科技日報

Science and Technology Daily

VOL.5-NO.218 NOVEMBER 29-30, 2025

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Innovation Pathway

G20 Summit Advances Equitable Global Governance

By Staff Reporters

The 20th G20 Leaders' Summit in Johannesburg, South Africa, on November 22-23, constituted a landmark event in the history of the group, being the first time a G20 summit was hosted on the African continent.

While the African Union is a member, South Africa is the only African nation within the G20.

Over more than two decades of its evolution, the G20 has become a pivotal platform for global economic governance. Today, its members account for approximately 85 percent of global GDP and represent two-thirds of the world's population, making it one of the most critical platforms for global economic governance. There are strong international expectations that the G20 will take the lead in championing multilateralism, reforming and improving global governance, and promoting shared development.

This year, the Leaders' Declaration at the summit underscored the need for multilateral cooperation to tackle global challenges, and called for enhanced support for developing countries to advance inclusive growth and sustainable development.

The declaration comes at a time when the world is facing mounting geopolitical tensions, resurgent unilateralism and protectionism, weak global growth, and widening development gaps. The current global governance system is increasingly exposed as outdated and unbalanced, which has caused a deepening deficit.

A report released just before the summit starkly illustrated these disparities, revealing shocking North-South inequalities in wealth distribution, trade access, resource allocation, and education. This is a sobering reminder that lasting global prosperity and stability cannot be built on a foundation where the rich grow richer and the poor poorer.

It is precisely this context that gave the two-day summit, themed "Solidarity, Equality and Sustainability," exceptional significance. Global South countries issued broad appeals for renewed commitment to multilateralism, bridging the North-South development divide, and forging deeper cooperation.

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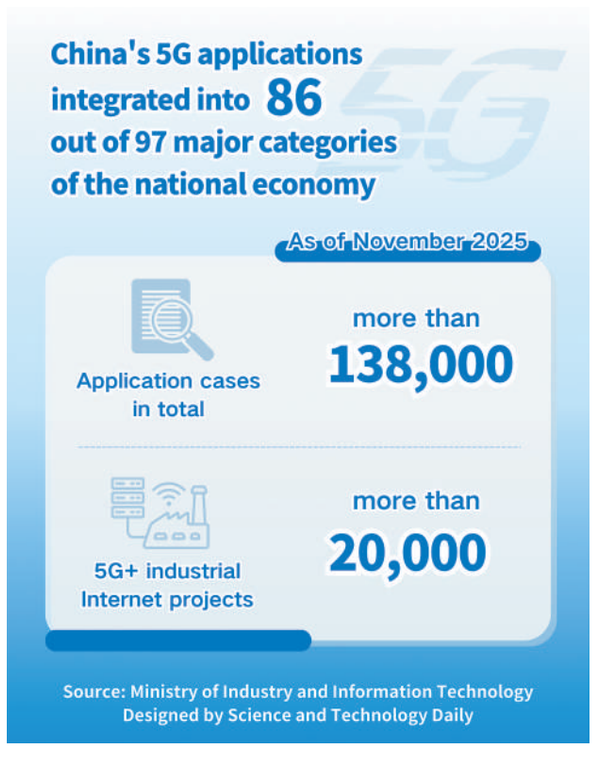
New Graphic



WECHAT ACCOUNT

E-PAPER

①China launches the Shenzhou-22 spaceship from the Jiuquan Satellite Launch Center in northwest China, on November 25, 2025. ② A Long March-2F Y22 rocket carrying the Shenzhou-22 spaceship blasts off from the Jiuquan Satellite Launch Center, on November 25, 2025. (PHOTO: XINHUA)

STI Frontier

Oysters Shield Marine Engineering Projects

By Staff Reporters

Marine engineering projects like cross-sea bridges and port dock banks, crucial for exploring and utilizing the sea, face a daily challenge: erosion by sea water.

Traditional anti-erosion paint has a strong odor and could pose a threat to the ecosystem. A research team from the College of Aerospace and Civil Engineering, Harbin Engineering University (HEU), figured out a unique solution: Let oysters do the trick.

Oysters stand out

According to Lv Jianfu, HEU professor and the team lead, marine sessile organisms can be used to prevent erosion, meeting not only the requirements of engineering construction, but also restoring the ecosystem.

The first step in adopting this method was to pick the right species. Lv and his team cooperated with other research institutions, including the Institute of Oceanology, Chinese Academy of Sciences, to conduct field research and sea tests. Many sessile organisms were compared and screened, and oysters stood out.

Oyster reefs, formed by clusters of oysters growing in a fixed position, are known as "ecosystem engineers." They possess multiple ecological uses such as improving the water quality, enhancing biodiversity, and protecting coastlines.

Lv's team reconstructed the design logic of marine infrastructure by deeply integrating cement-based materials and marine organisms, pioneering the world's first integrated technology for high-durability marine concrete engineering and ecological restoration based on oysters.

This technology creates a biological armor for marine engineering projects, which is highly anti-corrosive, low cost and self-restorative.

By activating the natural power of marine sessile organisms like oysters, the life of engineering projects such as piers and cross-bridges can be extended to more than 50 years.

Attracting and settling oysters

Research shows that the biological armor would leverage its protective capabilities fully only when marine sessile organisms cover more than 95 percent of the surface of the concrete works. Therefore, how to attract oyster clusters to voluntarily come to the targeted area and build a defense system became another key issue.

Lv's team designed a full-chain solution, which included artificial induction, material design and function integration, greatly enhancing the safety and durability of the concrete works.

Considering the sophisticated marine environment, Lv's team conducted tests at different marine engineer works, including cross-sea bridges and port wharfs in the Yellow Sea, the East China Sea and the South China Sea. ***See page 4***

Innovation Drives Smart Maritime Progress

Edited by WANG Xiaoxia

Building China into a strong maritime nation is a high priority in its 14th Five-Year Plan (2021-2025). This is evidenced by a series of advancements over the past five years, with the support and guidance of sci-tech innovation in marine economic development, marine technological innovation and marine ecological protection.

Marine economy

The new generation 100,000-tonne smart aquaculture vessel can load 200,000 juvenile fish into the breeding hold in just 10 minutes, while the annual gas production of Deep Sea No.1 gas field is expected to exceed 4.5 billion cubic meters. These are just some examples of the wealth of opportunity that lies beneath the ocean, driving the momentum of China's marine economy.

In the first quarter of 2025, the output of aquatic products across the country increased by 4.5 percent year-on-year.

In 2024, China's marine GDP exceeded 10 trillion RMB. The amount of new orders received, delivered orders and orders on hand for marine engineering equipment increased by 143 percent, 10.5 percent and 20 percent respectively year-on-year. This ensured China's international market share in marine economy remained the world's leader for seven consecutive years.

Meanwhile, the research and development of marine drugs is advancing, such as the anti-tumor polysaccharide drug BG136 and the new anti-hepatitis B virus drug LY102.

Technological innovation has also become the core driving force for the development of the marine economy. Even traditional industries like aquaculture are increasingly adopting advanced technologies, said Professor Luan Weixin from Dalian Maritime University.

Major projects

Over the past five years, sci-tech innovation has played a key role, with several key milestones. ***See page 3***

International Cooperation

Roundtable Calls for Int'l Cooperation in Space Science

By LU Zijian

"International cooperation has been very important, and will become more and more important in the future," Jean-Jacques Dordain, former director general of the European Space Agency (ESA), told *Science and Technology Daily* in an interview at the Roundtable for International Cooperation in Space Science in Beijing on November 21.

Organized by the Chinese Society of Space Research, the roundtable called for further global collaboration within the space science community to maximize scientific output and contribute to the advancement of knowledge.

Dordain regards the exploration of the universe and the solar system as an objective aimed at understanding the Earth and ensuring that humanity's future on the planet is as long as possible.

"It's a common objective for all humans and this is the reason we all have to contribute to that common objective," he said. "And this is the reason why international cooperation is so important."

However, global collaboration in space science is not an easy job. "You have to make sure that you understand your partner and trust your partner," Dordain said.

Alvaro Giménez, senior science advisor of the Spanish Space Agency, shared similar views. He mentioned three key elements for international cooperation, namely mutual benefits, commitment reliability, and mutual respect.

"All partners have to gain benefit from the cooperation... people have to respect the contribution of each partner," he said.

China has been cooperating with many countries and regions in space science.

Dordain said China has done a lot in international cooperation and gave the example of the Beijing-headquartered Asia-Pacific Space Cooperation Organization (APSCO), via which China offers other countries access to space data.

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WEEKLY REVIEW

China's 1st Emergency Launch in Manned Space Program Made

China launched the Shenzhou-22 spaceship to provide a return vessel for the three Shenzhou-21 astronauts in orbit on November 25. This momentous occasion marked the accomplishment of the first emergency launch mission in the country's manned space program.

Non-invasive Insulin Delivery Through Skin Achieved

A research team led by scholars from Zhejiang University has achieved the world's first non-invasive delivery of insulin through skin, securing a blood sugar-lowering effect comparable to regular insulin injections. The approach was recently published in *Nature*.

All-optical Modulation with Single Photons Using Electron Avalanche Developed

A Purdue University research team has developed a "photonic transistor" that precisely controls light at the single-photon level, a breakthrough published in *Nature Nanotechnology*. This device can operate at single-photon intensities, a long-standing challenge in photonics, and could enable the development of photonic chips and quantum computing by offering much higher speeds and lower power requirements than traditional methods.

New Method to Treat Orthotopic & Metastatic Pancreatic Cancer

A research team from the University of California, Los Angeles, developed allogeneic IL-15 – enhanced, mesothelin-specific CAR-engineered invariant natural killer T (Allo15MCAR-NKT) cells through gene engineering. This new method is a promising next-generation immunotherapeutic approach for pancreatic cancers, with the potential to overcome critical challenges especially in the context of metastatic disease.

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