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मनोहर पर्रिकर रक्षा अध्ययन एवं विश्लेषण संस्थान

CHINA SCIENCE AND TECHNOLOGY REVIEW

February 2026

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China-Pakistan Space Programme Cooperation

In a significant milestone for space cooperation between China and Pakistan, the Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) has announced two astronauts for a space flight mission on the China *Tiangong* space station. This announcement came as the China Manned Space Agency (CMSA) unveiled its 2026 spaceflight plans, which include two crewed missions and one cargo resupply flight to the orbiting station. The CMSA also mentioned that astronauts from Hong Kong and Macao Special Administrative Regions are expected to participate in the upcoming missions.

CMSA spokesperson Lin Xiqiang stated that the Pakistani astronauts will undertake a short-duration mission during a crew rotation period, serving as payload specialists for conducting scientific research and microgravity experiments, covering materials science, biological studies and space technology applications.

Earlier on 12 February, Pakistan successfully launched its second indigenous Earth Observation Satellite (PRSC-E02) from China's Yangjiang Seashore Launch Centre, marking the first time a Pakistani satellite was launched using a Chinese sea-based mobile launch platform. Developed by SUPARCO, the PRSC-E02 is designed to provide high-resolution imagery for applications across agriculture, urban planning, natural resources management and disaster management. On the successful launching of the satellite, Pakistan Foreign Minister Ishaq Dar commended China's continued support to Pakistan's space programme.

Major Landmark Achievements by CAS in 2025

In the year 2025, several milestones were made by Chinese universities and research institutes in the field of nuclear science, biology, chemistry, medicine and engineering. The following top-12 are considered by the Chinese Academy of Sciences (CAS) as landmarks in the field of science and technology for the year 2025.

1. On 29 May 2025, the first asteroid sample-return mission *Tianwen-2* was successfully launched. The objective of the mission was to collect samples from the near-Earth asteroid 2016HO3 and explore the main-belt comet 311P, which is more distant than Mars.

2. On 21 January 2025, the Experimental Advanced Superconducting Tokamak (EAST), commonly known as China's "artificial sun", achieved a remarkable scientific milestone by maintaining a steady-state high-confinement plasma operation for an impressive 1,066 seconds.

3. A team of researchers from the University of Science and Technology of China and its partners made significant advancements in random quantum circuit sampling with Zuchongzhi-3, a superconducting quantum computing prototype featuring 105 qubits and 182 couplers.

4. Researchers from the Institute of Physics (IOP) of the Chinese Academy of Sciences developed a convenient, universal, atomic-level manufacturing technique – called vdW squeezing – for the production of 2D metals at the angstrom thickness limit.

5. Researchers from the University of Science and Technology of China developed an AI tool that predicts liver cancer recurrence risk with 82.2 percent accuracy.

6. Subsequent to the “Black Soil Granary” science and technology initiative in April 2025 in Harbin, Heilongjiang Province, where more than 90 institutions and over 1300 researchers from China participated, established an air-space-ground integrated monitoring technology system and completed the first nationwide remote sensing mapping of soil carbon and nitrogen in typical black soil regions with a spatial resolution of 10 meters. Based on this data, the program has proposed a theory centered on stabilizing and enhancing soil fertility for the prevention and control of black soil degradation and the promotion of soil health. It has also developed a comprehensive slope-gully erosion prevention and control technology system.

7. Research teams from the Center for Excellence in Brain Science and Intelligence Technology (CEBSIT) and Huashan Hospital affiliated with Fudan University developed China’s first-in-human brain-computer interface (BCI) device.

8. A research team led by Fu Qiaomiei from the Institute of Vertebrate Paleontology and Paleoanthropology and Ji Qiang of Hebei GEO University developed a method for automatic identification of human populations based on ancient proteins, revealing the most informative ancient human proteome to date.

9. A research team from the University of Science and Technology of China, the Shanghai Artificial Intelligence Laboratory and other collaborators has demonstrated a high-speed atom rearrangement technique that significantly advances neutral-atom quantum computation.

10. A Chinese scientific expedition team has successfully completed a manned deep-sea diving mission in the Arctic. The operation was carried out on *Tan Suo San Hao* (*Exploration III*), China's first comprehensive scientific research ship designed for global deep-sea exploration and the *Fendouzhe* (Striver) deep-sea manned submersible. Over a 98-day voyage, *Fendouzhe* completed 43 dives in Arctic waters and performed the first-ever underwater joint operation with China's *Jiaolong* submersible, pioneering a new “ship-submersible coordination” dive mode for manned underwater operation.

11. Shanghai Institute of Applied Physics (SINAP) has successfully achieved the first-ever thorium to uranium nuclear fuel conversion in a Thorium Molten Salt Reactor (TMSR) and obtained valid experimental data following thorium fuel loading, confirming the technical feasibility of thorium utilization in a molten-salt reactor nuclear energy system

12. On June 25, 2024, China's Chang'e-6 mission successfully returned 1,935.3 grams of lunar soil from the Moon’s South Pole at the *Aitken Basin* on the lunar far side – the Moon's largest, deepest, and oldest impact structure.

Scientific Collaboration Projects

Under the ambit of the Alliance of International Science Organisations of the China Belt and Road Initiative, Chinese and Bangladeshi scientists, using an innovative technology developed by the Institute of Hydrobiology of the Chinese Academy of Sciences, successfully carried out a survey and detected 146 Ganges River dolphins on the surface of the Jamuna River. The survey conclusion provided one of the most comprehensive population snapshots to date of a species, which for a long time was considered nearly 'invisible' to the human eye. The Ganges River dolphin is considered endangered by the International Union for Conservation of Nature, and for decades conservationists have struggled to accurately count its population. Commenting on the success of the mission, Chinese acoustic engineer Chen Yuwei stated that the recognition of dolphins through sound turned out to be far higher than through visual means, which only confirms the irreplaceable role of sound-based monitoring for the species. Meanwhile, applauding the Chinese role on the project, Mohammad Abdul Aziz from Jahangirnagar University underscored that "this is not just technology transfer" but a "different way and philosophy of conservation."

Scientific Research Breakthroughs and Discoveries

The Institute of Engineering Thermophysics under the CAS and Zhong Chu Guo Neng (Beijing) Technology Co., Ltd. achieved a major breakthrough in compressed air energy storage (CAES) technology. Test results showed that their compressor reaches a maximum discharge pressure of 10.1 MPa and a peak power output of 101 MW. It operates across a wide load range, from 38.7 percent to 118.4 percent, and achieves an efficiency of 88.1 percent at maximum discharge pressure, representing a leading level of performance globally. With this successful result, the CAS declared it as the world's first CAES compressor with a single-unit power exceeding 100 MW, which also stands out for its high efficiency, high-pressure capability, and wide operating range.

China Science Diplomacy

The 27th edition of the Asia Pacific Economic Cooperation (APEC)'s Policy Partnership on Science, Technology and Innovation (PPSTI) meeting was held in Guangzhou on 1 February. Participants reviewed the latest progress and follow-up plans for APEC cooperation in science, technology and innovation (STI) fields and held in-depth discussions on matters related to PPSTI's institutional development. Hosted by the Ministry of Science and Technology of China under the theme of "Fostering an Open and Collaborative Innovation Ecosystem for Resilient Growth in the Asia-Pacific", it brought together approximately 100 representatives from governments, businesses, academia, and the APEC Secretariat as well as guest international organizations across APEC member economies. The three priorities for APEC 2026 are: Openness, Innovation, and Cooperation. Within the APEC framework, PPSTI is a working group focused on advancing STI cooperation.