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Astronauts salute the Chinese people after they enter Tianhe, the core module of the Chinese space station, on Thursday. After the Shenzhou XII spacecraft successfully completed a fast automated rendezvous and docking with the orbiting Tianhe module, the crew entered the orbital capsule. **JIN LIWANG / XINHUA**

Astronauts reach space station

Core module's first occupants carrying out tasks as pioneering mission begins

By ZHAO LEI
at Jiuquan Satellite Launch Center
zhaolei@chinadaily.com.cn

Three Chinese astronauts have entered the core module of China's permanent space station to embark on their three-month mission, becoming the module's first occupants and pioneers in one of the nation's grandest space endeavors.

Major General Nie Haisheng, Major General Liu Boming and Senior Colonel Tang Hongbo floated into the core module, named Tianhe, or Harmony of Heavens, at 6:48 pm on Thursday, after their Shenzhou XII spaceship linked with the module in a low-Earth orbit about 390 kilometers above the Earth at 8:54 pm.

They have begun to carry out their tasks inside the craft, which is the first and central section of China's space station, called Tiangong, or Heavenly Palace.

The all-male crew, from the People's Liberation Army Astronaut Division, was launched by a 20-story Long March 2F carrier rocket, which blasted off at 9:22 am at the Jiuquan Satellite Launch Center in northwestern China's Gobi Desert.

After about 10 minutes, the vehicle put the 8-metric-ton spaceship into the orbit to rendezvous and dock with Tianhe.

General Xu Qilang, a vice-chairman of the Central Military Commission and the highest-ranking uniformed officer in the Chinese military, and a host of senior officials



The Shenzhou XII spacecraft is launched by a Long March 2F carrier rocket from the Jiuquan Satellite Launch Center at 9:22 am on Thursday. **SUNONG / FORCHINA ONLY**

watched the mission's launch at the Jiuquan center.

The three astronauts are tasked with testing and verifying plans, technologies and equipment for crucial elements of the Tiangong station's construction and operation, such as astronauts' long-term mission arrangements, life-support system, in-orbit resupply, extravehicular activity and spacecraft maintenance and repair.

They also will carry out other space tasks and experiments in Tianhe.

During the mission, the astronauts are scheduled to conduct two extravehicular operations, or spacewalks,

Landmarks in Chinese spaceflight

- **Shenzhou V mission:** Launched on Oct 15, 2003, lasting 21 hours. China's first manned space mission. One astronaut.
- **Shenzhou VI mission:** Launched on Oct 12, 2005, lasting nearly five days. China's first multiperson spaceflight. Two astronauts.
- **Shenzhou VII mission:** Launched on Sept 25, 2008, lasting nearly three days. China's first extravehicular activity. Three astronauts.
- **Tiangong I mission:** Launched on Sept 29, 2011, lasting about four-and-a-half years. As China's first space laboratory, it received two groups of astronauts from the Shenzhou IX and Shenzhou X missions.
- **Shenzhou IX mission:** Launched on June 16, 2012, lasting nearly 13 days. China's first space docking (with Tiangong I) and the first time

Chinese astronauts entered a space laboratory. Three astronauts.

- **Shenzhou X mission:** Launched on June 11, 2013, lasting nearly 15 days. During the mission, the first space lecture for Chinese students was made. Three astronauts.
- **Tiangong II mission:** Launched on Sept 15, 2016, lasting almost three years. It was China's second space laboratory and received astronauts from the Shenzhou XI mission.
- **Shenzhou XI mission:** Launched on Oct 17, 2016, lasting 33 days. So far the longest stay in space by Chinese astronauts. Two astronauts.
- **Shenzhou XII mission:** Launched on June 17, 2021, planned to last three months. The first manned mission in the space station program. Three astronauts.

ZHAO LEI

to use mechanical arms to install equipment and check Tianhe's external condition.

Their work will enable the China Manned Space Agency to accumulate experience and check the capability, performance and compatibility of systems involved in the space station program to prepare for the next steps in its construction, according to Ji Qiming, the agency's assistant director.

The astronauts' host craft, the Tianhe core module, was lifted by a Long March 5B heavy-lift rocket at the Wenchang Space Launch Center in Hainan province on April 29.

Tianhe, the biggest and heaviest spacecraft China has constructed, is 16.6 meters long and has a diameter of 4.2 meters. The craft's weight at 22.5 tons, is equal to the combined weight of 15 standard-size automobiles. It has three parts — a connecting section, a life-support and control section and a resources section.

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Officials, envoys hail role of Shanghai in opening-up

By CAO DESHENG in Shanghai
caodesheng@chinadaily.com.cn

Zheng Haiao, deputy director of the Policy Research Bureau at the Management Committee of China (Shanghai) Pilot Free Trade Zone, described his job as something like a "woodpecker".

By working out measures for reform and innovation, Zheng said he and his colleagues manage to "peck off" the institutional barriers that might affect international market players in the pilot FTZ, in order to make their business development more "simplified, efficient and free".

Speaking at a dialogue in Shanghai on Wednesday evening on the city's achievements in practicing Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, he discussed the development of the FTZ since it was founded in 2013.

Zheng spoke of the work to reduce the number of items on the zone's "negative list". The number of the items on the negative list was reduced from more than 190 to only 30 in order to keep widening market access for foreign businesses, and more than 12,000 foreign companies had set up operations in the FTZ, he added.

Over the past eight years, Zheng said that China will continue to open wider through consistent reforms, and Shanghai will definitely become a magnet for international investors.

Shanghai has been the reform and barometer of China's frontier and opening-up, said at the country's opening-up policy was launched in 1978.

In August 2019, the Chinese government announced the establishment of the Lingang Special Area of the Shanghai FTZ, a major strategic move to further opening-up, facilitate overseas investment and capital flows and realize the free flow of goods.

President Xi Jinping has said on many occasions that China is committed to all-around opening-up

to the world. During an inspection tour of Shanghai in November 2019, he called for bolder moves to conduct a higher-level opening-up in broader fields in the Lingang area of the FTZ.

Addressing Wednesday's meeting, which was organized by the International Department of the Communist Party of China Central Committee and the CPC Shanghai Municipal Committee, Li Qiang, Shanghai's Party secretary, said it is through deepening reform and opening-up that Shanghai has become what it is today and created many miracles.

Going forward, Li said the city center's development itself will be bold moves, keep deepening reforms, think outside the box and take innovative steps for new achievements in promoting all-around opening-up.

The event took place ahead of the celebration of the centenary of the founding of the CPC on July 1. More than 740 representatives from 126 political parties and organizations in nearly 100 countries participated in the event online, and ambassadors of more than 40 countries to China also took part in the meeting in Shanghai.

Song Tao, director of the International Department of the CPC Central Committee, said at the meeting that it has been the CPC's strategic choice to stick to opening-up, mutual benefit and win-win cooperation in order to promote common development between China and the rest of the world.

The country, led by the CPC, will embrace the world with increasing openness in order to have better interactions with the world and contribute to the building of an open world economy, Song said.

Rosign participants at the meetings also commended the CPC's open and inclusive nature. Ndong Ella Baudeaire, Gabonese ambassador to China, said that, led by the CPC, China has made huge achievements through reform and opening-up and also contributes to world peace, development and progress.

"I think it is an inspiration for countries like us," the ambassador said.

INSIDE

Xinjiang seeks long-term stability, overall development

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RIGHT TRACK

Negative list to be shortened for investors

By LIU ZHIHUA and OUYANG SHIJI

China's unwavering efforts to deepen reform and opening-up are set to provide more business opportunities to foreign investors and contribute further to world economic recovery, according to experts and business leaders.

Their comments came after the country's top economic planner announced on Thursday that China will further shorten the negative list for foreign investment this year, as part of ongoing efforts to continuously open its vast domestic market to global investors.

Meng Wei, a spokeswoman for the National Development and

Reform Commission, said the country is speeding up the efforts to shorten the negative list for 2021, which will promote opening-up in the service sector in a bid to foster high-quality economic development.

A negative list refers to special administrative measures for the access of foreign investment in certain industries or areas.

"We will open more sectors of the economy on a larger scale and at a deeper level, to develop a new system promoting a higher-standard open economy," Meng said at a news conference in Beijing on Thursday.

The country will continuously support the implementation of major foreign investment projects,

especially in sectors such as advanced manufacturing and high-tech, and will encourage foreign investors to participate in the country's high-quality development of manufacturing, new infrastructure construction and innovation-driven growth, she said.

To provide foreign investors with a fairer, more transparent and sound business environment, China will improve post-establishment national treatment for all foreign investors, treating domestic and foreign enterprises equally in accordance with the law in areas such as government procedure, certification and the setting of standards.

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A herd of wild elephants feeds on crops in a field in Yimen county, Yuxi, Yunnan province, on Wednesday. **XIN PUBLIC SECURITY BUREAU**

Insurance program helps cover damage by roaming elephants

By HOU LIQIANG in Pu'er, Yunnan
houliqiang@chinadaily.com.cn

ECO YUNNAN

The baby elephant was so small that it didn't yet know how to swim, but it didn't hesitate to join others from its roaming herd in Yunnan province when they walked into a fishpond.

Apparently to prevent the baby from being submerged, the adult elephants made great efforts to lower the water level by destroying the banks of the pond.

They succeeded, but most of the fish in the pond died, resulting in a loss to the fishpond's

owner of about 5,000 yuan (\$775). The herd's damage to the village of Dazhai in the city of Pu'er, Yunnan province, went far beyond that amount, said Ding Chunlin, head of the village committee.

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TOP NEWS

New manned space vehicle planned

Craft designed to accommodate up to 7 astronauts

By ZHAO LEI
at Jiuquan Satellite Launch Center
zhaolei@chinadaily.com.cn

While Shenzhou-series spacecraft still serve as the main pillar of China's manned spaceflights, Chinese engineers are developing a next-generation vehicle to help to materialize the country's future aspirations in space.

Once put into formal service, the new spacecraft, which has yet to be named, will feature world-class designs and technologies, high reliability and flexibility, reusability and multiple functions, according to designers at the China Academy of Space Technology, a major supplier of spacecraft in the nation.

The new craft will be tasked with serving the operation of China's space station as well as the country's manned lunar missions that are now in planning.

It will have two major parts — a reentry module, which will house astronauts and serve as the main part for the entire craft during a spaceflight, and a service module that will contain power and propulsion systems.

The craft will be nearly 9 meters long and 4.5 meters in diameter, and it will weigh 22 metric tons.

By comparison, a Shenzhou spacecraft is 9 meters long and 2.8 meters in diameter and weighs nearly 8 tons.

Shenzhou-series spacecraft consist of three modules — a forward orbital module, a reentry capsule in the middle, and an aft service module.

Designers said that the new model will be able to undertake longer missions than the Shenzhou series, house more astronauts and cargo, and operate in a



Astronauts Nie Haisheng (right), Liu Boming (center) and Tang Hongbo wave during a ceremony before the launch of the Shenzhou XII manned space mission at the Jiuquan Satellite Launch Center in Northwest China on Thursday. LI GANG / XINHUA

tougher environment.

It will be able to accommodate up to seven astronauts, compared with only three in the Shenzhou. It will also be able to transport large amounts of materials between Earth and a space station, a function Shenzhou does not possess.

The new spaceship will have better working and living quarters than the Shenzhou. There will be specific areas inside for mission control, dining, entertainment and personal hygiene, making the astronauts' journey more comfortable, designers said.

China conducted an unmanned flight test of the new spacecraft's prototype in May 2020, on the maiden mission of the Long March 5B heavy-lift carrier rocket from the Wenchang Space Launch Center in Hainan province. The craft was deployed in a low-Earth orbit and was in space for about three days.

The purpose of the test was to check key technologies and equipment in the spaceship, including devices for heat-resistance, control and recovery. The test results have been used for further improvements.

China, Russia and the United States are each developing new manned spacecraft. The US is building the Orion Multi-Purpose Crew Vehicle, Dragon 2 and CST-100 Starliner, and Russia is working on its Oryol spacecraft.

China's Shenzhou spacecraft have carried out 12 flights since November 1999, when Shenzhou I was launched. The first four and the eighth Shenzhou spacecrafts did not carry astronauts because they were experimental. Shenzhou V fulfilled the country's first manned spaceflight in October 2003.

Successful program ignited by modest spark of an idea

By ZHAO LEI
at Jiuquan Satellite Launch Center

It was in August 1958 that Chinese scientists first floated the idea of sending Chinese astronauts to space.

At that time, the Chinese Academy of Sciences, the country's top scientific body, had formed a panel of distinguished scientists to discuss the research and development of satellites. Whether and how China should start a manned space program was also included on the agenda, three years before the Soviet Union's Yuri Gagarin undertook mankind's first space journey.

During a workshop at the academy's Institute of Mechanics in Beijing in late August, Zhao Juzhang, a preminent geophysicist, became the first Chinese scientist to suggest the government consider developing and building spaceflights for manned missions.

Meanwhile, a handful of Chinese institutes had also begun to carry out preliminary research into fields related to manned spaceflights, such as life-support technologies.

With a mountain of difficulties facing the young People's Republic of China, the government and the scientific community soon found that they could not afford the resources required for a manned space program, and would have to bide their time.

In February 1963, the CAS established a "space travel commission" to make theoretical preparations for robotic and manned spaceflights.

In the next three years, several remarkable advances were made: Two institutes were founded to prepare for manned space missions; specific schedules were produced; and scientists launched several carrier rockets to ferry animals, including dogs and monkeys, into and back from space.

Although endeavors by mission planners and scientists slowed down during the period of the "cultural revolution" (1966-76), they did not abandon their aspirations to

send Chinese into space and continued trying to persuade the government to approve and fund a manned spaceflight.

In February 1968, the government set up the People's Liberation Army Fifth Academy, which later became the China Academy of Space Technology, to design and manufacture satellites and also to explore manned spaceflight technologies.

In the meantime, more researchers from across the country began to take part in discussions and planning for China's first manned spacecraft, which was named by State leaders Shuanggong I, or Dawn Light I.

In July 1970, Chairman Mao Zedong and other top leaders formally approved China's first manned space program. Three months later, the PLA started to select 20 astronaut candidates from Air Force pilots and train them at a highly classified complex in Beijing.

The government had also chosen a remote valley in Xichang, Sichuan province, as the location of a new space launch facility to serve manned spaceflights. The facility's construction started in the winter of 1970.

Due to the nation's poor technological and industrial capabilities as well as the absence of institutes and factories capable of making certain components, China's manned spaceflight program halted in the mid-1970s.

About 10 years later, space authorities and scientists urged the government to reopen the program and add a new objective to build a permanent space station.

In the 1980s, their suggestion became reality as the government launched what later became known as Project 863.

In August 1992, a special committee decided that China would use manned spacecraft to assemble a space station in the near future. The plan was approved in September that year by the top leadership, officially kicking off the nation's manned space exploration program.

Mission: Tiangong station scheduled to begin formal operations around end of 2022

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The module is central to the Tiangong station's construction and operations, given that astronauts will live there and control the entire station from inside. It will also be used to host scientific and technological experiments.

The craft is now connected with the Tianzhou 2 robotic cargo ship, which was launched by a Long March 7 rocket from the Wenchang facility on May 29. The two craft docked with each other the next day.

Currently, Tianzhou 2 contains living materials and mission payloads for the Shenzhou XII crew to use, as well as propellants that will be used to retune the core module.

Based on project plans, the Tianzhou 3 cargo ship will be launched in September to dock with Tianhe, and in October, another three-crew team will fly with the Shenzhou XIII to the module to stay there for six months.

In 2022, two large space labs will be launched to connect with the core module. Moreover, two manned missions and two robotic cargo flights will be made to continue construction of the Tiangong station, which is scheduled to be completed for formal operation to begin around the end of 2022.

One of China's most adventurous space endeavors, Tiangong will consist of three main components — a core module attached to two space labs — with a combined weight of nearly 70 metric tons. The entire station is set to work for about 15 years.

Upon its completion, Tiangong will be manned regularly by groups of three astronauts in periods lasting several months. During handovers to new three-astronaut groups, the station will accommodate up to six astronauts.

Challenges ahead

Huang Weifen, chief trainer of Chinese astronauts, said that Shenzhou XII will be the longest mission that Chinese astronauts have ever performed and will pose a lot of challenges for the mission crew.

"First of all, they must be able to maintain good health, considering that a lengthy stay in a weightless

environment will cause greater effects on the human body than short-term flight," Huang said. "They will face many adverse effects, such as strong vibration and loud noise, as well as the impact of rotation."

Astronauts must remain healthy and energetic to withstand and then adapt to such a tough environment and to fulfill their tasks, Huang said.

"Second, living and working long in the craft's small space, separation from family and familiar places, together with the unfavorable physical influences, can easily result in negative emotions like irritability and depression. Astronauts should have a strong mind and excellent psychological qualities to cope with those probable problems and be capable of responding to possible emergencies," the trainer added.

Furthermore, Huang said, the complexity of building and running a sophisticated space station tests astronauts' professional knowledge and skills.

Recognizing the challenges and heavy workload the crew members will face on their mission, program planners have tried their best to make the astronauts' living conditions as comfortable as possible.

According to Yang Hong, Tianhe's chief designer at the China Academy of Space Technology, the usable space in the Shenzhou series spaceship is about 7 cubic meters. By comparison, about 50 cubic meters is available inside the core module for occupants' living and work activities — much more room than in all previous Chinese crewed spacecraft. Once the two space labs are connected with the module to complete the Tiangong station, astronauts will have as much as 110 cubic meters of usable space, he said.

Zhang Han, a senior engineer at the academy who took part in the module's development, said there are separate quarters inside the module for working, sleeping, personal hygiene, dining, healthcare and physical exercises. Each astronaut will have a bed and will share a dedicated washroom — a first for a Chinese spacecraft.

Engineers also installed many appliances inside the craft to make crew members' stay more comfortable, such as an air conditioner, microwave oven, refrigerator, water dispenser and treadmill.

The crew's transporter, the Shenzhou XII spacecraft, is another example of technical advances achieved by Chinese designers. Compared with its predecessors, Shenzhou XII features the capability of conducting rapid rendezvous and docking operations, upgraded reentry technologies and higher accuracy in landing, designers said.

Leisure time

In addition to improved hardware, astronauts can also choose some entertainment in accordance with their personal preference, Huang said.

"They can watch movies, listen to music or use a telephone to chat with family members, friends or colleagues on the ground in their leisure time," she said.

The trainer also said that astronauts are allowed to bring a certain amount of personal belongings aboard Tianhe.

Astronaut Liu said before he set out on the space trip that he would take along a group family photo and a bull plush toy that symbolizes good luck in Chinese tradition.

Tang, another crew member on Shenzhou XII, said some video clips of his wife and son will accompany him during the three-month journey.

"My son is very lovely and optimistic. He is my pride," he said.

Nie refused to disclose details of the contents of his luggage, saying only that it includes some of his favorite food and things he will display to the public during the spaceflight.

On Oct 15, 2003, the country carried out its first manned spaceflight, sending Yang Liwei on a 21-hour journey around Earth in the Shenzhou V spacecraft.

Before Shenzhou XII, China had conducted six manned spaceflights, which totaled 68 days and orbited Earth 1,089 times, while 11 Chinese astronauts had traveled more than 46 million km in space and conducted more than 100 experiments.

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从红船走来： 代表历史前进方向的人民政党 Long March from Red Boat

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Editorials

Mission new contribution to human space journey

A new milestone was reached in the country's space exploration cause on Thursday morning, when the spacecraft Shenzhou XII with three astronauts aboard blasted off the launchpad in Jiuquan, Gansu province.

In the afternoon, the spaceship successfully docked with Tianhe, making the astronauts the first visitors to the core module of the space station that was sent into low-Earth orbit in late April. The country's first manned mission in nearly five years, and the longest manned mission so far, it is a key step toward the completion of China's space station Tiangong.

The module has living quarters for three crew members, and the astronauts are due to stay there for three months. During their stay they will test and maintain the onboard systems, conduct spacewalks and undertake scientific experiments.

It was from Jiuquan that China sent its first artificial satellite into space 51 years ago. Since then, generations of scientists, engineers and scientific workers have contributed to the progress of the country's aerospace cause.

The harsh research and living conditions during the early days of the country's space endeavors and the developed countries' sanctions on technology and equipment only served to spur them to make breakthroughs in one key technology after another.

It is the pioneering spirit of their predecessors and their example of hard work, perseverance and self-sacrifice that have motivated newcomers to continuously strive to make new achievements. And it is thanks to the dedication of these scientists and engineers and others involved in various capacities

that the country has managed to overcome the tremendous difficulties it has faced along the way.

The Chinese people firmly believe that having the ability to explore outer space, or the final frontier as it is known, is a responsibility that any country with the technological capabilities should shoulder, as it can contribute to the common good of all people and help deepen our understanding of the cosmos.

Believing the outer space provides a new realm for international cooperation, China's space endeavors are not exclusive and it always keeps its door open to international cooperation.

In 2019, China and the United Nations jointly released a list of the first nine international cooperation projects for China's space station, which involved 23 entities from 12 countries in the fields of aerospace medicine, space life sciences and biotechnology, microgravity physics and combustion science, astronomy and other emerging technologies.

Shenzhou XII, China's seventh manned space mission since 2003, represents a comprehensive test of these advanced technologies, as well as new materials and China's management of complicated space missions, and it will help the country accumulate valuable firsthand experience for future missions.

We offer the three astronauts and all those involved our best wishes for a successful mission, and we look forward to welcoming the astronauts home on their safe return in October.

It is also hoped that the bravery, wisdom and commitment they embody can inspire more young talents to join the lofty cause and set the vastness of space as the stage to realize their ambitions and the country's dream of national rejuvenation.

Song Chen

