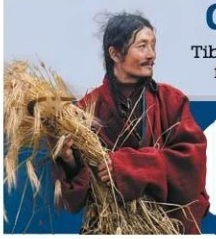

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Zhai Zhigang (left), Wang Yaping (center) and Ye Guangfu, the three astronauts taking part in the Shenzhou XIII mission, pose for the camera before the launch of the Long March 2F carrier rocket in Jiuquan, Gansu province, on Friday night. LI GANG / XINHUA

Shenzhou XIII crew starts epic mission

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A Long March 2F carrier rocket blasts off at 12:23 am on Saturday from Jiuquan, sending into space the Shenzhou XIII spacecraft, with three astronauts on board. LI GANG / XINHUA

China launched the Shenzhou XIII mission to the Tiangong space station early on Saturday morning, marking the start of the country's longest spaceflight.

Carrying the Shenzhou XIII spacecraft, a 20-story-tall Long March 2F carrier rocket blasted off at 12:23 am at the Jiuquan Satellite Launch Center in northwestern China's Gobi Desert, brightening the dark sky as it roared up from a huge service tower.

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After about 10 minutes, the rocket placed the 8-metric-ton spaceship in a low-Earth orbit about 400 kilometers above the planet. The three-member crew — Major General Zhai Zhigang, Senior Colonel Wang Yaping and Senior Colonel Ye Guangfu — will enter the station's core module, named Tianhe, or Harmony of Heavens, after their spacecraft docks with the module, which is the first, and central, section of the permanent space station — Tiangong, or Heavenly Palace. They will then start a six-month journey inside the station.

The mother of a 5-year-old girl, Wang is China's second female astronaut to take part in a spaceflight. She took part in the Shenzhou X mission in June 2013. In the Shenzhou XIII flight, she will become the first Chinese woman to enter a space station and also the first Chinese woman to carry out a spacewalk.

Vice-Premier Han Zheng and other high-ranking government officials watched the launch at the Beijing Aerospace Control Center in the capital city's northwestern suburbs. General Zhang Youxia, a vice-chairman of the Central Military Commission, and a group of senior military officers watched the launch at the Jiuquan center.

Shenzhou XIII is the fourth spacecraft to visit the Tiangong station and the second crewed ship to transport astronauts to the orbiting outpost.

The mission is expected to become the longest crewed spaceflight by China, doubling the time spent in the Shenzhou XII mission. It will also see the first spacewalk by a Chinese woman.

The Shenzhou XIII crew is tasked with a wide range of assignments, such as performing two to three spacewalks to install a small robotic arm onto a larger one; verifying key procedures and technologies like manual control of the robotic arms and robotic arm-assisted movement of station modules; checking the

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Space: Astronauts prepared to deliver scientific lectures

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performance and capability of devices inside the station; and testing support instruments for astronauts' life and work in long-term flights, Lin Xiqiang, deputy director of the China Manned Space Agency, said at a news conference on Thursday at the Jiuquan center.

The astronauts will conduct scientific experiments and technology demonstrations in space medicine, microgravity physics and other fields. They will also deliver educational lectures that will be televised for Chinese students to watch, the official said.

The first astronauts inside Tiangong — Major General Nie Haisheng, Major General Liu Boming and Senior Colonel Tang Hongbo — finished their 92-day mission in mid-September.

Pang Zhihao, a spaceflight researcher in Beijing and a former analyst at the China Academy of Space Technology, said that the Shenzhou XIII mission will lay a solid foundation for the next steps in the Tiangong space station program.

"It will test the station's mechanism and capability of ensuring a long-term stay by a crew, including the bioregenerative life-support systems, material supply and health management plans. It will also check whether the core module and the Shenzhou spaceship can withstand a tough environment during a long-term flight," he said.

The mission is a valuable opportunity for China's science community because it allows the astronauts to carry out large in-orbit experiments requiring a long time and manual manipulation, Pang added.

The researcher said that contrary to many people's opinion that it is inconvenient for women to take part in lengthy spaceflights, female astronauts actually have many advantages over their male counterparts in extended missions.

"Research and previous missions with female crew members have found that the many physiological indices in women such as hormonal levels and trace elements are better than those in males. They are less susceptible to negative conditions such as iron poisoning, thrombus, vasospasm and arrhythmia.

"Women are usually more sensitive, attentive and careful in many regards, and normally are better at communicating. These traits are useful assets in extended flights. The presence of a female astronaut usually brings more joy to a demanding mission," Pang said, noting he looks forward to Wang's success.

Editorial

Space station moves closer to generating common human good

The successful launch of the Shenzhou XIII manned spacecraft from Jiuquan, Gansu province, in the early hours of Saturday marked a big stride toward the conclusion of trials for key technologies for China's first space station Tiangong.

With three astronauts on board, Shenzhou XIII will dock with Tianhe core module about eight hours later. Two cargo spacecraft, Tianzhou 2 and Tianzhou 3, already joined the space station earlier this year where the three astronauts will spend the next six months.

During that period, they will conduct two to three extravehicular operations, install important devices to the mechanical arms of the space station and carry out several scientific and technological experiments and applications.

Shenzhou XIII is China's sixth manned mission in Tianhe's technology trials, but its importance should not be underestimated, as it will evaluate the functions and performances of all the systems and work units of the space station, and help complete its construction.

According to the China Manned Space Agency, if all goes well, the country will launch six other missions — Tianzhou 4 cargo spacecraft and Shenzhou XIV manned spacecraft, Wentian and Mengtian experimental spacecraft, Tianzhou 5 cargo spacecraft, and Shenzhou XV manned spacecraft — during the construction stage of the space station which is scheduled for completion before the end of 2022.

That China has fulfilled one goal after another of its manned spaceflight program since it announced it in 1992 shows its ability to transform blueprints into reality thanks to the advancements it has made in the field of space science and technology, its dedicated and hardworking teams of scientists, technology experts, technical workers, support staff, and the determination and able helmsmanship of the country's leaders. Not to forget its extensive international cooperation with other countries including Russia, Germany and France, and international agencies such as the United Nations Office for Outer Space Affairs and the European Space Agency.

China sees its space station as a platform for deeper international cooperation, regards outer space as an area for global collaboration for the common good of humankind, and therefore welcomes foreign astronauts to its space station once it starts full operations.

In fact, cooperation between China and some other countries for selection and training of astronauts has already started. The China Manned Space Agency, in collaboration with the UN Office for Outer Space Affairs, has been working to invite some UN member states to conduct scientific experiments on board Tianhe.

It is hoped more scientists and astronauts from around the world will participate in the initiative, and more young minds will be inspired by China's space mission to explore the unknown and help build a community with a shared future for humankind.

Bidding astronauts bon voyage from Gobi Desert

JIUQUAN, Gansu — In 2003, college graduate Deng Xiaojun joined the Jiuquan Satellite Launch Center in Northwest China's Gobi Desert.

With his job coded 212, he felt the excitement of sending China's first astronaut Yang Liwei into space.

Eighteen years later, Deng is code zero, tasked with the high-profile job of leading the countdown to ignition for the launch of the Shenzhou-12 crewed mission.

"Code zero is not a number, but a team," said Deng, noting the team has been sharing the responsibility and excitement of China's space missions for years.

As a home port for China's space exploration, the Jiuquan Satellite Launch Center has completed major launch missions, including 12 Shenzhou series spaceships, building the most reliable and safe spaceport for Chinese astronauts.

Deep in the Badain Jaran Desert in Northwest China, lights blaze at the vehicle assembly building throughout the night. Engineers are working around the clock to prepare for China's next space mission.

Zheng Yonghuang, the launch center's chief engineer, said a crewed space mission goes through more than 10 phases, involving hundreds of thousands of parts and components from entering the launch site to blastoff.

According to Zheng, staff members enter into preparation three months before every launch, testing and checking equipment and facilities. Even for parts as small as a fuse, how long is its service life? How long has it been in use? When should it be replaced? "We need to have every answer in mind.

"When people start to cheer a successful launch, it's time for us to learn lessons for further improvements," said Zheng.

Shi Chuangfeng is in charge of hoisting the rockets with cranes. "When hoisting a rocket, we need to align and connect dozens of bolts in one go. There are no shortcuts to take. The only thing you can do is keep practicing."

Shi has his own way of training himself: hooking a welding rod onto the crane and driving the crane to insert the rod into a beer bottle. Today, Shi and his colleagues can control the crane arm to insert a chopstick and pour wine, just like using their hands. The weather team has the same birthday as the launch center. The weather on the Gobi Desert often changes rapidly, posing challenges to launch or landing missions.

During the Shenzhou-12 crew's return, it was necessary to ensure no dangerous weather such as lightning or rainstorms at the landing site. The average ground wind speed could not exceed 15 meters per second, and the high-altitude wind could not exceed 70 meters per second. The visibility had to be no less than 10 km with no precipitation.

According to the weather team, 50 days before the return, they began to analyze the land climate data, making forecasts for the expected climate on the return.

Thirty days before return, mobile weather radars were on duty at each station, and they formulated an emergency response plan for the return. Twenty days out, the weather team had consultations with local meteorological stations.

Seven days before return, they released daily forecasts for six sites related to the landing site, and consultations were held twice a day. Within 48 hours of return, the forecasts were upgraded to hourly.

On Sept 17, the team released forecasts every three hours till the three astronauts of the Shenzhou-12 mission safely returned to the Dongfeng landing site.

Deng said he watched every blastoff from the launch site for the past 18 years, from the control room to the rooftop of his home, from the Gobi Desert to a local bridge called Shenzhou.

He once left the launch team in 2014. When he returned to the job in 2017, it felt like a family reunion.

"You stand by the window and smell something familiar. That is from the rocket's first stage engine. It feels so good to reunite with my family."

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