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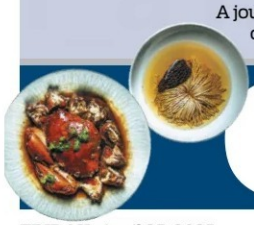

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Astronauts embark on six-month space trip

By ZHAO LEI
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Shenzhou XX astronauts, Senior Colonel Chen Dong (center), Colonel Chen Zhongrui (right) and Colonel Wang Jie, attend a departure ceremony on Thursday at the Jiuquan Satellite Launch Center in northwestern China. ZHANG XIAONING / FOR CHINA DAILY

China successfully launched its Shenzhou XX manned spaceship on Thursday, sending three astronauts to the Tiangong space station for a six-month mission.

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A Long March 2F rocket blasted off from the Jiuquan Satellite Launch Center in northwestern China at 5:17 pm, carrying the spaceship with mission commander Senior Colonel Chen Dong and crew members Colonel Chen Zhongrui and Colonel Wang Jie onboard.

Shortly after crossing the Karman line — the boundary separating Earth's atmosphere and outer space at an altitude of 100 kilometers above sea level — the Shenzhou XX spaceship separated from its carrier rocket and activated rapid autonomous rendezvous-and-docking mode.

The astronauts, who are all members of the People's Liberation Army Astronaut Division, are scheduled to arrive at the space station early on Friday, joining their peers from the Shenzhou XIX mission who have been in orbit for nearly six months.

At a news conference on Wednesday at the launch site, mission commander Chen Dong said he was thrilled to embark on his third spaceflight. "On the one hand, I feel immensely proud and honored, because being able to launch into space for my country again is both a great privilege and a source of deep happiness. On the other hand, there's also a deep sense of anticipation, as every journey into space is unique. I look forward to gaining more experience and achieving new breakthroughs," he added.

Wang Jie, a former spacecraft engineer at the China Academy of Space Technology in Beijing, said that as the mission's spaceflight engineer, his responsibilities include platform maintenance, equipment checks and repairs, handling emergencies, and conducting scientific experiments.

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Space: Shenzhou XIX crew to return next week

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"While each crew member has specific tasks to complete during the mission, we broadly operate as a team. Every procedure or scientific experiment is carried out through collaboration, with each of us serving as backup for the others as and when necessary," Wang said.

The Shenzhou XX crew is conducting China's 15th manned spaceflight and will be the ninth group of residents aboard the Tiangong, which is currently the only operational space station independently run by a single nation.

After their spaceship approaches and docks with the front port of the Tianhe core module of the Tiangong, the trio will enter the space station to meet with their Shenzhou XIX peers — mission commander Senior Colonel Cai Xuzhe, Lieutenant Colonel Song Lingdong and Lieutenant Colonel Wang Haoze.

Both teams will work together for about four days to ensure a smooth handover, after which the Shenzhou XIX crew will return to Earth, with their reentry capsule scheduled for touchdown on Tuesday.

Over the next six months, the Shenzhou XX astronauts will carry out a variety of tasks, including scientific experiments, technological demonstrations, and spacewalks to install space debris shielding equipment and other external instruments. They will also retrieve equipment from the station's exterior and hold science lectures.

Foreign proposals invited for Mars mission payload

By **ZHAO LEI** in Shanghai
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China has begun soliciting cooperation proposals for its ambitious Mars sample-return mission, Tianwen 3, the China National Space Administration said on Thursday.

At a ceremony in Shanghai marking the country's 10th Space Day, the agency announced it would offer opportunities for foreign researchers to place scientific instruments aboard the Tianwen 3 robotic probe.

According to the latest information published by the administration, the Tianwen 3 mission will include five components — a lander, an ascender, a service capsule, an orbiter and a reentry module. The mission is scheduled to launch around 2028 using two Long March 5 heavy-lift carrier rockets from the Wenchang Space Launch Center in southern Hainan province.

The lander, ascender and service capsule will travel along an Earth-Mars transfer trajectory and carry out orbital corrections before entering Martian orbit. At that point, they will separate, with the lander and ascender attempting an engine-assisted soft landing on the Martian surface. The service capsule, designed primarily to power the journey, will also carry scientific payloads.

Meanwhile, the orbiter and reentry module will follow the same path into Martian orbit, where they will remain to relay signals and await the samples.

Once collected and sealed in a vacuum metal container, the samples will be lifted into orbit by the ascender to rendezvous and dock with the reentry module.

After transferring the samples, the ascender will undock.

The orbiter and reentry module will then leave Martian orbit and head toward Earth. Near Earth, they will separate, and the reentry module will conduct a series of complex maneuvers to land at a designated site.

If successful, the mission would mark the first time Mars samples are returned to Earth. Scientists hope the material will help them search for signs of past life, study Martian geology and internal structure, and gain insight into the planet's atmospheric cycles.

In its announcement on Thursday, the administration said it has allocated 15 kilograms of payload capacity on the orbiter and 5 kilograms on the service capsule for foreign payloads. It encouraged interested parties to review detailed technical requirements on its official website.

China launched its first Mars mission, Tianwen 1, in July 2020. That mission, the country's first independent interplanetary exploration effort, saw its lander touch down on the Martian surface in May 2021 and deploy the Zhurong rover to carry out scientific tasks.

People view lunar soil samples displayed at a science exhibition celebrating China's 10th Space Day in Shanghai on Thursday. TAO LEI / FOR CHINA DAILY

Chang'e 5 samples to be shared with six nations

Deal signed with selected institutions during an event marking 10th Space Day

By **ZHAO LEI** in Shanghai
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In its latest move to promote international space cooperation, China has agreed to distribute lunar samples collected by its Chang'e 5 mission to foreign scientists.

At a ceremony in Shanghai on Thursday marking the country's 10th Space Day, the China National Space Administration announced the results of international applications to borrow the precious lunar material.

Seven universities and institutes from six countries were selected: the Institut de Physique du Globe de Paris in France; the University of Cologne in Germany; the University of Osaka in Japan; Pakistan Space and Upper Atmosphere Research Commission; The Open University in the United Kingdom; and Brown University and Stony Brook University in the United States.

Agreements were signed with representatives of the selected institutions during the event.

The CNSA began accepting international applications for the Chang'e 5 samples in November 2023. By the deadline at the end of 2023, it had received 24 applications from 11 countries and international organizations, requesting a total of 71 sample sets.

A panel of experts reviewed the applications based on the Chinese government's Procedures for Requesting Lunar Samples and Rules for Management of International Cooperation in Lunar Samples and Scientific Data, ultimately selecting the seven institutions.

"Chang'e samples belong not only to China, but also to the world, representing a shared treasure for all humanity," CNSA Administrator Shan Zhongde said at the ceremony.

He emphasized that China's lunar exploration efforts have always upheld principles of equality, mutual benefit, peaceful use and win-win cooperation, adding that the country is committed to sharing its scientific achievements with the global community.

"We will continue accepting international applications for lunar samples and look forward to global scientists making further discoveries to expand human knowledge and benefit all mankind," he said.

Wang Yanan, editor-in-chief of Aerospace Knowledge magazine, said the move demonstrates China's commitment to open scientific exchange and collaborative lunar research.

"Scientists around the world are also eager to have access to the Chang'e 6 samples — the first ever collected from the moon's far side, which researchers believe hold enormous scientific value. I'm sure the Chinese government will soon open international applications for those samples," he said.

The Chang'e 5 robotic mission, launched on Nov 24, 2020, from the Wenchang Space Launch Center in Hainan province, successfully landed on the moon on Dec 1. It was the third spacecraft to touch down on the lunar surface in the 21st century, following China's earlier Chang'e 3 and 4 missions.

The landmark mission returned with 1,731 grams of lunar rocks and soil on Dec 17, marking the world's first lunar sample return in 44 years. It made China the third country — after the US and the former Soviet Union — to retrieve materials from the moon. The CNSA distributed the first batch of Chang'e 5 samples in July 2021, handing over 17.5 grams to scientists at 13 domestic research organizations conducting 31 scientific projects.

To date, eight rounds of samples have been distributed to Chinese researchers, supporting the work of more than 100 research teams.

The samples have enabled Chinese scientists to achieve significant academic breakthroughs, including the discovery of the sixth new lunar mineral — Changesite-(Y) — which falls under the merrillite category. It is the first lunar mineral identified by Chinese researchers.

At the invitation of China's permanent mission to the United Nations in Vienna, representatives from Kenya, South Africa and envoys from Venezuela, Belarus, Egypt, Malaysia, Indonesia and Kazakhstan in Vienna traveled to China to participate in a series of activities for the country's Space Day.

10 intl projects picked for Chang'e 8 mission

By **ZHAO LEI** in Shanghai
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China has selected 10 international scientific and technological projects to join its Chang'e 8 lunar exploration mission, the China National Space Administration announced on Thursday.

The selected projects — from 11 countries and regions and the International Society for Terrain-Vehicle Systems — span a wide range of fields and will be carried to the moon aboard the Chang'e 8 robotic probe.

According to the agency, the projects include a multifunctional robot designed by researchers at two Hong Kong universities, an intelligent exploration robot from Turkiye's Middle East Technical University, a lunar visible and infrared imaging system jointly built by Bahrain's National Space Science Agency and the Egyptian Space Agency, and a lunar electric potential monitor developed by the Iranian Space Agency.

CNSA Administrator Shan Zhongde said on Thursday that China will work with international partners to advance the Chang'e 8 mission, aiming for scientific discoveries and technological breakthroughs in lunar exploration "to benefit mankind".

Scheduled for launch around 2029, the Chang'e 8 mission will target the Leibnitz-Beta Plateau near the moon's south pole. The mission will consist of a lander, a rover and a robot.

Together with the earlier Chang'e 7 mission, Chang'e 8 will conduct scientific surveys and test technologies for in situ resource utilization — the practice of collecting, processing and using materials found or manufactured on other astronomical bodies, such as the moon or Mars. These efforts will help lay the groundwork for an International Lunar Research Station.

The use of lunar resources will be crucial for supporting human activity on the moon, said Wu Weiren, an academician at the Chinese Academy of Engineering and chief planner of China's lunar exploration programs.

In October last year, CNSA opened 200 kilograms of payload capacity for international cooperation and received 41 proposals. After evaluations based on scientific merit, technical feasibility and diversity of collaboration, 14 proposals from 11 countries and regions, as well as the International Society for Terrain-Vehicle Systems, were integrated into 10 selected projects, according to the agency.

Pang Zhihao, a space technology expert who worked for decades at the China Academy of Space Technology, said China's push to build an international research outpost on the moon underscores its commitment to global cooperation in lunar exploration.

"You can find that most of the selected projects come from developing nations that want to build their own space industry," Pang said. "Allowing their participation in world-class missions like Chang'e 8 will tremendously boost their experience and know-how in planning and executing space activities and enable their designers and engineers to learn and practice as early as possible."


Visitors view a model of a future lunar research station displayed at a science exhibition marking China's 10th Space Day in Shanghai on Thursday. TAO LEI / FOR CHINA DAILY

Joint venture debunks theories about universe

By **LIN SHUJUAN** in Shanghai
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A cutting-edge astronomical satellite jointly developed by Chinese and French scientists has captured the attention of the global scientific community with groundbreaking discoveries, just 10 months after entering orbit.

The Space-based Multi-band Variable Object Monitor, or SVOM, unveiled its initial scientific achievements during China's 10th Space Day celebration in Shanghai, marking a major step forward in the study of gamma-ray bursts — the most violent explosions in the universe since the Big Bang. These bursts occur during the collapse of massive stars or the merger of compact stellar remnants such as neutron stars and black holes.

Launched on June 22, 2024, after nearly two decades of collaboration between the China National Space Administration and France's National Center for Space Studies, SVOM has already detected more than 100 gamma-ray bursts. The results affirm the satellite's status as the most powerful "gamma-ray burst catcher" in the world.

Among its most notable findings is GRB250314A, a gamma-ray burst originating from just 730 million years after the birth of the universe — about 13 billion years ago. Scientists believe it may have been caused by the collapse of one of the universe's earliest stars into a black hole or neutron star, offering valuable clues about the cosmic dawn.


An image of the Space-based Multi-band Variable Object Monitor. PROVIDED TO CHINA DAILY

SVOM also observed GRB241105A, now considered the most distant short-duration gamma-ray burst ever recorded, highlighting the satellite's unprecedented capabilities.

"These discoveries not only affirm the exceptional performance of the satellite, but also offer a fresh perspective on exploring topics such as the formation of early stars and the genesis of black holes," said Wei Jianyan, SVOM's principal investigator on the Chinese team and a researcher at the National Astronomical Observatories of the Chinese Academy of Sciences.

Wei said SVOM has also enabled the discovery of several peculiar gamma-ray bursts, posing new challenges to established theories in high-energy astrophysics.

Bertrand Cordier, principal investigator for the French team, emphasized the satellite's sensitivity to rich X-ray gamma-ray bursts, which were previously difficult to detect, thus expanding the scientific frontier in the field.

The SVOM project, launched in 2005, has brought together scientists and engineers from institutions including the Research Institute in Astrophysics and Planetology in Toulouse, France, the Institute of High Energy Physics in Beijing and Xi'an Institute of Optics and Precision Mechanics in Shaanxi province.

Weighing 930 kilograms, the satellite was built by the Chinese Academy of Sciences' Innovation Academy for Microsatellites in Shanghai. It is equipped with four scientific payloads jointly developed by Chinese and French teams.

Zhang Yonghe, SVOM's project manager and a researcher at the academy, said the satellite is the centerpiece of a rapid, sophisticated observation system that connects with more than 40 ground communication stations worldwide. Once a gamma-ray burst is detected, the system can coordinate space and ground-based observations in less than 10 minutes.

"The system can relay observation commands to SVOM in the time it takes to enjoy a cup of coffee," Zhang said.

With a minimum operational life of three years, SVOM is expected to play a key role in advancing high-energy astrophysics. Scientists anticipate it will deepen understanding of how the first stars formed and died, clarify the mechanics behind black hole formation, identify electromagnetic counterparts to gravitational wave events and refine theories on the early evolution of the universe.

The satellite was officially handed over to the National Astronomical Observatories of the Chinese Academy of Sciences on Wednesday.