, explained. "It's similar to seeing distant lights through turbulent air, where the brightness flickers."

The primary purpose of IPS monitoring is to conduct space weather research and disaster forecasting, Yan said. Possessing immense destructive power, violent solar storms are like "space bombs." They can cause satellite dam-

age, communication disruptions, navigation errors and power grid failures - posing significant risks to national security and critical civilian infrastructure. Therefore, enhanced monitoring and space weather forecasts are imperative.

To accurately predict when solar storms will reach Earth and their impact, the speed, density and structural changes of the solar wind and the disturbances it carries through interplanetary space have to be gauged, Yan said. "IPS monitoring is a crucial method for obtaining this vital information."

How it works

Nicknamed the Prairie Sky Eye, the telescope is a major facility of Phase II of the Meridian Project, a national scientific infrastructure in China's space weather field.

The telescope system consists of a main station and two auxiliary stations, all located in Xilingol League in Inner Mongolia, approximately 200 kilometers apart, forming an equilateral triangle.

The main station consists of three

rows of parabolic-cylindrical antennas, each row measuring 140 meters north-south and 40 meters east-west. "Together, they form China's largest parabolic-cylindrical radio telescope to date," Wang Wei, senior engineer at the National Space Science Center (NSSC) of the Chinese Academy of Sciences, said.

The parabolic-cylindrical design of the main station's antennas overcame the limitations of traditional parabolic telescopes, reducing construction costs by 60 percent while maintaining equivalent sensitivity.

Each row of antennas has 600 feed units, commonly referred to as signal reception modules. These units receive cosmic radio signals reflected and focused by the parabolic cylinder, then transmit them to back-end equipment for data analysis. The main station telescope has achieved breakthroughs in key technologies such as antenna array coordination, electronic scanning and data synchronization.

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2025 Pujiang Forum: Cultivating Fertile Ground for Innovation

By LIANG Yilian, WANG Chun & LI Jun

The Innovation Culture Forum was a highlight of the 2025 Pujiang Innovation Forum for its timely discussion on the role of culture in technological advancement. Organized by *Science and Technology Daily* (*S&T Daily*), the Chinese Academy of Science and Technology for Development (CASTED), and the Shanghai Institute for Science of Science on September 21, the forum brought together experts to explore "innovation culture

in an era of transformation."

From Silicon Valley to 'Silicon Alley'

Wu Jing, president of *S&T Daily*, emphasized that innovation culture should be built on five pillars: scientific rigor, exploration, collaboration, mentorship, and humanistic values. "The media should not only be the recorders and disseminators of innovative practices, but also strive to become the advocates and nurturers of an innovation culture," she said, underlining the media's role in shaping such culture.

Liu Dongmei, party secretary of

CASTED, defined innovation culture as beliefs and habits that encourage inclusivity and participation in innovation. Liu warned against oversimplifying its role and stressed the need for open regional strategies. "Openness is crucial in building a regional innovation culture," Liu said. "This involves building networks with leading innovation regions, studying external experiences and models, and achieving innovative transformation through interaction and mutual learning."

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Sci-tech Powers High-quality Growth

By Staff Reporters

During the 14th Five-Year Plan period (2021-2025), China has intensified efforts to tackle key core technologies and apply research outcomes, leveraging innovation to lead the development of new quality productive forces. These efforts have yielded tangible results in upgrading traditional industries, boosting emerging sectors, and laying a solid foundation for future industries, said Yin Hejun, Minister of Science and Technology, at a press conference recently held by the State Council Information Office.

Innovation drives industrial transformation

In high-end equipment, the "Jinghua" tunnel boring machine, with a 16.07-meter excavation diameter, set a new record by advancing 542 meters in a single month while achieving non-disruptive tunneling beneath urban infrastructure.

China's first domestically designed and built deep-ocean drilling ship, the "Mengxiang" (Dream), has officially entered service. Equipped with an internationally advanced drilling system, it is designed for a maximum drilling depth of 11,000 meters.

In advanced manufacturing, China now leads the world in the number of "Lighthouse Factories," leading manufacturers recognized by the World Economic Forum, accounting for over 40 percent of the global total. It has also successfully developed a world-leading robotic transportation and loading system for large open-pit mines, achieving large-scale deployment with hundreds of units in individual mines and a total of over 3,000 units across multiple sites.

Emerging industries gain momentum

Yin stressed that innovation in fields such as AI, the Internet of Things and big data has enabled traditional industries to become high-end, intelligent and green. Innovation in sectors such as new-generation information technology and new energy has also aided the development and growth of emerging industries.

There have been major technological breakthroughs in fields such as next-generation information technology and new energy. With approximately 4.6 million 5G base stations, China maintains global leadership in both 5G technology and user scale, accelerating digital transformation across industries.

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New Graphic



WECHAT ACCOUNT



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