

Sound repairer

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Crew members of the Shenzhou XIV mission, Chen Dong (right), Liu Yang (center) and Cai Xuzhe, attend a preflight ceremony at the Jiuquan Satellite Launch Center, Gansu province, on Sunday. This is the first in a series of missions that together will see Chinese astronauts in space throughout the next 10 years. **LI GANG / XINHUA**

TIANGONG SPACE STATION (TO BE COMPLETED BY THE END OF 2022)

ARTIST'S RENDERING

The first four and the eighth Shenzhou craft were unmanned because they were used to demonstrate technologies and equipment. So far, the country's nine manned spaceflights (including the Shenzhou XIV) have sent 34 Chinese astronauts into orbit.

Chinese engineers are developing a next-generation manned spacecraft, which has yet to be named. The new craft will consist of two major parts — a re-entry module that will house astronauts and serve as the control center, and a service module, which will house the power and propulsion systems.

Source: China Academy of Space Technology

Orbital module
Re-entry module
Service module

9m height
2.8m diameter
8 metric tons

It will carry up to three astronauts

It will be able to orbit for five days powered by its own fuel

CHINA DAILY

Astronauts sent on mission to complete space station

By **ZHAO LEI**
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The crew of the Shenzhou XIV mission, China's ninth manned spaceflight, arrived at the Jiuquan Satellite Launch Center in the northwestern Gobi Desert.

The three astronauts — mission commander Senior Colonel Chen Dong, Senior Colonel Liu Yang and Senior Colonel Cai Xuzhe — had entered the space station's core module, Tianhe, by 8:50 pm.

They are scheduled to stay in the outpost, orbiting 400 kilometers above the Earth, for six months to complete the assembly in space of the colossal station.

Their Shenzhou XIV spacecraft was launched by a Long March 2F rocket that blasted off at 10:44 am from a service tower at the outskirt Jiuquan center.

It is the second time that Chen and Liu have gone into space, and Cai's first, making him the 14th Chinese astronaut in outer space.

When their mission is completed, around the end of this year, the Tiangong space station will have become fully operational.

The three astronauts' mission

has inaugurated a 10-year period in which, barring unforeseen circumstances, Chinese astronauts will be in space every day.

Shenzhou XIV is the sixth spacecraft to visit Tiangong and the third crewed ship to transport astronauts to the orbiting outpost.

Tiangong currently consists of four sections — Tianhe, the core module, the Shenzhou XIV craft; and the Tianzhou 3 and Tianzhou 4 cargo ships.

The Shenzhou XIV crew, all from the second generation of Chinese astronauts, will work with ground controllers to connect the Wentian and Mengtian space labs with the Tianhe module and then use the robotic arm to move the labs into their permanent position, said Lin Xiqiang, deputy head of China Manned Space Agency.

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Online
Watch the video
by scanning
the code.

CHINA

Six months of tasks ahead

Shenzhou XIV astronauts have plenty of objectives to complete at space station

By ZHAO LEI
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The Shenzhou XIV mission crew will embark on a tight schedule that involves a succession of complex operations during their six-month space visit, astronaut Liu Yang said on Saturday. Liu, the first Chinese woman in outer space, said at a news conference on Saturday at the Jiuquan Satellite Launch Center in northwestern China's Gobi Desert, that she and two other astronauts — Chen Dong and Cai Xuzhe — will be very busy during their stay, as they are tasked with monitoring the assembly of the Tiangong space station, which will be altered nine times as various components arrive.

The crew arrived at Tiangong on Sunday afternoon. The two space lab components — Wentian and Mengtian — will be transported to Tiangong's orbit to dock with the Tianhe core module during the astronauts' tenure. The crew will work with ground controllers to carry out the lab's docking and repositioning operations, she said.

Meanwhile, the astronauts will also need to prepare for the arrival of the Shenzhou XV crew and Tiangong's 5 cargo ship near the end of their journey, Liu noted.

"In addition, we will enter the Wentian and Mengtian labs to arrange and take care of the scientific equipment. We will use a new hatch and a new small robotic arm to conduct spacewalks. We will perform a large number of scientific experiments and also offer educational activities for schoolchildren via livestream," she said. "This mission will also mark the first time that

“This mission will also mark the first time that Chinese astronauts will celebrate our National Day in space.”

Liu Yang, first Chinese woman in outer space and crew member of Shenzhou XIV

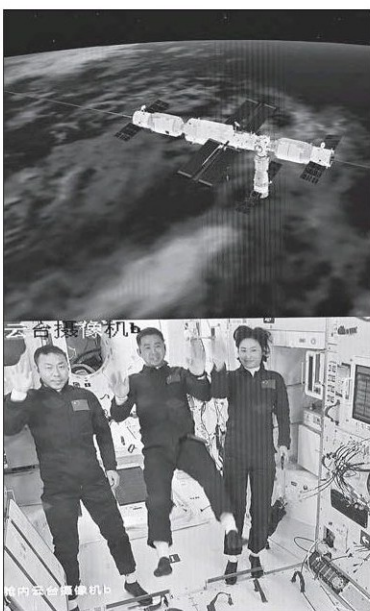
Chinese astronauts will celebrate our National Day in space.”

Chen, the mission commander, said at the meeting that his crew will make full use of the Tiangong station to conduct sophisticated, cutting-edge experiments and tests to advance science and technology. He said the scientific and technological achievements that will emerge from Tiangong will benefit people worldwide.

In an interview with China Central Television that was broadcast on Saturday, Liu said she had talked to her daughter and son about her six-month trip.

"I explained why their mom needs to take part in this spaceflight and why I will be away from home for half a year. I also told them what they need to do during my mission period. At first, they were not so happy about my leaving, but they finally said later that they understood," she said.

"They told me that they want me to take as many pictures as possible so they can share the



Astronauts Cai Xuzhe, Chen Dong and Liu Yang (from left) wave to the command center after entering the Tianhe core module of China's Tiangong space station on Sunday evening. U XIN / XINHUA

beautiful cosmic scenes with their classmates.”

Cai, who is on his first spaceflight, told the State broadcaster that he will watch TV shows, lis-

ten to music and read some books on his personal devices in his leisure time. He also plans to grow some plants using seeds he'll take to the station.

Cutting-edge scientific testing to be undertaken

By ZHAO LEI
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Upon its completion by the end of this year, the Tiangong space station will extensively advance science and technology, said Lin Xiqiang, deputy head of the China Manned Space Agency.

There will be 25 scientific equipment cabinets inside the station after its two space lab components are connected with the core module, he told a news conference at the Jiuquan Satellite Launch Center on Saturday.

"Each cabinet is a small lab that can hold interdisciplinary experiments. Cabinets inside the Wentian lab will mainly be used to serve biological and life science work and can

support research on the growth, aging and genetic traits of plants, animals and microbes in the space environment," Lin said.

"Equipment in the Mengtian lab will be focused on microgravity studies and will be used to carry out experiments in fluid physics, materials science, combustion science and fundamental physics."

Scientists said there will be a cutting-edge atomic clock instrument on the station that will help scientists revolutionize research in quantum mechanics, one of the most sophisticated spheres in physics.

The device, called a high-accuracy time-frequency cabinet, will be one of the most accurate chronometers ever built by man.

Meet the crew

• Senior Colonel Chen Dong, 43, a native of Henan province, joined the People's Liberation Army Air Force in August 1997. He served as a squadron commander in a fighter jet regiment until May 2010, when he was recruited by the PLA Astronaut Division as one of its second-generation astronauts.

In October 2016, Chen took part in the 33-day Shenzhou XI mission.

In December 2019, Chen was selected for the Shenzhou XIV mission. He was a member of the backup crew for the Shenzhou XIII mission.

• Senior Colonel Liu Yang, 43, a native of Henan province, joined the PLA Air Force in August 1997. She was a deputy squadron commander of a transport aircraft unit before joining the second group of the PLA Astronaut Division in May 2010.

Liu took part in the Shenzhou IX

mission that lasted nearly 13 days in June 2012, becoming the first Chinese woman to go to outer space.

In December 2019, Liu was selected for the Shenzhou XIV mission. She was also a member of the backup crew for the Shenzhou XIII mission.

The astronaut is a vice-president of the All-China Women's Federation.

• Senior Colonel Cai Xuzhe, 46, a native of Hebei province, joined the PLA Air Force in September 1995 and was a commander of a fighter jet unit.

Cai was selected as one of the PLA Astronaut Division's second-generation astronauts in May 2010.

In December 2019, he was selected for the Shenzhou XIV mission and was also a member of the backup crew for the Shenzhou XIII mission.

ZHAO LEI

Mission: Spacewalks, student lectures scheduled

From page 1

Wentian, the station's first lab component, will be launched in July by a Long March 5B rocket from the Wenchang Space Launch Center in Hainan province. Mengtian, the second lab component, will be launched by a Long March 5B from Wenchang in October.

After they are connected with Tiangong, the station will form a T-shaped structure.

The astronauts will also be tasked with installing and configuring equipment, conducting scientific experiments and technological demonstrations, and maintaining routine operations on Tiangong, Lin said.

They will engage in two to three spacewalks and give science lectures to students, he said.

In the second half of the mission, the Tianzhou 5 cargo craft and Shenzhou XV crew are scheduled to arrive at the massive space station.

The Shenzhou XIV and XV crews will meet inside Tiangong and work together for a short period before Chen's crew returns to Earth in December, the official said.

Previously, the Shenzhou XII and XIII three-member crews lived inside Tiangong. The Shenzhou XIII crew returned to Earth in mid-April.

In early May, the Tianzhou 4 cargo spacecraft was launched by a Long March 7 rocket from the Wenchang Space Launch Center, transporting nearly 6 metric tons of propellants and materials to the Tiangong station.

Pang Zhihao, a retired analyst from the China Academy of Space Technology and an independent spaceflight researcher, said on Sunday that the Shenzhou XIV crew's tasks are more demanding and challenging than those handled by the Shenzhou XII and XIII crews.

"They will not only need to monitor the docking of the Tianhe module and the two space labs, but also are responsible for assembling and configuring many instruments inside the labs," he said.

"What's more, it will be the first time that large components, namely the two space labs, will be linked with the core module. There will likely be technical uncertainties that the astronauts may have to deal with."

At the end of their journey, the crew will share their experience of operating and maintaining the station with the Shenzhou XV crew, he said.

Wang Ya'an, editor-in-chief of Aerospace Knowledge magazine, said building and running a space station is a major symbol of a great space power.

This feat — along with other recent accomplishments, such as landing a rover on Mars — marks China's leading status in the international space arena, Wang added.

The Tiangong spacecraft is expected to operate for up to 15 years and scheduled to serve as a national scientific platform, space officials have said, noting that it will also be open to foreign astronauts.

Skater's salute



Two-time Olympic gold medalist Wu Dajing (center) cheers on the astronaut crew of Shenzhou XIV as they depart on their mission from the Jiuquan Satellite Launch Center in northwestern China on Sunday. Wu said he came to reciprocate support for the astronauts, who'd cheered on the athletes during the recent Beijing Winter Olympic Games. SU DONG / FOR CHINA DAILY

Space station a rewarding achievement

The successful launch of the Shenzhou XIV spacecraft from Jiuquan, Gansu province, on Sunday morning, and its successful docking with Tianhe core module of the Tiangong space station about seven hours later, mark the beginning of China's third crewed mission to its space station.

During their six-month stay in Tianhe, the three astronauts — Chen Dong, Liu Yang and Cai Xuzhe — will help with the docking, setting up and testing of two lab modules, Wentian and Mengtian, that are due to be launched in July and October.

The transformation of the space station from the current single-module structure into a three-module space laboratory will provide a larger-scale platform for scientific experiments in microgravity.

Another three astronauts are due to be sent to the space station at the end of the current mission to work and live with the crew for five to 10 days, which will be the first crew rotation in space and bring the number of astronauts in space to a record six at the same time.

The Tiangong space station is scheduled to be fully crewed by the end of next year and operational for about 15 years from then on.

After the space station's operations are normalized, large-scale scientific research projects are

planned with the aim of not only furthering understanding of the universe but also helping to promote sustainable development on Earth.

Despite being a latecomer to space, with the huge input of the country and productive international cooperation, China has proved to be not only a keen learner but also a brave explorer and a true innovator in its space endeavors — it successfully landed the first exploratory rover on the far side of the moon in 2020 — and its space ambitions span far into the future with grand plans for space exploration, research and commercialization.

That the country has been making one achievement after another with its space missions reflects the rapid development of its aerospace sector thanks to its institutional strengths. Adopting a results-oriented model, hundreds of institutes, universities, labs and companies are involved in China's space cause. Their achievements in advancing China's space cause also produce tangible benefits for the whole nation in the form of transferrable research results.

The remarkable achievements China has made in space exploration are expected to attract more young people to dedicate their talents to the meaningful cause that benefits humankind as a whole.