Making waves

Female captain braves the high seas for search and rescue missions LIFE, PAGE 18

AI speeding up diagnosis of cervical cancer

CHINA, PAGE 5

Healthcare boost

Using drones to deliver critical medical supplies gains ground

BUSINESS, PAGE 15

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Nation to launch asteroid probe next year

By **ZHAO LEI**
zhaolei@chinadailyuk.com.cn

China plans to carry out a series of massive space programs in the near future, according to a senior official of the China National Space Administration.

Bian Zhigang, deputy director of the space administration, said on Thursday at a news conference in Beijing that the administration is working on two new lunar expeditions and three deep-space exploration missions.

"We are developing the Chang'e 7 and Chang'e 8 robotic probes. Chang'e 7 will be sent to the South Pole region on the moon to conduct environmental and resources surveys, while Chang'e 8 will undertake technology demonstrations for in-situ resources utilization," he told Chinese and foreign journalists attending the news conference, which was hosted by the State Council Information Office.

Bian did not mention when the two lunar probes are scheduled for launch, but information published by the space administration indicates that Chang'e 7 will be launched around 2026 and Chang'e 8 around 2028.

The Chinese government has approved three new deep-space exploration missions to enable scientists to advance their research on the origins and evolution of the solar system, the impacts of small celestial bodies and solar activities on Earth, the possibility of extraterrestrial life, and other such significant scientific issues, according to the senior official.

"The Tianwen 2 will be a robotic mission to retrieve samples from a near-Earth asteroid. It is scheduled for launch next year. Tianwen 3, scheduled for (launch) around 2030, aims to land on Mars, collect and bring samples back to Earth. The Tianwen 4 will be sent to explore Jupiter around 2030," Bian said.

Inside
See more, page 3

Currently, scientists and engineers are working on mission plans and key technologies for Tianwen 3 and Tianwen 4, he added.

Tianwen missions, named after an ancient Chinese poem, cover China's interplanetary exploration endeavors.

The Tianwen 1 was launched in July 2020 and it successfully touched down on Mars in May 2021. The probe deployed a rover, named Zhurong, to explore the Red Planet. Zhurong was the sixth rover on Mars, after five from the United States. It traveled more than 1,900 meters and obtained a great deal of data and images before ceasing operations.

According to mission planners and scientists, Tianwen 2 will target 2016 HO3, the smallest and closest quasi-satellite to Earth. The basic plan is to use a large carrier rocket to send a probe comprising two parts — an orbiter and a reentry module — toward the asteroid.

After approaching 2016 HO3, the unmanned spacecraft will orbit around the asteroid and then fly very close to it to use a mechanical arm to scoop dust from the surface.

Tianwen 2 will fly back to the Earth's orbit and release its reentry module, allowing the latter to fall back to the ground, carrying the samples. The orbiter will then travel toward a main-belt comet called 311P to continue its scientific exploration tasks.

So far, scientists have identified about 1 million asteroids in the solar system, with more than 20,000 traveling near Earth.

The 2016 HO3, also known as 469219 Kamo'oalewa, was first spotted in April 2016 by an asteroid survey telescope at the Haleakala Observatories in Hawaii, the US.

Chang'e 6 mission sparks hopes for Sino-US space collaboration

By **LIA ZHU** in San Francisco
liazhu@chinadailyusa.com

China's historic feat of successfully retrieving the first-ever samples from the far side of the moon has ignited discussions about the United States' approach to exclude China from space projects, with experts emphasizing that the US should focus on inclusion rather than exclusion.

The Chang'e 6 probe returned to Earth on Tuesday, bringing back rock and soil samples from the lunar far side, which always faces away from the planet.

The probe landed on the moon on June 2 and lifted off two days later to start its journey back to Earth. The far side of the moon presents unique technical challenges for both landing and liftoff, yet China managed to land the probe, collect samples and bring them back safely.

The retrieved samples are expected to shed light on the origins of the solar system, while the potential for tapping lunar resources offers a promising path for collaboration between the US and China, particularly in advancing artificial intelligence technologies, according to an editorial posted by a Silicon Valley-based think tank and consultancy Sinotalks.

"Prior to the Chang'e 6 mission, China published the world's first high-definition lunar geologic atlas to, among other goals, facilitate scientists' identification of a proper site for a potential lunar station. New knowledge acquired from analyses of samples brought back by the Chang'e 6 probe will enrich the content of the atlas, making the establishment of a lunar station more promising," Mei Gechlik, founder and CEO of Sinotalks, told China Daily.

When the lunar station is established, in-depth studies on the moon's resources and evolution as well as studies on the whole solar system can be conducted more effectively, which could lead to the discovery of new lunar resources for the development of AI hardware more powerful than existing semiconductors, she said.

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>
> **Mei Gechlik,** founder and CEO of Sinotalks

In addition, innovative AI applications could be tested at the lunar station under conditions not available on Earth, Gechlik said. "These long-term and expansive benefits should motivate China and the United States to collaborate by contributing the financial capital and human capital needed to pull off this feat."

Taylah Bland, a researcher at the Asia Society Policy Institute's Center for China Analysis, also sees potential for China-US cooperation.

"China's latest achievement as the first country to land on the far side of the moon reinforces its space exploration strengths and capabilities," Bland wrote in a newsletter. "Despite an ongoing space race with the United States, China's collaboration with the European Space Agency on the Chang'e 6 mission highlights the potential for cooperation, not competition," she said.

However, a major hurdle stands in the way of such collaboration — the ongoing tensions between the two nations. The US has actively excluded China from NASA projects since 2011, and has intensified restrictions to limit China's access to US-developed technologies to contain its AI development.

This exclusionary approach of the US, according to Sinotalks, is meant to weaken China's space technology advancement, but it might be backfiring, as it bars US participation in China's space missions.

"Unlike their counterparts from France, Italy and Sweden engaging in moon-related research supported by payloads carried by the Chang'e 6 probe, US scientists have missed these opportunities because US restrictions have also excluded them from participating in China's space projects," Sinotalks said.

The think tank's editorial board further questioned whether the restrictions would genuinely hinder China's AI development, given its ability to overcome obstacles and continue with its space exploration.

The US restrictions are unlikely to be dismantled soon, but China's historic lunar mission presents an opportunity for a shift in its stance, said Gechlik, the Sinotalks CEO.

The 4-billion-year-old lunar samples brought back by the Chang'e 6 probe are 1 billion years older than samples brought back by the US and the former Soviet Union decades ago, she said, noting that China has "a good opportunity to extend an olive branch" to the US by inviting the country's scientists to study the new samples together.

The determination of US scientists to stay competitive in lunar exploration may prompt them to urge US authorities to accept China's olive branch, she said, adding, "If this occurs, a new era of 'moon diplomacy' will begin."

Chang'e 6's success is source of pride for HK

Tu Haiming says city's role in the space mission puts spotlight on its sci-tech research prowess, innovation

Lunar exploration reached another significant milestone with Chang'e 6's return to Earth bearing lunar samples on Tuesday.

President Xi Jinping extended his warm congratulations and sincere greetings to the Chang'e 6 mission command and all those who participated in the mission, noting that for the first time in human history, Chang'e 6 has successfully collected samples from the moon's far side and returned to Earth, marking another landmark achievement in China's journey to becoming a space and sci-tech power.

The overwhelming success of the Chang'e 6 mission brought both pride and joy to Hong Kong residents as the city contributed to the mission, and its contribution will go down in history. The Surface Sampling and Packing System used in this mission was jointly developed by a Hong Kong Polytechnic University (PolyU) research team and the China Academy of Space Technology. As Hong Kong prepares to celebrate the 27th anniversary of its reunification with the motherland, its residents are rejoicing, along with their mainland compatriots, at this feat and are cheering the city's contribution to the successful moon exploration journey.

The key task of Chang'e 6 was to collect samples from the far side of the moon, which could not have been achieved without the help of the Surface Sampling and Packing System codeveloped by the PolyU research team. Based on experience gained in previous aerospace projects, the PolyU research team had made multiple improvements to the device used in Chang'e 6 to expedite the sampling task.

Since PolyU joined the country's space mission in 2010, it has collaborated with the China Academy of Space Technology in developing space instruments, assisting in the assessment of suitable landing sites with the use of advanced topographic surveying technology, and has successively contributed to the success of Chang'e 3, Chang'e 4, and Chang'e 5 lunar explorations and the Tianwen 1 Mars mission.

The achievement of Chang'e 6 corroborates PolyU's world-class scientific research capability and embodies the country's full recognition of the city's sci-tech undertakings. How the Chang'e lunar explorations benefited from Hong Kong is widely discussed in public discourse. Many have come to realize that besides the city's glittering reputation as a free port, international metropolis and international financial center, Hong Kong also shines in scientific research. It goes without saying that Hong Kong would not have been able to take part in the space mission without the country's progress in the aerospace industry. The country provides the special administrative region with opportunities to flex its muscles in science and technology.

Tu Haiming
The author is vice-chairman of the Committee on Liaison with Hong Kong, Macao, Taiwan and Overseas Chinese of the National Committee of the Chinese People's Political Consultative Conference and chairman of the Hong Kong New Era Development Thinktank.

Geologists at the University of Hong Kong have also been involved in lunar exploration projects. They have recently worked with counterparts at home and abroad to study the landing area of Chang'e 6 at the Apollo Basin, where they spotted frequent but varied volcanic activity, reconstructed its volcanic history, and provided a geological framework that serves as an important reference for analyzing the collected samples. The success of the Chang'e lunar missions has instilled a sense of confidence in Hong Kong scientists for space exploration. Yung Kai-leung, director of the Research Center for Deep Space Explorations at PolyU, said that Hong Kong should devote more effort to research and development to support the country's future space explorations to the moon, Mars, and beyond. Hong Kong scientists see it as their dream, their duty, as well as their mission.

As Hong Kong excels in many areas, its prowess in scientific research is often overlooked. The city's contribution to the success of Chang'e 6 has drawn attention to the city's capacity in sci-tech development.

Hong Kong boasts abundant scientific research resources, with five of its universities ranking among the global top 100, which is no mean feat. The city also has two medical schools ranking among the top 50 globally, as well as 16 State Key Laboratories, with six Hong Kong Branches of Chinese National Engineering Research Centers.

Hong Kong's innovation capability is among the best in the world. In the 2023 Global Innovation Index released by the World Intellectual Property Organization, the Shenzhen-Hong Kong-Guangzhou science and technology cluster was ranked second globally for the fourth consecutive year, with Hong Kong retaining fifth place in Asia and 17th among 132 economies surveyed.

The success of Chang'e 6 should serve as an inspiration for Hong Kong society to make full use of the city's competitive edge to promote technological innovation. For example, Hong Kong has solid advantages in life and health technology, artificial intelligence, data science, and advanced manufacturing, which can be further developed for economic benefits. To this end, Hong Kong's research institutions can expand cooperation with world-class research institutions to develop an open sci-tech platform that facilitates the course of scientific development and avoids unnecessary detours; they should also expand cooperation with their mainland counterparts to complement each other's strengths, thereby raising the bar of scientific research to new heights; and they should collaborate with advanced manufacturing enterprises to commercialize their research and development results.

By complementing the strengths of all relevant parties and focusing on areas where it enjoys advantages, the city can find a shorter and smoother path to advance technological development for socioeconomic benefits.

In his opening remarks at this year's National Security Education Day commemoration in Hong Kong, Xia Baolong, director of the Hong Kong and Macao Work Office of the Communist Party of China Central Committee, emphasized the need for Hong Kong society to adopt a new mindset, and explore new ways and new approaches to facilitate the city's development. The successful Chang'e 6 mission points to a feasible direction for Hong Kong to pursue its own development and achievements while contributing to the country's development.

The views do not necessarily reflect those of China Daily.