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# Probe makes historic landing on Mars

Tianwen 1's arrival on the Red Planet latest milestone in China's space industry, Xi says

By ZHAO LEI  
zhaolei@chinadaily.com.cn

A Chinese spacecraft successfully landed on the surface of Mars on Saturday morning, marking a historic accomplishment in China's space endeavors and making it the second country in the world to achieve the feat.

President Xi Jinping, who is also general secretary of the Communist Party of China Central Committee and chairman of the Central Military Commission, sent a letter soon after the successful landing was announced at the Beijing Aerospace Control Center, extending congratulations and greetings to all those involved in the landmark mission.

The letter read that the Tianwen 1 mission has left the nation's first mark on the Red Planet and is another landmark achievement in the development of China's space industry.

"Thanks to your courage in the face of challenges and pursuit of excellence, China is now among the leading countries in planetary exploration," Xi said in the message. "The country and people will always remember your outstanding achievements."

He encouraged those involved to continue working hard in the mission's next steps.

Vice-Premiers Han Zheng and Liu He were at the Beijing Aerospace Control Center in the capital's northwestern suburbs on



Space program team members celebrate on Saturday at the Beijing Aerospace Control Center after the successful landing of China's Tianwen 1 Mars probe on the Red Planet was announced. PHOTOS BY JIN LIWANG / XINHUA



A simulated image of the Tianwen 1 Mars probe on the surface of Mars

Saturday morning and met those involved in the landing operation after Xi's letter was read.

The touchdown of Tianwen 1 on Mars was the latest example of China's rapidly expanding presence in outer space, following a string of recent accomplishments that include putting the first section of the country's permanent space station into orbit, returning the first lunar samples to Earth in more than four decades and completing a global navigation satellite network.

"Each and every step during the entry, descent and landing process was executed with perfect accuracy," Wu Yanhua, deputy director of the China National Space Administration, told China Daily at the Beijing Aerospace Control Center after the spacecraft's touchdown.

Wu said that more than half of the over 20 Mars landing attempts made by spacefaring nations so far failed due to the exceptionally difficult nature of such maneuvers.

Tianwen 1's rover, which is

named Zhurong, after an ancient Chinese god of fire, is scheduled to observe and map the landing site and to perform diagnostic tests in the coming days, he said.

Zhurong will move from its landing module onto the Martian soil to begin scientific surveys, the official said, adding that the first photos to be taken by the rover are expected to be transferred back to Earth around the end of this month.

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# Project aids disabled rural kids in accessing education

By LI LEI  
lilei@chinadaily.com.cn

In rural areas, where education and rehabilitation services were once rare, the fate of children with severe disabilities sometimes resulted in them being locked in their rooms while their parents went to work.

However, over the past six years, a government-backed program has moved to remedy the situation in rural areas of Jiangxi province. In 2015, authorities in Xinfeng county, which pioneered the initiative, started setting aside annual funding of 300,000 yuan (\$46,600) for the "bringing lessons home" program.

Hundreds of teachers from public schools have been sent to the children's homes as tutors and rehabilitation instructors. By Sunday, the 31st National Day for Helping the Disabled, almost 400 children scattered across rural communities had taken part in the program. More than 45,000 home visits have been made by educators to "deliver personalized education plans to children's doorsteps," according to county officials.

Under China's poverty-alleviation drive headed by President Xi Jinping, dropout rates of rural students have fallen significantly in recent years.

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## RIGHT TRACK

# Yearlong 'upswing' expected for trade in services

By LIU ZHIHUA  
liuzhihua@chinadaily.com.cn

The promising performance of China's trade in services in the first quarter demonstrated the strong growth momentum of the country's economy in terms of high-quality development, officials and analysts said.

Growth in China's services trade is predicted to continue, helping stabilize international supply chains and sustain the world economic recovery amid the COVID-19 pandemic.

The country's trade in services was about 1.16 trillion yuan (\$180.2 billion) in the first quarter, up 0.5 percent year-on-year, while the sector's deficit declined to 66.69 billion yuan, down 74.7 percent from a year earlier, according to the Ministry of Commerce.

Trade in services accounted for 12.05 percent of China's total foreign trade in the first quarter. The proportion was about 12.4 percent last year.

March alone saw services trade rise by 7.9 percent year-on-year, becoming the first month with an increase since the outbreak of the pandemic.

Excluding the tourism sector, China's services trade in the first three months expanded by 21.1 percent on a yearly basis. Without tourism, exports and imports of services during the period surged by 28.2 percent and 13.6 percent respectively year-on-year.

"As various policies to stabilize services trade take effect, and the business environment continues to improve, China's services trade is expected to be on the upswing throughout the whole year," said Gao Feng, a spokesman for the ministry, at a news conference in Beijing on Thursday.

Gao said the ongoing technological revolution led by digital technology has been injecting new impetus into China's trade in services.

Zhang Yansheng, chief researcher at the China Center for International Economic Exchanges, forecast that China will witness increasing competitiveness in international services trade within the next five to 10 years, due to the country's pursuit of high-quality development.

"The core of high-quality development lies in promoting innovation,

boosting producer services, and the thriving of smart cities, which means the upgrading of the Chinese economy and the transformation and optimizing of the services trade sector," he said.

Wang Tu, an associate researcher at the Chinese Academy of International Trade and Economic Cooperation's Institute of International Trade in Services, said the decline in overall services trade deficits and growth in the knowledge-intensive services sector indicated an improvement in the structure of China's services trade.

The country's trade of knowledge-intensive services saw robust growth in the first quarter, surging by 15.5 percent year-on-year to 539.5 billion yuan. That accounted for 46.6 percent of the total volume of trade in services, or 61 percentage points higher than that of a year ago.

Among them, knowledge-intensive service exports hit 301.03 billion yuan, up 14.7 percent year-on-year and accounting for 55.2 percent of the total service exports.

Oscar Wang, head of the Shanghai office of Teneo, a global advisory company, has observed robust

demand growth from multinational companies seeking advice to further cement their presence in the Chinese market.

Wang Tu, the researcher, said COVID-19 has accelerated the digitalization in China's services trade, leading to the thriving of various new business forms such as telemedicine and online education to shore up the knowledge-intensive services trade.

In addition, digital transformation in other economies has expanded demand for related knowledge-intensive services from China, leading to fast growth in the sector, Wang said.

"While international trade has declined sharply due to the pandemic, China has become an important driving force for global economic growth, thanks to demand recovery in its huge market. It also provides high-quality services to other economies," he said.

According to Zhang, China's services trade is providing important support to global development, especially its high-quality but inexpensive services in the logistics and smartphone sectors for economies involved in the Belt and Road Initiative.



The Al-Jazeera building, which housed The Associated Press and Al-Jazeera media offices, is hit by an Israeli airstrike in Gaza on Saturday. The building was destroyed. ASHRAF ABU AMR / REUTERS

# FM urges Washington to contribute to Gaza stability

By ZHANG YUNBI  
zhangyunbi@chinadaily.com.cn

In a manifestation of China's commitment to cooling the soaring tension between Palestine and Israel, Beijing's senior diplomats have publicly spoken out at Washington for thwarting international efforts in brokering an early cease-fire.

State Councilor and Foreign Minister Wang Yi urged all members of the United Nations Security Council to shoulder their "due responsibilities" and effectively preserve the region's peace and security.

As a sign of the tension's severity, the Chinese embassy in Israel

updated its travel alert on Wednesday advising Chinese citizens to monitor the situation and take appropriate precautions.

An Israeli airstrike destroyed the 13-floor Al-Jalaa building housing media outlets including Al-Jazeera television and The Associated Press in the Gaza Strip on Saturday.

At the UN headquarters in New York, the Security Council has held two rounds of emergency closed-door consultations on the Palestine-Israel issue so far this month.

However, both meetings failed to release a statement to cool the tension as the United States stood alone in opposing the release.

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# HOW RUSSIA AND US WILL COME TO THE TABLE

All eyes on possible summit between Putin and Biden

By REN QI in Moscow and ZHAO HUANKUN in Washington

Global media and think tanks will focus their attention in coming months on a European corner, where a summit could be held between Russian President Vladimir Putin and his United States counterpart Joe Biden.

Although it is still not known where the meeting will take place,



experts and analysts have begun to predict potential topics to be discussed by the two leaders.

There are a number of things that Biden, unlike his predecessor Donald Trump, would like to achieve on the international stage, ranging from climate change and

tax reform to solving the Iran nuclear issue.

However, Sam Greene, a professor of Russian politics at King's College London, said, "Sad as it may sound, there are no problems on Joe Biden's agenda for which Vladimir Putin is a plausible part of the solution."

Regarding climate change, it would be nice to have Russia on board, but the negotiations that really matter are with Brussels, not

Moscow, Greene said, adding that when the time comes, Russia will be brought to the negotiating table not by the US, but by Europe, spurred by the European Union's proposed carbon border tax.

The fate of Biden's global minimum tax for transnational corporations does not depend in any meaningful sense on Russia's position, according to Greene.

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# Tianzhou 2, carrier rocket transported to launchpad for liftoff

By ZHAO LEI  
zhaolei@chinanews.com.cn

## 6.5 metric tons

Total payload of supplies a Tianzhou cargo spacecraft can carry into orbit

China's Tianzhou 2 cargo spacecraft and its carrier rocket — a Long March 7 — were moved to the launchpad on Sunday morning, undergoing final tests before their planned launch in the coming days, according to the China Manned Space Agency.

Preparation work before the launch has begun at the Wenchang Space Launch Center in the southernmost island province of Hainan, the agency said in a brief statement, without giving more details.

Tianzhou 2, the country's second cargo spaceship, is tasked with docking with the currently unmanned core module of China's Tiangong space station and then conducting autonomous refueling and resupply operations.

Its predecessor, Tianzhou 1, was China's biggest spacecraft when it entered service and was launched at the Wenchang launch center in April 2017.

It carried out several docking and in-orbit refueling maneuvers with the Tiangong II space laboratory in a low-Earth orbit from April to September that year, making China the third nation capable of in-orbit refueling, after the former Soviet Union and the United States.

A Tianzhou spacecraft is 10.6 meters long and has a diameter of 3.35 meters. Its maximum liftoff weight is 13.5 metric tons, enabling it to carry up to 6.5 tons of supplies, according to the China Academy of Space Technology, the spacecraft's developer.

This type of spacecraft is essential to China's space station program, which aims to put a three-part and approximately 70-ton station into operation before the end of 2022. It is responsible for refueling and resupplying the station.

The world's first operational cargo spacecraft, Progress 7K-TG, was developed and launched by the Soviet Union in 1978. This type of transport vehicle conducted 43 cargo flights before being retired in 1990.

More than 200 cargo vehicles have been sent to deliver supplies to space stations. Currently, four models are in service — China's Tianzhou, Russia's Progress-MS and the US' Cargo Dragon and Cygnus.

# Mission: Zhurong rover to explore surface of Mars

From page 1

Genq Yan, a senior planner for China's deep-space exploration programs at the space administration, said Saturday's landing was a serious test for the country's capabilities in science, technology and engineering.

"Such a challenging attempt is characterized by a succession of complex activities that must be conducted completely by the spacecraft within a very short period of time," he said. "What added to the difficulties was that we don't know much about the Martian atmosphere, which brought a lot of uncertainties to the mission."

## Sophisticated maneuvers

The Tianwen 1 robotic probe activated some of its engines around 1 am on Saturday to move closer to Mars, according to the China National Space Administration. At about 4 am, the craft separated into two parts — the landing module and the orbiter — and the landing module continued to fly toward the Martian atmosphere.

Three hours later, the module, which contained Zhurong, entered the Red Planet's thin atmosphere at an altitude of about 125 kilometers, embarking on the riskiest and most challenging nine minutes of the entire Tianwen 1 mission.

Due to the long distance between Mars and Earth, which stood at about 320 million km on Saturday, and the resulting delay in signal transmission, the whole entry-descent-landing procedure had to be carried out autonomously by the landing module based on a preset program and data obtained by its sensors.

Following a predetermined pro-

gram, upon entering the atmosphere, the capsule would first use a heat shield to decelerate, slowing the craft by aerodynamic drag. It would then deploy a parachute to further reduce speed and drop the heat shield. Next, the craft would unfold its four landing legs, drop the parachute and ignite its retrorockets at 15 km above the Martian surface.

At about 100 meters, the module would suspend its descent and check the landing spot for obstacles such as rocks. The module would then continue its descent until it reached very close to the surface and the retrorockets shut down and the capsule would touch down.

The capsule successfully landed at 7:18 am on the southern part of the Utopia Planitia, a large plain in Utopia, the largest known impact basin on Mars and in the solar system, the space administration said.

The site was selected because scientists determined that it has suitable terrain and weather for a landing, and is also highly likely to have been part of an ancient Martian ocean, making scientific research extremely worthwhile.

If it rolls safely onto the Martian soil and works as planned, Zhurong will become the sixth rover deployed on Mars — following five US spacecraft — and will give Chinese scientists their first opportunity to closely observe Mars.

Sun Zehou, chief designer of the Tianwen 1 probe, previously explained that a rover will have to overcome an array of difficulties on Mars, such as disturbances in sunlight reception and extreme weather, in order to survive and operate.

He said the Chinese rover has been programmed to inactivate under extreme circumstances and reactivate itself when it is safe to do so.

Zhurong is 1.85 meters tall and weighs about 240 kilograms. It has six wheels and four solar panels, and can move at 200 meters an hour on the Martian surface. Among the six scientific instruments it carries are a multi-spectral camera, a meteorological sensor and ground-penetrating radar.

If the semi-autonomous vehicle functions efficiently, it will work for at least three months and undertake comprehensive surveys of the planet.

Its success would mark the completion of all of Tianwen 1's mission objectives — orbiting Mars for comprehensive observation, landing on the planet and deploying a rover to conduct scientific operations. This would make Tianwen 1 the first Mars expedition to accomplish all three goals with one probe.

The Tianwen 1 orbiter has returned to its parking orbit and will continue circling the planet for mapping and measurement with seven scientific instruments, including a high-resolution imager and magnetometer. It also relays signals between ground control on Earth and Zhurong.

## Lengthy journey

Tianwen 1, named after an ancient Chinese poem, was launched by a Long March 5 heavy-lift carrier rocket on July 23 from the Wenchang Space Launch Center in the southernmost island province of Hainan, kick-starting China's first mission to another planet in our solar system.

Propelled by a mixture of 48 large and small engines, the spacecraft

rocketed more than 470 million km and carried out four midcourse corrections and a deep-space trajectory maneuver before entering the orbit of Mars on Feb 10. At that time, Mars was 193 million km from Earth. Because the two celestial bodies keep moving in their own orbits, a Mars-bound spacecraft must fly in a carefully calculated, curved trajectory to reach Mars.

On Feb 24, Tianwen 1 entered a preset parking orbit above Mars. The spacecraft was programmed to maintain that orbit for about three months to examine the preset landing site.

Tianwen 1 is the 46th Mars exploration mission since October 1960, when the former Soviet Union launched the first Mars-bound spacecraft. It followed the US' Mars 2020 mission, which has already deployed a rover, named Perseverance, and the first Mars-based rotorcraft, called Ingenuity.

Only 19 Mars missions so far have been considered successful.

Eight Mars orbiters are in active service as well as three operational rovers — the US' Curiosity and Perseverance and China's Zhurong.

Zhang Rongqiao, chief planner of the Tianwen 1 mission, said on Saturday that China has started planning for a sample-return mission to Mars, a task not yet achieved by any country.

Mars, one of the four terrestrial planets in the solar system and the most similar to Earth, is the most favorable destination for deep-space exploration. It also fires the imagination — among all scientific topics, people seem to be most enthusiastic about searching for life on other planets and an eventual attempt at interplanetary immigration.

## Editorials

# Landing on Mars giant leap for China in development of space technology

Around 50 Mars missions have been launched globally so far since 1960. Yet more than half of them have failed to reach the planet some 55 million kilometers away from the Earth.

So after China's Mars probe, Tianwen-1, was launched on July 23 last year, there was an anxious wait to learn its fate.

The news that the craft carrying exploration rover Zhurong landed safely on the surface of the planet on Saturday has therefore been met with both relief and celebration in the country.

That the landing was carried out exactly as planned has made China the latest member, after the United States and Russia, of the club of the world's pioneering Mars explorers, and shows the reliability of the relevant technologies that China has developed on its own.

Though the first Mars mission of the country, it was a bold undertaking: to complete orbiting, landing and roving in one single mission.

It is that can-do spirit of self-reliance that has played a key role in China's scientific and technological development in recent decades despite some foreign countries' attempts to thwart its progress in this regard.

China made its early breakthroughs in rocket and space technologies with its own scientists, engineers and scientific workers starting from the 1960s under very difficult conditions when the

country remained largely a backward agricultural country and faced foreign blockades of technology and materials.

However, the country has made the most of what it had over the past more than six decades, making unremitting efforts to forge ahead in the aerospace cause. Thanks to the hard work and even sacrifices of generations of scientific workers, China has laid a solid foundation for the fast development of its aerospace industry, and has achieved one milestone after another in its space endeavors, including manned space flights, lunar exploration, and its BeiDou Navigation Satellite System.

Late last month, China sent Tianhe, the core module of its future space station, into space, kicking off a series of launches that will complete the construction of the station around 2022.

All these achievements have contributed tremendously to the peaceful use of outer space, and to the common good of the people, as many projects China has initiated with other countries in agriculture, climate change, disaster prevention and reduction, ecological preservation, are based on them.

China has always welcomed and participated in global cooperation on the peaceful use of outer space. During its Mars mission, China has worked with European partners and others.

In the human space odyssey, China, with enthusiasm, diligence and willingness to cooperate, will help propel humankind to travel faster and farther.