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WEEKLY EDITION

## Green Light for Mega Project to Ramp Up Computing Capacity

By WANG Xiaoxia

China approved a mega project for the construction of eight national computing hubs and plans to build 10 national-data center clusters on February 17, to channel more computing resources from east China to its less developed, yet resource-rich, western regions.

The project, approved by the National Development and Reform Commission (NDRC) and three other departments, marks the completion of the overall layout for the national integrated big-data center system.

The eight national computing hubs will be built in the Beijing-Tianjin-Hebei region, the Yangtze River Delta, the Guangdong-Hong Kong-Macao Greater Bay Area, the Chengdu-Chongqing economic circle, north China's Inner Mon-

golia Autonomous Region, southwest China's Guizhou Province, northwest China's Gansu Province and Ningxia Hui Autonomous Region.

The eight hubs will develop data-center clusters, carry out collaborative construction within data centers, cloud computing and big data, and bridge the gap between eastern and western regions in computing resources, to better empower digital development.

Like the South-to-North Water Diversion Project and the west-east power transmission program, this project, which optimizes the nationwide resource allocation and improve resource utilization efficiency, will raise the country's overall computing capacity, promote green development, expand effective investment and coordinate development among regions, NDRC official Sun Wei said.

## What to Expect from China's Aerospace Missions in 2022

By TANG Zhexiao

China plans to carry out more than 50 space launches and six manned flights to complete the building of the China Space Station in 2022, according to the *Blue Book of Aerospace Science and Technology*.

The blue book, which reviews the nation's space activities in 2021 and introduces missions for 2022, said China's aerospace has entered a new development phase.

Last year saw many highlights on space exploration. China has completed five space station missions, successfully launched the first journey to explore Mars, developed space commerce, and basically formed a space industry chain.

A total of 55 launches were carried out, the most in the world throughout the past year. The aggregate weight of spacecraft sent into orbit hit a new record high of 191.19 tons, with an increase of 85.5 percent year-on-year.

China's space industry has also committed to strengthening international exchanges and cooperation, and implemented various projects in 2021, including cooperative research and development, facility and data sharing, and application service.

In 2022, China plans to carry out more than 50 space launches, sending over 140 spacecrafts, according to the China Aerospace Science and Technol-

ogy Corporation (CASC).

Among the tasks, six manned space flights will be dedicated to fully completing the building of China's space station, with the Tianhe core module as the command center and the Wentian and Mengtian lab modules as experimental platforms before the end of this year.

The country's new generation of medium-sized launch vehicles, the Long March 8, is currently undergoing pre-launch testing and scheduled to be launched at the Wenchang launch site from the end of February to the beginning of March, said CASC.

As the latest model of China's Long March series of launch vehicles, the Long March 8 can undertake more than 80 percent of the launch missions in low and medium orbits.

Ma Tao, deputy director of the aerospace department of CASC, said many other scientific research satellites for national civil space infrastructure and business satellites will be launched in 2022, making aerospace technology, "Better serve the society and the people's livelihood, and also serve the development and construction of the national economy."

All of these achievements and plans are China's new journey into space in cooperation with other countries, and also efforts of all countries to work together to build a global community with a shared future in outer space.



The Olympic flame is extinguished during the closing ceremony of the Olympic Winter Games Beijing 2022 at the National Stadium in Beijing. (PHOTO: XINHUA)

## Editor's Pick

### TCM: Time Honored Healing for All

By LU Zijian

In the Main Media Center of Beijing 2022, there is an exhibition area for Traditional Chinese Medicine (TCM). After trying their hand at Tai Chi, with instruction via an AI screen, visitors receive a mystery box (*mang he*), containing bookmarks and fridge magnets featuring TCM pictures.

It is the first time that TCM culture has been extensively displayed at a global sports event.

**Serving Winter Olympics**

TCM was not only on exhibition at Beijing 2022, but also offered as an alter-

native treatment for athletes.

Orthopedics treatment is quite common among skiers, and there are doctors specialized in bone fracture treatment using TCM who accompanied team China during Beijing 2022.

Zhang Qiang, doctor-in-charge from Sichuan Province Orthopedic Hospital, was responsible for the health care of Su Yiming, who won a historic gold medal in the men's snowboard big air for China. Adopting a unique approach, Zhang offered Su a good TCM treatment before the competition so that he could perform at his best.

As for doctors assigned to alpine

skiers, they need to know how to ski as injuries can take place on the slopes far from hospital.

Some foreign athletes also came to TCM doctors for help. Nathan Crumpton, who became immensely popular after carrying the flag for American Samoa at the opening ceremony of Beijing 2022, received acupuncture treatment at the Olympic Village in Yanqing district, Beijing.

He spoke highly of TCM and the doctor who offered the treatment, as the pain in his back and waist vanished right after the treatment.

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### AfCFTA Offers Opportunities for China-Africa Cooperation

By WANG Xiaoxia

As the world's largest free trade area in terms of the number of participating member states, the African Continental Free Trade Area (AfCFTA) is committed to removing trade barriers and promoting economic integration in Africa, as well as providing unprecedented opportunity for China-Africa collaboration.

Since its official launch in January 2021, AfCFTA has been witnessing stable progress amid challenges such as the global COVID-19 pandemic.

Secretary-General of AfCFTA Secretariat, Wamkele Mene, said last month that a total of 39 countries had already ratified the free trade zone agreement, and the negotiations on the rules of origin had been completed and more than 80 percent of the rules are agreed.

On January 13, the Pan-African Payments and Settlement System (PAPSS) was launched to facilitate cross-border trade and other economic activities

among African countries, which is expected to save the continent 5 billion USD of payment costs per year.

Mene said that AfCFTA will further boost trade and investment in Africa and accelerate the industrialization process.

The construction of AfCFTA will not only promote Africa's own development and revitalization, but also bring important opportunities for China-Africa economic and trade cooperation, said Qian Keming, Vice Minister of Commerce of China, while signing a MoU with Mene on establishing an Expert Group on Economic Cooperation in October 2021.

Statistics from the General Administration of Customs of China show that China-Africa trade volume exceeded 250 billion USD in 2021, the highest since 2014. AfCFTA could create a huge market for the free flow of goods and services, which will attract more Chinese investors, said John Gatsi, Dean of University of Cape Coast Business School in

Ghana. With the use of the PAPSS, Chinese investors will find it more convenient to trade their goods within the continent, said Gatsi.

Yao Guimei, researcher from Chinese Academy of Social Sciences said that AfCFTA is expected to unleash its potential of growth in multiple sectors and industries. Apart from prioritizing infrastructure construction, many African countries are also expanding new areas such as mobile communications, the digital economy, clean energy, and smart cities. This will bring new opportunities for China-Africa cooperation, said Yao.

Amid the pandemic, Chinese enterprises have shared experience with Africa in terms of pandemic control and economic recovery, with the support of digital technology and digital platforms. Online promotion events and live-streaming have boosted the export of African products to China, and the digital economy is expected to be a new highlight of China-Africa cooperation, said Yao.

## 100kW Class HET Developed

By Staff Reporters

Using xenon as the propellant, HET-450, the single-channel Hall effect thruster (HET) at Lanzhou Institute of Physics, achieved 4.6 newtons of force at a power of 105kW maximum in a recent experiment, a major breakthrough for China's 100kW class HET in the field of high-power electric propulsion.

From a technical perspective, HET-450 stands shoulder-to-shoulder with the X3 multi-channel HET developed by the University of Michigan with a maximum force of 5.4 newtons and power of 102 kW.

Based on the discovery of the Hall effect by American physicist Edwin Hall, an HET functions as follows: It limits the electrons in a magnetic field, then uses them to ionize the propellant (xenon and krypton are the most common), accelerates the ions to produce thrust, and neutralizes the ions in the plume.

As an advanced electric propulsion device, HETs are widely adopted in position holding and attitude control of satellites. They are also regarded as preferred propulsion devices for spacecraft in the future due to simple structure, high specific impulse (at 10-second level) and high efficiency (could reach more than 60 percent). **See page 2**

## WEEKLY REVIEW

**Chinese Sci-tech Journals' International Rankings Improved**

96 scientific and technological journals are ranked in the top 25 percent globally, with 25 journals listed in the top 5 percent and seven journals placed in the top 1 percent, said the China Association for Science and Technology on Feb.17.

**Nuclear Unit with Hualong-1 Reactor Starts Operation**

The No. 6 unit using domestically designed third-generation nuclear reactor Hualong-1, has reached 100% full power operation for the first time with normal parameters on Feb.19, according to the China National Nuclear Corporation.

**Lunar Glass Globules Captured by Yutu-2**

The Yutu-2 lunar rover of China's Chang'e-4 mission has discovered two macroscopic translucent glass globules during its exploration of the far side of the moon, which could potentially help reveal the moon's early impact history.

**New Quantum Computing Software Released**

A research team from the Chinese Academy of Sciences has released a new quantum computing programming software named "isQ-Core" and deployed it to the country's superconducting quantum hardware platform, to provide support for scientists to conduct quantum computing theory and application research.

WECHAT ACCOUNT

E-PAPER



Animation shows the completed Chinese space station. (PHOTO: VCG)

## Agricultural and Rural Modernization Prioritized

By LI Linxu

As China is at a historical juncture of moving toward its second centenary goal, agriculture, rural areas and farmers are high on the country's list of priorities.

Its "No. 1 central document" for 2022 unveiled on February 22, the first policy statement released by China's central authorities each year since 2004, outlines key tasks to comprehensively push forward rural vitalization this year.

Ten days earlier, another important document concerning agriculture, rural

areas and farmers was released by the State Council.

The document, titled the *Plan for Promoting Agricultural and Rural Modernization During the 14th Five-Year Plan Period*, maps out the next steps towards the agricultural and rural modernization in the coming years.

The 14th Five-Year Plan period (2021-2025) is an important strategic opportunity for speeding up the process of such modernization, notes the plan.

It is China's first plan that integrates agricultural and rural modernization as a whole and aims to advance the

two simultaneously, said Deng Xiaogang, vice minister of Agriculture and Rural Affairs during a policy briefing.

The country's work concerning agriculture, rural areas and farmers is undergoing a historical shift during the 14th Five-Year Plan period, said Deng, adding that rural vitalization in an all-around way has become the major task.

By 2025, the strategy of rural vitalization expects to be fully operational, with significant progress being made on agricultural and rural modernization, according to the goals set by the plan.

To measure such objectives, the plan proposes 17 key quantitative indexes in such fields as overall grain production capacity, total meat production, and high-standard farmland areas.

During 2021-2025, the contribution rate of agricultural sci-tech progress will grow four percent cumulatively to 64 percent.

Moreover, the comprehensive mechanization rate of crop cultivation and harvesting is expected to increase four percent to 75 percent in the same period.

Meanwhile, per capita disposable income of rural residents will rise with the pace of GDP growth in the next five years. During the 13th Five-Year plan period, the average per capita disposable income of rural residents reached 17,131 RMB, double that of 2010.

To achieve these goals, the support-

ing role of sci-tech is greatly emphasized in the plan, calling for further promoting innovation in agricultural science and technology and deepening integration between sci-tech and agricultural sectors.

To yield more food in a limited arable land, science and technology is the key, while seed is the core, said Zeng Yande, chief agronomist of Ministry of Agriculture and Rural Affairs, adding that a large part of the growth in grain yield in recent years is owing to seed improvement.

Expanding the opening-up and international cooperation of agricultural sectors is also highlighted in the plan.

Focusing on food security, climate change and green development, China plans to actively take part in international cooperation in agricultural science and technology, and be heavily involved in the global governance of food and agriculture, said Wu Xiao, director general of the department of rural economy of the National Development and Reform Commission, adding that Belt and Road Initiative will play an important role in the high-level opening-up of the country's agricultural sectors.

By 2035, decisive progress is expected to be made in rural vitalization, and modernization of agriculture sectors and rural areas will be basically achieved, as per the plan.

## High-tech Takes Winter Olympics to New Heights

By LI Linxu

From climate-friendly ice rinks to Ultra HD 8K digital broadcasting technology, Beijing has raised the technology bar for the Winter Olympics to new heights.

The Olympic Winter Games Beijing 2022 have made history in achieving an unprecedented level of digitalization and set new technology standards for the future, while allowing more people to experience the culture and excitement of the Olympics, said Thomas Bach, president of the International Olympic Committee (IOC).

In the National Speed Skating Oval, dubbed the Ice Ribbon, 10 Olympic records and one world record were broken.

Swedish speed skater Nils van der Poel, who broke an Olympic record and a world record in the Ice Ribbon, spoke highly of the ice surface, saying it was, perhaps, the best stadium he has skated in.

Behind the record-breaking performances, there are huge technological advances helping athletes become better, faster, and stronger.

For the first time in Olympic history, the Ice Ribbon has applied CO2 transcritical ice-making technology, said Yu Hong, director of the Beijing 2022 Organising Committee's technology department.

The ice-making process adopted one of the most advanced and energy-efficient technologies to create safer, smoother and faster skating experiences, which has won praise from the IOC as well as the International Skating Union.

Another first for the Games is that all of the 26 venues were fully powered by green electricity, owing to an array of key core technology breakthroughs.

In total, more than 200 sci-tech achievements were used to support the

Games, said Xu Qiang, director of the Beijing Municipal Science and Technology Commission.

Among them, four technologies had the world debut and 33 technologies were used in the Olympic Games for the first time, added Xu.

Thanks to the ubiquitous use of high-tech showcased at the Games, it is the most technologically-advanced Winter Games yet.

To make the Games a high-tech one, a tentative plan for the High-tech Winter Games was proposed after winning the bid, an action plan was formulated in 2016, a key specialized project was established in 2017, and then a leading group was formed, according to Zhu Xuehua, director of the department of social development, the Ministry of Science and Technology.

Focusing on major sci-tech needs in the running, participating and watching of the Games, a series of cutting-edge technologies, such as ice-making, snow-making, smart transport, smart robots and hydrogen-fueled handheld torches, were successfully developed for the Games.

More than 10,000 researchers from over 500 teams were involved in the development of these high-techs, said Zhu.

Sci-tech innovation has provided strong support for the dazzling opening and closing ceremonies of the Games, said Huang Jing, director of the Administrative Center for China's Agenda 21. The ceremonies were perfect integration of creativity and technology, with the deployment of AI, 5G, AR, naked-eye 3D, LED and other advanced technologies.

These high technologies have not only ensured a successful running and participation of Beijing 2022, but also will play an active role in the country's high-quality economic and social development after the Games, noted Zhu.



Spraying machines in operation at a farm in Hebei province. (PHOTO: XINHUA)

## Advancing Emergency Response System

By ZHONG Jianli

China will update its emergency management system during the 14th Five-Year Plan period (2021-2025), with the aim of forming a system with higher levels of sci-tech information, according to a plan recently issued by the State Council.

The goal is to make significant progress in modernizing the country's emergency management system by 2025, and comprehensive support systems should be built. The ability of society to prevent and respond to disasters and accidents should be enhanced.

By 2035, an emergency response system with Chinese characteristics to achieve socialist modernization should be established.

Specifically, the preparedness system for emergency management is ex-

pected to be improved, with risk prevention and control mechanisms more efficient, measures against catastrophes more prepared, and the allocation of basic resources for emergency management optimized.

The plan seeks to formulate standards for emergency management by implementing an action plan, and establishing a standard system with a complete structure, clear levels, and scientific classification, while setting up technical organizations for improving professional standards related to emergency management.

To strengthen risk monitoring and early warning capabilities, the plan proposes that technologies including the Internet of Things, industrial Internet, remote sensing and 5G should be fully employed. The network of natural disaster monitoring stations should be opti-

mized, and the emergency satellite observation constellation should be perfected.

It also calls for speeding up the development of intelligent, practical and lightweight rescue equipment that is suitable for extremely harsh environments, such as high altitudes, special terrains, and virgin forests.

Building a sci-tech innovation platform for emergency response is also planned for. The mechanism for use of relevant innovation achievements requires improvement, and incentives should be given to different parties participating in innovation, according to the plan.

The plan encourages different regions to develop emergency response industrial clusters according to their own characteristics, and build regional innovation centers. What's more, enter-

prises should be guided to increase investment in emergency capacity building. A number of large enterprise groups with strong competitiveness in both international and domestic markets must be developed.

International exchanges and cooperation are also of great importance to advance the emergency management system. China will strengthen cooperation with the United Nations Office for Disaster Risk Reduction and other international organizations, to set up the international and regional disaster risk reduction network.

In addition, the country will promote the building of the Belt and Road international cooperation mechanism on natural disaster prevention and emergency management, and advance China-ASEAN cooperation on emergency management.

### Case Study

## Zhangbei's Wind Energy: Green Olympic Power

By CHEN Chunyou & WEI Yichen

During the Olympic Winter Games Beijing 2022, the use of Zhangbei's wind energy resources provides a solid power supply for the Olympic stadium.

Zhangbei, a county in Hebei's

Zhangjiakou city, is 45 kilometers away from other urban areas. The landscape in Zhangbei is very rugged, and the huge temperature differences produce strong air convection, making it the main airflow channel for cold air from the Mongolian Plateau to the North Plain. The

wind resources are very rich, with a reserve reaching more than 20 million kW.

A wind turbine with a 146-meter-diameter blade in Zhangbei county can generate about 24,500 kWh of electricity a day, which can satisfy all the needs for snow-making at the Shougang Big Air, a sports venue in Beijing's Shijingshan district.

In Zhangbei, it takes about three seconds to drive a two MW wind turbine to rotate at a rated speed, which can generate about two kWh electricity, with almost zero carbon dioxide emissions.

One kWh of green electricity can light up the main stage of the award plaza for 22 seconds, and allow a chef to make two dishes in an all-electric kitchen at the Winter Olympic Village.

It is estimated that by the end of Beijing 2022, which will end on March 13, the Olympic stadium will have consumed about 400 million kWh of green electricity, which is equivalent to reducing standard coal burning by 128,000 tons and carbon dioxide emissions by 320,000 tons.

Wind power is prone to be affected

by the natural wind, and the wind speed is not subject to human control. However, the normal use of wind power needs high stability, as unsteady electric current is likely to cause a breakdown to the power system.

In order to reduce the instability of wind power use and ensure a safe transmission of energy to Beijing, the Zhangbei flexible direct current (DC) power grid project was constructed with the support of the State Grid Corporation of China.

With a total investment of up to 12.5 billion RMB, the transmission line is the world's first renewable energy-based flexible DC power transmission system, with pioneering core technologies and key equipment created by China.

The project is significant for improving clean energy delivery ability, such as supporting the green Olympics. The wind resource in Zhangbei has been turned into efficient and clean energy, which offers a solid guarantee for the power demand of the competition events, and adds a new dimension to Beijing 2022.



National Speed Skating Oval, dubbed the Ice Ribbon, sees a number of Olympic records broken. (PHOTO: XINHUA)

## Top 10 Agricultural Science Advances of 2021 Unveiled

By LI Linxu

A list of China's top 10 advances in the field of agricultural science in 2021 was unveiled by the Chinese Academy of Agricultural Sciences (CAAS).

The advances on the list cover the research fields such as genomics, analysis of main function genes, infection and transmission of SARS CoV-2 in animals, catastrophe mechanism of major disease and insect pest, and cultivation and farming of crops.

These studies provide theoretical basis and technological foundations for molecular design breeding of staple crops, selection and breeding of green and efficient varieties, and R&D of COVID-19 vaccines, said Wu Kongming, president of the CAAS.

Among them is a study on the prevention and control of bemia tabaci. Researchers revealed how the insect overcomes the defenses of its host, providing new ideas for the development of green control technology for bemia tabaci.

## 100kW Class HET Developed

From page 1

With high thrust ratio and large thrust force, HET is the closest to application in space as the mainstream technical approach concerning high-power electric propulsion around the globe.

After years of effort, researchers at the Lanzhou Institute of Physics solved

more than 10 globally acknowledged technical conundrums and mastered several key technologies whose intellectual property rights were solely owned by China, which will provide critical technical support in the implementation of tasks like manned lunar landing and on-orbit service.



Wind turbines stand tall and scatter on the hill in Zhangbei county, Hebei province. (PHOTO: VCG)

## Voice of the World

## Fukushima Nuclear Wastewater Conundrum

Edited by QI Liming

The Japanese government's plan to dump wastewater from the Fukushima Nuclear Power Station into the sea is causing huge controversy at home and abroad.

Anxiety is high among local Japanese fisher folk and coastal communities. The government's plan has met with stiff vocal opposition from neighboring countries, regions and international organizations, including South Korea, as well as Pacific Island states and the Pacific Islands Forum, the inter-governmental organization of the region.

**Not a dumping ground**

Vijay Naidu, adjunct professor at the School of Law and Social Sciences, University of the South Pacific in Fiji, told Al Jazeera that the wastewater adds to the already nuclear polluted ocean.

"This threatens the lives and livelihoods of islanders heavily reliant on marine resources. These include inshore fisheries as well as pelagic fishes such as tuna. The former provides daily sustenance and food security, and the latter much needed foreign exchange via fishing licences for distant water fishing nation fleets," said Naidu.

In Japan, local fisher people also fear it would undermine years of work to restore confidence in their seafood.

Satyendra Prasad, the Chair of Pacific Islands Forum Ambassadors at the United Nations, reminded the world last September of the Pacific's ongoing struggle with the legacy of nuclear testing



An aerial view of the contaminated water tank at the Fukushima Nuclear Power Station. (PHOTO: VCG)

from the transboundary contamination of homes and habitats to higher numbers of birth defects and cancers.

In 1985, regional leaders established the South Pacific Nuclear Free Zone Treaty, prohibiting the testing and use of nuclear explosive devices and the dumping of radioactive waste in the sea by member states, including Australia, New Zealand and Pacific Island nations.

"For us in the Pacific, the Pacific Ocean has become a proving ground, a theatre of war, a highway for nuclear submarines and waste. The Pacific is not a dumping ground for radioactive waste water," said Maureen Penjueli, Coordinator of the Pacific Network on Globalization.

**Progress of IAEA's five-day visit**

A Task Force of experts dispatched by the International Atomic Energy Agency (IAEA) collected water samples and scrutinized detailed technical data during their first mission to Japan from February 14-18, in order to review the safety of its plan to discharge treated water from the Fukushima Daiichi Nuclear

Power Station into the sea.

After analysis on details of the water samples and evaluation in the safety and radiation effects on humans and the sea, IAEA would release a report on this week's mission in about two months' time, said Deputy Director General Lydie Evrard, Head of the IAEA Department of Nuclear Safety and Security. IAEA will also carry out follow-up missions to Japan this year and next, and a comprehensive report with conclusions will be published before the water release begins.

To independently verify the levels of radioactivity in the treated water stored in tanks as well as in the ocean, IAEA will collect water samples for analysis in its laboratories in Austria and Monaco.

**Alternative proposals**

The Commonwealth of the Northern Mariana Islands says there is a viable alternative to Japan's plan to dump more than one million tons of treated water from the crippled Fukushima nuclear power station into the Pacific Ocean, and

it requires urgent consideration.

"The expectation is that the discharge will not happen until 2023. There is time to overturn this decision," Sheila J Babauta, a member of the Northern Mariana Islands' House of Representatives, told Al Jazeera in an interview last month.

"The effort that went into the creation of the joint resolution exposed research and reports from Greenpeace East Asia highlighting alternatives for the storage of Japan's nuclear waste, including the only acceptable option, long-term storage and processing using the best technology available," said Babauta.

In a report published in 2020, Greenpeace argued that, "The only acceptable solution" was for Japan to continue the long term storage and processing of the contaminated water. "This is logistically possible and it will allow time for more efficient processing technology to be deployed as well as allowing the threat from radioactive tritium to diminish naturally," the environmental group said.

The wastewater storage option is also favored by the expert civil society organization, the Citizens Committee on Nuclear Energy (CCNE), which is supported by Tilman Ruff, associate professor at the Institute for Global Health at the University of Melbourne in Australia.

"The argument that they make, which I think is really very valid, is that if this water was not stored for an indeterminate period, but even for a period of about 50-60 years, then, by then, the tritium will have decayed to a tiny fraction of what it is today and hardly be an issue," Ruff told Al Jazeera. Human and environmental consequences of even very low levels of radiation exposure cannot be discounted.

"At even those very low levels, harmful effects have been demonstrated," he said.

## Olympics Enhances Awareness of IPR Protection

## Comment

By ZHONG Jianli

If you want to know what is more difficult than winning an Olympic medal, the answer could be trying to buy a Bing Dwen Dwen, the cute panda mascot of the Winter Olympic Games Beijing 2022.

The hard-to-get mascot not only reflects the passion of the Chinese people for the Winter Olympics, but also shows enhanced awareness of protecting the Olympics-related intellectual property rights (IPRs).

Since the beginning of the Winter Olympics, China has been showing zero tolerance to relevant IPR infringements.

A most prominent character under copyright protection is Bing Dwen Dwen. As a protected Olympic symbol, the patents, trademarks, and copyright associated with the mascot are all well-protected. Only authorized manufacturers are allowed to produce the merchandise. That's why it's in short supply and hard to get.

For a long time, China has made efforts to protect Olympics-related copyrights. In 2018, the *Regulation on the Protection of Olympic Symbols* was revised to include the protection of the relevant symbols of the Olympic and Paralympic Winter Games Beijing 2022. As the Games approached, an action

plan was issued by China National Intellectual Property Administration (CNIPA) and the State Administration for Market Regulation to protect the IPRs of the symbols of Beijing 2022.

To date, 63 Olympic symbols, 14 patents and 315 trademarks submitted by the Organizing Committee of Beijing 2022 have been placed under an all-encompassing protection, according to the CNIPA.

To detect copyright-infringing activities, the latest technologies, including big data, have played an essential role.

A total of 3,363 online accounts involved in IPR infringement had been detected and punished as of February 12, according to Tang Zhaozhi, an official of the copyright management division under the Publicity Department of the Communist Party of China Central Committee.

The regulations, harsh punishments and technology-based detection have contributed to keeping the games running smoothly.

These efforts of China to protect Olympics-related IPRs have also shown commitments to maintaining Olympic rules and disseminating the Olympic culture. It will help encourage innovators and exert a positive influence on the country's IPR protection work in the future.

Beijing 2022 will no doubt leave tangible legacies such as venues and facilities. It will also pass on intangible legacies, such as awareness of protecting Olympic IPRs, which will become more deeply rooted in the hearts and minds of people.

## Hi! Tech

## Tianwen-1 Congratulates Beijing 2022 from Space

By Staff Reporters

A blessing that traveled 320 million kilometers from distant space arrived on time at the opening ceremony of Beijing 2022 on February 4. China's Mars probe Tianwen-1 took a "cosmic" picture via a camera mounted on a selfie stick, framing the Chinese flag on the Mars Orbiter with the Beijing 2022 Winter Olympic and Paralympic emblems. This is the farthest congratulatory message in Olympic history.

The camera is used to observe the movement and status of the Tianwen-1 rover in space, which is mounted on the end of a variable structure locking and extending device, that serves as a selfie stick.

The stick is made of special material, and it was retracted during Tianwen-1's journey to Mars. After reaching the Mars orbit, the stick is partially heated and expands outward from its four folded sections to a length of 1.6 meters, allowing the camera to point at the Mars Orbiter for stable monitoring of its flight.

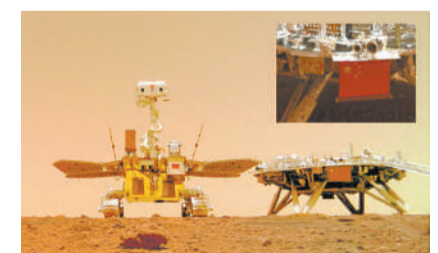
Tianwen-1 Mars Orbiter has used two separate cameras before, taking beautiful full-body photos of the orbiter and the group photos of Mars and the orbiter during the limited drift time. Unlike other cameras, the selfie camera allows for steady, up-close continuous shooting, thus capturing more details of the circulator in flight in more situations.

For the sake of maximizing the pho-

tographic field of view, the development team used a larger field of view lens, so that the camera's horizontal and vertical fields of view are more than a 100-degree angle, almost twice as much as other cameras.

It was not easy for the Tianwen-1 Mars Orbiter to take a selfie. The Mars Orbiter is always in flight, and its lighting conditions, the range it receives photos from, and the angle of the selfie stick when extended will cause continuous changes in the optical properties of the flag, the Olympics emblem, and the orbiter itself.

According to the designer of the camera, the team designed an adaptive exposure imaging control strategy centered on the national flag. Through calculating the image acquisition conditions and adjusting the exposure time autonomously, the clear images of the flag under continuously changing lighting conditions can be ensured.



Tianwen-1's greeting for Beijing 2022 from outerspace. (PHOTO: TIANWEN-1'S OFFICIAL WEIBO)

## Olympic Robots: At Your Service

By YU Haoyuan

The Winter Olympics Games Beijing 2022 came to a close last Sunday. Relating to its success, many journalists and athletes have already voiced their comments during the Games. In general, what impressed them most was the use of many cutting-edge technologies, in particular robots. In order to minimize contact among people during the COVID-19 pandemic, robots were widely used inside the Olympic village.

**Robot chef**

During the Olympics, machines and humans worked together in the 3680 square meter dining hall, specifically prepared for journalists. A troop of robots were set behind the glass, and they could automatically cook stir-fried dishes, noodles, or Western-style hamburgers and French fries for the visitors. Through scanning a QR code and inputting what to eat or drink and your seating location, dishes would be delivered to people sitting in socially-distanced cubicles via tracks on the ceiling, precisely when they are ready to eat.

*The Mirror* praised the fact that food prepared by machines served to reduce the people contact and bring, "a lower likelihood of athletes coming across someone who is carrying COVID."

NBC Chicago said that the robot meal service is like a scene out of a sci-fi movie. It not only makes people safer during the pandemic but also brings convenience. "The process is probably even more convenient than ordering from a human server at a restaurant," said an NBC report.

"I came here just to experience the intelligent meal preparation process, and I've been here four or five times. Each time I feel like I've just walked in a sci-fi movie," Czech reporter Thomas Budak said of the Olympic dining experience.

**Robot bartender**

Also in the medium dining center, a bartending robot, one of the most popular robots among journalists, demonstrated its skills. It could whip up juices and cocktails on request without asking for any tips from patrons.

In other areas, robots were also used to clean floors, check people's temperatures, and remind them to wear masks.

BBC reporter Anna Thompson encountered a sweeping robot in a lift. She thought that little robot had lost its way. "This little fellow joined me in the lift this morning but was a bit unsure which floor to get off on," she wrote.

Another BBC reporter Katie Falkingham is a fan of the coffee robot.



Robot serves food from ceiling in the medium dining hall at Beijing 2022 to minimize contact. (PHOTO: S&T DAILY)

She posted a video on Twitter, showing a robot making coffee and pouring the steaming brew into a cup. What surprised her most is the machine could even clean up the table afterward. "I need one of these at home," she wrote.

**Why use Robots at Beijing 2022?**

The Olympics should be a global event to allow athletes to perform at their peak, without the pandemic being a disrupting factor. As a key method to contain the pandemic, robots can effectively reduce the human workforce and protect people from COVID-19 through lack of contact. In other words, the fewer volunteers working inside the Olympic closed loop, the lower the risk of infection will increase after the

Games.

"The [robot] installation comes amid organizers' efforts to minimize the risk of spreading COVID-19 at the Games," wrote USA Today.

Vesti.ru.com wrote that if China's pandemic prevention measures were not so strict and effective, the Winter Olympics would not have been held at all.

China is the first country to use robots on such a massive scale during an Olympics. Unlike other technologies such as Electric Vehicles, 5G and Livestreaming technology, Robotics technology is the easiest way for the world to witness tech improvement and its use at the Winter Olympics has given many people a glimpse of the future.

By JIAO Yang &amp; QI Liming

As China's space station construction proceeds at a rapid pace, the aerospace technology being used in 2022 has another connection much closer to home. In fact it is a very apt connection considering the massive success of Beijing 2022 — ski jumping, where speed, strength and courage are boosted by technology so that athletes can take that big leap of faith.

Ski jumping is an extreme sport popular among ice and snow lovers all over the world, noted for its long jump distances and graceful posture. And pre-

## The Aerospace Technology Behind Winter Sports

paring for those, the wind in the air is the ski jumper's closest partner in training and competition.

Various environmental changes to the wind, and speed of movement for each athlete, especially when the athletes are in different flight stages will produce the corresponding law of air moving, which is professionally known as aerodynamic characteristics.

The use of wind tunnels in aerospace technology can effectively assist ski jumping training. A wind tunnel is an artificial way to generate and control air flow, which is used to simulate the flow of air around aircraft or objects.

The basic principle can be understood as "objects move, and the air does not move" in the real movement process. While in the air tunnel it is the "air

moves, and the objects do not move," so as to simulate the aerodynamic characteristics generated by the mutual movement between air and objects.

Using the wind tunnel, the force, speed, angle and rotation speed in the process of movement can be obtained. Then the equipment control and the best posture of the athletes can be analyzed and determined.

Through the technology of air flow display, the flow characteristics around the test object will be visualized. Thus it would be more intuitive and convenient to record the analysis and interpretation of the test object.

In addition, computational fluid dynamics (CFD) also provides a more effective means for ski jumping research. Through the three-dimensional scanning of athletes, the three-dimensional modeling of assisting and flying posture will be presented, and a quantitative reference for the optimization of technical movements would become available.



Zhao Ziheng competes in ski jumping. (PHOTO: XINHUA)

## Letter to the Editor

# China Stuns the World with High-tech Winter Olympics

By Musundali Bhuiyan

Despite many challenges, China has successfully staged a grand Olympic Winter Games Beijing 2022. Amid many festivities and fanfare, the premier sports event in the world saw athletes from different countries flex their prowess in three Olympic arenas — Zhangjiakou city, Beijing city and Yanqing district — every day from February 4-20.

Beijing 2022 has attracted unusual attention due to many reasons. Since it was organized during the COVID-19 pandemic, the world has kept a close eye on how it ensures the safety of their athletes. The so-called 'diplomatic boycott' of the U.S. has also drawn special attention to the games. Many were highly skeptical if China could actually be successful in holding the Games.

But thanks to the prudent leadership of China, the Games was a huge success, which is being considered a knockout punch to the face of so-called boycotters. Beijing 2022 has also set several records in the history of the Olympics. China has stunned the world by applying its exciting and cutting-edge technologies in Games. From designing and evaluation to construction and operation, scientific innovation and technologies have been applied in every aspect.

High-tech has mainly been applied to preventing and controlling the pandemic, reducing carbon emissions, ensuring the safety of the events, and creating a better viewing experience for the fans. The much-expected 5G signals covered all venues, including the roads, providing network connectivity for applications such as ultra-high-definition video and smart services. Hydrogen buses and autonomous driving have also been a big talking point.

Robots were employed for disinfection, body temperature checks, and environment monitoring against aerosol transmission of COVID-19. Robots cooked mouth-watering dishes and served guests. The robots proved their mettle as butlers in the canteen of the Olympic village and athletes were full of praise for the taste of the dishes they produced as well as the robots



The National Speed Skating Hall for Beijing 2022, also known as the "Ice Ribbon", is the world's first Winter Olympic venue using carbon dioxide transcritical direct cooling ice making technology. (PHOTO: XINHUA)

reminding them to wear masks.

China has made history by reusing its eleven Summer Olympics venues for the Winter Olympics, which has cut emissions, reduced environmental pollution, and minimized the consumption of water, energy, and materials. China demonstrated its commitment to the concept of a green Olympics by using many high-tech tools to ensure that the goal of carbon neutrality was achieved throughout the games.

For the first time in the history of the Olympics, all the venues were wholly powered by green energy. Power generated from the wind and solar resources in Zhangjiakou, Hebei, was used in all of the venues. In addition, China planted tens of millions of trees to ensure the carbon-neutrality of the venues.

To give viewers a real-time experience of the games, China employed new broadcasting technologies, such as 8K ultrahigh definition live streaming and 360-

degree instant replays, for large-scale implementation at all of the venues. As a result, Beijing 2022 became the most-viewed Winter Olympics of all time.

Application of scientific innovation, high and new technologies, and artificial intelligence have earned huge acclamation across the world. The use of digital currency and smart beds also added a new dimension to the Games this time around.

Many splendid videos filming phenomenal upshots of the application of the newest technologies at the Games by the athletes have already gone viral on social media platforms. In my eyes, the Games have been an ideal platform to showcase high-tech innovation and the next stage of technology implementation, which is speaking volumes of the Chinese miracle in sciences and technologies, especially in artificial intelligence.

Musundali Bhuiyan is a Bangladeshi journalist and columnist now based in Beijing.

## Foreigners Behind Beijing 2022

By HE Liang

While the world's attention was focused on the thrilling performances and intense competition in the Olympic Winter Games Beijing 2022, a group of foreigners, along with their Chinese counterparts, were making a significant contribution to the grand event's success.

### Getting the messages across

Only 26 international interpreters and 12 Chinese interpreters provided simultaneous interpretation services in seven languages, including Chinese, English, French, and Russian, for the relevant parties during the nearly 20-day competition and hundreds of press conferences.

According to Alex Ponomarev, the chief interpreter of Beijing 2022, "We provide a remote simultaneous transmission service, so tons of translation work can be done online at the same time."

It was Ponomarev's eighth time to be working as a simultaneous interpreter for the Olympic Games. What is impressive is that he made his first Olympic debut at the Games in 2008.

"At the Beijing 2008 Olympic Games, there were nearly 220 interpreters traveling to different venues every day to provide simultaneous interpretation services. For the Olympic Winter Games Beijing 2022, simultaneous interpretation was provided online through the remote simultaneous translation center," he said.

Ponomarev said changes in technology have made translation services more sustainable and streamlined. Even in the face of the challenges of COVID-19, all interpreters could present safe and lively simultaneous services.

### Fully utilizing the venue

Harald Springfield, who was born in Innsbruck, Austria — a city that has hosted two Olympic Winter Games, served as Beijing 2022's Chief Ice Hockey adviser. He and his team were responsible for the renovation of the ice hockey venue before the Games and Games-time operation of the venue.

"The Fan" (National Indoor Stadium in Beijing) and Wukesong Stadium are all legacy venues used in the 2008 Olympic Games in Beijing. For Springfield, it was a unique experience to renovate two venues for the Winter Olympics. "It brings me great joy to see hock-

ey players from all over the world experiencing the fruits of our transformation and providing positive feedback," he said.

Compared to other Winter Olympics events, hockey competitions need on-site laundry and garment-making services for players and referees. Springfield collaborated with Chinese engineers to convert shipping containers into locker rooms and provide washing and drying services for each team's game clothing to ensure that the users get clean clothing returned within three hours.

"It is a green and cost-effective practice," said Springfield, adding that the proper transformation not only meets the event's unique needs, but also fully embodies the Olympic Games' player-centered philosophy.

### Preserving legacies

In 2022, Beijing became the first city in the world to host both the Summer and Winter Olympic Games, making it the first dual Olympic city. Laszlo Vajda of Hungary was involved in Beijing's bid for the 2022 Olympic Winter Games and worked in the village planning and operation department. Vajda expressed his delight at being able to contribute to Beijing 2022.

Vajda moved to Beijing in 2005 and began working on preparations for the Summer Olympics in 2008. His stories about the Winter Olympics continued in 2022.

"Being involved in the preparation work for the Olympic Winter Games Beijing 2022 is a wonderful gift for me because it allowed me to fully utilize my abilities and experience," he said.

Thanks to the valuable legacy of the 2008 Beijing Olympic Games in human resources, the volunteer team continues to grow, and the volunteer service continues to innovate and improve. Over 1,000,000 volunteer applications were sent to Vajda's team, demonstrating this improvement. "You can see that there is a lot of enthusiasm for volunteering right now in China," said Vajda.

In addition, many professionals trained during the 2008 Beijing Olympic Games are essential to further implementing various policy planning and service initiatives for the Olympic Winter Games Beijing 2022 and realize relevant suggestions proposed by Vajda's team.

## Traditional Eastern Wisdom

# Sun Simiao: A Pioneer in TCM Development

By Staff Reporters



SUN Simiao. (PHOTO: VCG)

Sun Simiao, a pioneer of the comprehensive and systematic study of Traditional Chinese Medicine (TCM), is revered as the "Medicine God" or the "King of Medicine" by Chinese people. He was a great medical expert of China in the Tang Dynasty (618-907).

Sun is said to have studied hard and mastered several Chinese classics by the age of 20. He did extensive research on ancient medical classics, and according to historical records, in the history of TCM, he had particularly innovative views on medical ethics, gynecology, pediatrics, acupuncture, and other topics. Sun held noble medical ethics in high regard, and his perspective on medical ethics was pivotal in the history of Chinese medicine. From his point of view, the doctor's sole responsibility is to relieve patients' pain

without being influenced by a desire for reward, such as financial gain, fame, or favors bestowed upon them. Patients should be treated fairly, regardless of their rank, wealth, or other external factors, said Sun. In his well-known book *Qianjin Yaofang*, he proposed that a good doctor should place equal emphasis on medical ethics and skills.

Sun's experience with herb formulas and knowledge of medicine was documented in *Qianjin Yaofang*. The book presented life-saving remedies as well as case studies on acupuncture, massage, diet, and exercise. Sun wrote a second well-known book, *Qianjin Yifang*, as supplement to his earlier work. Both of the books are still in print today, as part of the *Qianjin Fang* collection.

His writings focused on the treat-

ment of women and children, with special volumes devoted to female disorders (including pregnancy), infant diseases and breastfeeding.

Sun's research on health care was highly insightful. In terms of his overall health philosophy, he believed that people should combine massage therapies, physical exercise, and breathing exercises. He advocated disease prevention, emphasizing the importance of "caution in a speech before sleep" and "moderation in eating."

Sun was described as a "magnificent teacher of hundreds of generations" by Li Shimin, Emperor of the Tang Dynasty. Some of Sun's revolutionary ideas can be used as a reference for current medical development, and his nurturing method for health still remains popular among people of all ages.

## Service Info

# Huairou Offers More Convenient Services for Foreigners

By Staff Reporters

On January 28, the Foreigner Service Office of Huairou District and the Foreigner Immigration Service Office of Huairou Branch of Beijing Municipal Public Security Bureau were set up in Huairou, providing foreigners working in China a one-stop service for both work and residence permits.

The service office integrates government services in order to effectively provide foreigners with entry visas, work permits, residence permits and permanent residence application services, reducing the processing time to 7 working days.



Pudacuo National Park, located in Yunnan's Diqing Xizang Autonomous Prefecture, covers an area of 602.1 square kilometers. (PHOTO: VCG)

# TCM: Time Honored Healing for All

From page 1

### Fighting against COVID-19

Having COVID-19 under control in China contributed to the successful hosting of the Winter Olympics, and TCM played an important role in the prevention and control of the pandemic.

TCM has been integrated in the entire process of COVID-19 treatment during the pandemic. For patients with mild and moderate symptoms, TCM is the major treatment approach, preventing the symptoms from getting worse.

For the severely infected patients, an integrative treatment using both TCM and Western medicine is adopted, making full use of TCM's advantage in relieving high fever, facilitating absorption of lung exudate and improving the condition of stomach and intestinal tract, so as to slow down or avoid the de-

terioration of the symptoms.

TCM and non-medicine treatments are used to boost the recovery of the patients.

A paper on the guideline of treatment with integrated TCM and Western medicine for severe COVID-19 cases was published by Chinese researchers on Pharmacological Research in December 2021, providing clinical guidance and decision basis for healthcare professionals and other concerned parties involved in the diagnosis, treatment, and care of COVID-19 patients.

### Going global

A commentator at the TCM exhibition center mentioned that many foreign journalists were already familiar with TCM treatments like acupuncture, despite this being their first visit to China.

TCM has been spread to 196 coun-

tries and regions. In 2019, TCM was involved in the 11th revision of the International Classification of Diseases (ICD) approved by the 72nd World Health Assembly, meaning it entered the global mainstream medical system. In cooperation with the International Organization for Standardization, China also released 64 international TCM standards.

TCM related content has also been incorporated in 16 free trade agreements, with the accumulated total volume of import and export trade for TCM products reaching 28.19 billion USD.

More than 70 TCM decoction pieces are involved in the *European Pharmacopoeia* (10th Edition). According to Wang Mei, chair of the Leiden University-European Center for Chinese Medicine and Natural Compounds, most med-

ical insurance companies in the Netherlands reimburse 70 percent to 100 percent of the treatment fees for acupuncture, because they found the treatment highly efficient and economical after clinical trials.

According to a development plan of better integrating TCM into the Belt and Road Initiative (BRI) released by National Administration of Traditional Chinese Medicine in January 2022, 30 high-quality overseas TCM centers and 56 bases for TCM international cooperation have been established, offering high quality TCM treatment for people from countries along the BRI.

TCM is a great legacy from ancient China and a crucial part of global civilization. Today, TCM can make a great contribution to the health and well-being of people worldwide.