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香港版
HONG KONG

CHINADAILY

中國日報

WEDNESDAY, November 30, 2022

www.chinadailyhk.com HK \$10



Crew members of the Shenzhou XV space mission — Major General Fei Junlong (right), Senior Colonel Deng Qingming (center) and Senior Colonel Zhang Lu — wave during a ceremony on Tuesday night prior to their departure from Jiuquan Satellite Launch Center in Northwest China. WANG JIANGBO / FOR CHINA DAILY

Shenzhou XV crew set out for Tiangong space station

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The crew members of the Shenzhou XV mission, China's 10th manned spaceflight, set out on their journey to the country's Tiangong space station on Tuesday night.

A 20-story-tall Long March 2F carrier rocket blasted off on schedule at 11:08 pm from the Jiuquan Satellite Launch Center in northwestern China's Gobi Desert and soon placed the Shenzhou XV spacecraft in a low-Earth orbit about 400 kilometers above the ground.

As this was the first time a rocket carrying astronauts was launched in freezing temperatures of nearly minus 20 degrees Celsius, engineers equipped the rocket and its service tower with a host of cold-proof materials.

All of the previous nine crewed

flights had been launched between June and October.

Within hours of the launch, the eight-metric-ton spaceship was due to approach and dock with the Tianhe core module of the Tiangong station.

After docking with the core module, the crew members — Major General Fei Junlong, the mission commander, Senior Colonel Deng Qingming and Senior Colonel Zhang Lu — would open a hatch and then float into the Tianhe module to meet their peers from the Shenzhou XIV mission — Senior Colonel Chen Dong, Senior Colonel Liu Yang and Senior Colonel Cai Xuzhe — who have been in space for nearly six months.

In a video which the Shenzhou XIV crew sent to Fei's team hours before Tuesday's launch, Chen, Liu and Cai appeared in pullovers which said in Chinese "Old Friends Are Coming" and said that they were very much looking forward to the arrival of the Shenzhou XV crew.



The Long March 2F carrier rocket carrying Shenzhou XV blasts off from the Jiuquan Satellite Launch Center on Tuesday. LI GANG / XINHUA

Liu and Cai also said: "We will give you a big hug as soon as we meet". The Shenzhou XV marks mission commander Fei's return to space after 17 years. The 57-year-old was a

member of the Shenzhou VI crew in October 2005.

For both Deng, 56, and Zhang, 46, it's their first journey into space. Deng is the last serving member of China's first group of astronauts to take part in a spaceflight while Zhang had been the only one in the second generation of astronauts without spaceflight experience prior to the mission.

Their arrival will mark the first time that six Chinese people have been in space at the same time. There have been at most three Chinese astronauts in space at a time.

During the six-month Shenzhou XV mission, Fei's crew will carry out three to four spacewalks to mount equipment outside the station. Their major tasks will also include unlocking, installing and testing 15 scientific cabinets, conducting more than 40 scientific experiments and technological demonstrations, and carrying out six cargo orbital deployment operations, according to mission officials.

Tiangong space station open to world

After years of efforts, China's space station will soon be fully operational.

Over the past 19 years, from China's first manned space mission Shenzhou V to the latest Shenzhou XV launch, the nation's space endeavors have progressed from a single-astronaut mission to the long-term stay of several astronauts in space. The number of astronauts one spaceship can carry has increased from one to three, and the length of time the astronauts stay in space has expanded from just 23 hours to six months.

When the Shenzhou XV spacecraft docks with the space station, the three astronauts already crewing the station will hand it over to the three new arrivals before returning to Earth. During the weeklong transition period there will be six people living in the space station.

China's space progress has been accelerating. It took eight years to go from Shenzhou V to the Tiangong 1 space lab, and five years from Tiangong I to the more advanced space lab Tiangong II. During that process the program advanced so rapidly that a planned Tiangong III was incorporated into Tiangong II.

Similarly, the Long March 2F Y15 rocket, which carried the Shenzhou XV spacecraft into space, has 45 technological improvements over its predecessor which carried Shenzhou XIV, completing the upgrading and optimization of the Long March 2F rocket series.

Likewise, after the Tianhe core module of the space station was put into orbit in April last

year, it took only a year and a half for the two laboratory modules to be attached, forming a Chinese space station complex that comprises the core module and two lab modules.

With the arrival of the Shenzhou XV spacecraft and its crew, the Chinese space station will open a new chapter for China's space program, as the astronauts will conduct a series of scientific experiments in space. More than 40 space science and technology experiments will be conducted by the Shenzhou XV astronauts. And with more scientific research equipment to be sent to the space station it will be equivalent to having a world-class university laboratory in space.

A number of space science projects China jointly selected with the United Nations Office for Outer Space Affairs and European Space Agency are planned, and the relevant payloads will begin to be sent to the Chinese space station next year. Requests have also been received from several countries to send astronauts to participate in the space station experiments, and China is coordinating with the relevant parties and actively preparing for the training of foreign astronauts.

The International Space Station has conducted over 3,000 experiments during its time in service, and the Chinese space station will be no slouch in this regard. As the only space station after the ISS is retired, it will continue to expand humanity's understanding of space. That is worth looking forward to.

Ann Buel

Space cooperation is now in the balance

Even before the historic flight of Yuri Gagarin and Sputnik, space was an area of cooperation, as well as competition or conflict. This was so during the Cold War, and is also the case today.

Space has become a central issue of war and peace, international law, justice and international development, and cooperation between the world's leading states. It is home for hundreds of satellites, which ensure the functioning of critical Earth systems — such as telecommunications, television and the internet, GPS navigation and weather forecasts, climate change observation, military applications, and many more.

However, the conflict in Ukraine has shifted a number of trends, suggesting that the nature of cooperation in space is moving in a direction that could pose serious international security threats.

The future of space exploration, which is being determined by the dynamics among the space blocs, has turned toward increased cooperation, but also toward competition.

In 1975, 10 European nations founded the European Space Agency, which now includes 22 nations, and this could be considered among the first space blocs. The recent ones established in the last decade include the African Space Agency; the Latin American and Caribbean Space Agency; and the Arab Space Coordination Group. The most current establishments are the United States-led Artemis Accords, and the Sino-Russian lunar agreement.

According to Svetla Ben-Itzhak, an assistant professor of space and international relations at Air University, these blocs allow for nations to collaborate closely with others in their blocs, but the blocs are competing with one another. For example, the Artemis Accords aim to return people to the Moon by 2025 and establish a governing framework for exploring and mining on the Moon, Mars and beyond. The mission aims to build a research station on the south pole of the Moon with a supporting lunar space station. Similarly, Russia and China are collaborating on a mission to send people to the south pole of the Moon by 2026. This joint Sino-Russian mission also aims to eventually build a Moon base and place a space station in lunar orbit.

Although being open, these blocs are not collaborating to accomplish similar missions on the Moon, which indicates that strategic interests and rivalries on the ground have been transposed to space. The European Space Agency, for instance, has discontinued several joint projects it had planned with Russia and is instead expanding its partnerships with the US and Japan. Although, according to European Commission sources, the recent energy crisis in Europe and the desire to allocate budgetary resources to Ukraine have led to a number of planned space exploration-related projects being postponed.

Space is also the home of the International Space Station, launched in 1998 by the US and Russia, which is now supported by

15 countries, working together to advance space exploration, and elaborate and test the new technologies. However, following the sanctions, related to the conflict in Ukraine, Roscosmos, the Russian space agency, reportedly announced that it will exit the International Space Station program after 2024 to focus on developing its own national space station called the Russian Orbital Service Station. The US is scrambling to find a replacement for Russia which controls essential functions on the station that keep it in an upright orbit around the Earth. But with Roscosmos' withdrawal, the operations of the International Space Station are coming to a halt, after which this masterpiece of space cooperation is expected to be de-orbited by 2030.

China has already assembled the three modules of its Tiangong space station in orbit and astronauts live aboard the spacecraft, which is expected to be fully operational by the end of this year. This will affect the space programs of the European Union in particular, which does not aim to build its own space station, sidelining it from defining the development of its space policy in the coming years. The space policy of the European Union recently focuses on expanding its satellite system with communication satellites to become operational by 2027, as confirmed by Rodrigo da Costa, executive director of the European Space Agency. The objective is to offer governmental services secure access to the internet in crisis situations — like cyberattacks and natural disasters, as well as offer

broadband connection in places where internet access currently isn't available in Europe, the Arctic region and Africa.

The path toward cooperation versus conflict in space is not closed, as has been confirmed recently by NASA, whose administrator Bill Nelson said at the international space conference in Paris in September that China and NASA have recently coordinated over issues such as the orbits of their respective Mars spacecraft. Although he noted that there is a lack of deeper understanding, NASA and CNSA (the China National Space Administration) have notably identified some of the same potential landing areas around the lunar south pole for their planned missions.

A NASA spokesperson said, just as the lunar south pole is of scientific interest to NASA, it is also of scientific interest to other nations, so some overlap in regions is to be expected and is not a concern.

According to Svetla Ben-Itzhak, if the existing space blocs remain flexible and open to all, cooperation will flourish, and the world may yet avoid an open conflict in space. Maintaining the focus on scientific goals and exchanges between and within space blocs — while keeping political rivalries at bay — will help to ensure the future of international cooperation in space. "Space is hard, so pooling resources, manpower and know-how makes sense."

The author is a former officer of the European Commission. The views don't necessarily represent those of China Daily.

Talking the language of harmony in space

European astronauts turn to Chinese to expand horizons and friendships

As China broadens its exploration of space at an ever faster pace, many in Europe are hoping for expanded cooperation with China in this new frontier.

With their career paths in mind, many European astronauts have begun learning Chinese, and they are also showing a great interest in Chinese culture.

"Looking up, I see the immensity of the cosmos. Bowing my head, I look at the multitude of the world. The gaze flies, the heart expands, the joy of the senses can reach its peak, and indeed, this is true happiness," Italian astronaut Samantha Cristoforetti tweeted in mid-October during a stay on the International Space Station, or ISS. She was quoting from *Lantingji Xu*, a classic of Chinese literature from the 4th century, to describe her feelings in space.

Cristoforetti is a member of the European Space Agency, or ESA, working group, who speaks Chinese very well. She is responsible for liaising with her Chinese counterparts.

Cristoforetti tweeted the verses from *Lantingji Xu* in Chinese with translations in Italian and English, as well as three photos of taken in space of China's Bohai Bay and the view of China's capital Beijing. The post quickly went viral.

In fact, her connections with China go beyond space. In 2019, she came to China and gave a lecture at the Beijing Institute of Technology. As the first Italian female astronaut in space, she was looked up to as a role model by the students, especially female ones, who are all future engineers.

"You are building a powerhouse for the future of aerospace engineering," she said in words of encouragement to them.

Thomas Pesquet is another ESA astronaut who has an affinity with China. One of the most famous European astronauts, he is also a prominent influencer on social media.

The Frenchman speaks six languages, including Chinese. On the eve of the year 2021, he shared his cultural knowledge of the Chinese New Year on Twitter: "The Chinese New Year starts 12 February (in 2021 according to the traditional Chinese calendar) and is celebrated with 'the dragon' (in emoji), my favorite mythical creature now."

In November last year, Pesquet and three other astronauts aboard the SpaceX Crew Dragon arrived at the ISS.

Crossing paths

The following day after he and his fellow crew members took off, the Chinese-manned space mission Shenzhou-11 landed. The French astronaut "crossed paths" with two Chinese taikonauts, Jing Haipeng and Chen Dong, who then recorded a short video for the ESA and especially for Pesquet, to greet his departure for the ISS.

When three Chinese taikonauts on the Shenzhou-12 mission joined the Chinese space station, or CSS, in mid-June 2021, Pesquet posted a congratulatory message on the image-hosting website Flickr: "The population of humans in space grew by 43 percent ... all human spaceflight is an incredibly

impressive achievement, congratulations!" The post included photos of China taken from space.

German Matthias Maurer is also an active ESA participant in Sino-European cooperation. He has been learning Chinese for years with the intention of working better with his Chinese counterparts on the Chinese station, he told Xinhua in 2018.

His Chinese name Ma Tan was chosen by himself, and means "heavenly horse," according to his Chinese teacher.

He and Cristoforetti participated in a sea survival exercise organized by the Astronaut Center of China in 2017, marking the first joint training session involving Chinese and foreign astronauts in China.

Maurer said China has a lot of advantages such as its own rockets, capsules and a space station. "I want to participate in both European and non-European experiments there. Also (to) build a live video connection so that the European public can talk with the European astronauts in the CSS and see inside," Maurer said.

"Training and living with 16 other Chinese astronauts, he felt like "being part of a family."

"I would expect to do any type of work and take the same responsibility as any Chinese astronaut on CSS," he said, noting that the cooperation is a "win-win".

Maurer is a believer in the strength of cooperation for the future of space activities. "Once we look beyond Earth orbit to the moon or Mars, we need all the partners we can find on this planet — the more we have in the family, the better we will become," he once said.

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