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WEEKLY EDITION

International Cooperation

ILRS: Next Frontier

Edited by LU Zijian

The China National Space Administration (CNSA) and the Asia - Pacific Space Cooperation Organization (APSCO) signed a joint statement on cooperation regarding the International Lunar Research Station (ILRS) at the opening ceremony for the First International Deep Space Exploration Conference on April 25 in Hefei, east China's Anhui province.

The two parties will conduct extensive and deep cooperation in the demonstration, construction, operation and application of ILRS, the statement said, including the verification of science targets, design and development of spacecraft, scientific instrument payloads, scientific and technological experiments, data analysis, education and training.

As early as June 2021, China released the ILRS Guide for Partnership. Russia, Pakistan, United Arab Emirates and APSCO have signed cooperation agreements and negotiation is now being conducted with over 10 other countries and organizations, according to Wu Weiren, director general of Deep Space Exploration Laboratory and academician of the Chinese Academy of Engineering.

An ILRS cooperation organization is to be established to jointly administer the facilities of the station and share research results. The preparation work and international liaison for the cooperation organization will be overseen by CNSA's Lunar Exploration and Space Program Center and the Deep Space Exploration Laboratory. Wu said that he hopes the agreements with member countries or organizations could be completed by the end of October.

Wu also revealed at the conference that ILRS is set to be built in three phases.

In the first phase, a basic model of ILRS will be built before 2028 to conduct environment exploration, experiments and verification of resource use on the moon. The Chang'e-6, Chang'e-7 and Chang'e-8 missions are also scheduled during this phase, around 2024, 2026 and 2028 respectively.

An improved ILRS will be introduced by 2040 for the second phase. Space environment exploration and scientific experiments will be conducted among the sun, Earth and the moon. The Queqiao-2 satellite constellation is to be built to serve deep - space exploration activities like manned lunar landing, Mars and Venus exploration.

An application oriented ILRS will be built during the third phase, upgrading the research station into a pragmatic and multi-functional lunar base.

Countries, international organizations and research institutes are welcome to join hands with China, to build and implement ILRS, Wu said.



Photo shows ships passing through the Three Gorges lock in Yichang, Hubei province. (PHOTO: XINHUA)

Editor's Pick

Impressive Contributions of Three Gorges Project

By WANG Xiaoxia

Three Gorges Hydroelectric Power Station, or Three Gorges Project, on Yangtze River, serves as a critical water-control system with a range of functions including flood control, electricity generation, shipping and water-resource utilization, according to data released by China Three Gorges Corporation (CTG).

Flood and drought relief

Over the past five years, the Three Gorges Dam has held back a volume of 75.2 billion cubic meters of water during flood seasons.

The Three Gorges Dam is situated at the intersection of the upper and middle-lower reaches of the Yangtze River, near the Jingjiang River, which used to suffer severe floods. With a flood storage capacity of 22.15 billion cubic meters, the project plays a major role in the flood control of the Yangtze River basin.

During the dry season, the Three Gorges Reservoir replenishes water in the middle and lower reaches of the Yangtze River, sending 112.7 billion cubic meters of water to middle and lower reaches over the past five years, according to CTG.

In the summer of 2020, the Yangtze basin saw its heaviest average rainfall in nearly 60 years. The Three Gorges Reservoir was able to cut the maximum flood peak from 75,000 cubic meters per second to 49,400 cubic meters per second, reducing them by more than a third and greatly easing flood-control pressure in the middle and lower reaches of the Yangtze River. This helped to avoid the relocation of 600,000 people, and the flooding of 490,000 mu (around 32,667 hectares) of farmland, effectively safeguarding people's lives and property, said CTG.

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Improve waterway conditions

While relieving the impact of natural disasters, the project's water allocation has also improved navigation conditions of the Yangtze River, making it a veritable "golden waterway."

The Chuanjiang waterway, which is the section of the Yangtze River between Yichang in Hubei province and Chongqing, was considered a "heavy danger" in the past because its natural channel was irregular in both width and depth. There were hundreds of rapids along the waterway, causing countless shipwrecks and loss of life, said Liu Hongyin, a captain who spent 60 years working on the river. The situation changed drastically after the completion of Three Gorges Dam, said Liu, as the water rose and the channel widened, a safe 24-hour navigation became reality. See page 4

China's Sci-tech Development for Good, People's Well-being

By LIN Yuchen & GONG Qian

The Chinese Embassy in the United States set up particularly a sci-tech exhibition hall during its open house event on May 6, in efforts to showcase American people China's sci - tech achievements.

By providing the pictures, models and on-site explanation about China's achievements in sci - tech development, the exhibition showed how sci-tech development in China is for good, people's well-being and social progress.

The exhibition is held against the backdrop of rising tensions between China and the U.S. in sci-tech cooperation in recent years.

"To China and the U.S. in terms of sci-tech development, cooperation brings the two benefits and division brings the two harms. The two countries should continue to pro- actively cooperate on global issues such as climate change, energy and ecology to create increasingly valuable cooperation rewards for the benefit of the people in the world," said Chen Futao, minister counsellor for science and technology of the Chinese Embassy.

"We should recognize that internationalization is an essential attribute of science. International exchanges and cooperation are crucial in driving forward sci-

tech development of the world," he noted.

In her remarks, Xu Xueyuan, Chargé d'affaires of the Chinese Embassy in the U.S., said that humanistic exchanges and civil contacts between China and the U.S. are the social foundations for the development of mutual relations, which help the two countries to enhance understanding, resolve differences, and achieve value integration and positive interactions.

The one - day event themed "Yunnan: A Many-Splendored Life" attracted about 15,000 American visitors, and over 350 guests from various sectors, including U.S. Deputy Assistant Secretary of State for China Rick Waters, who attended the VIP session.

Ecological Restoration Path with Chinese Characteristics

By Staff Reporters

"The harmonious coexistence of human and nature has become an essential requirement for Chinese-style modernization," according to Wang Zhibin, a director in the Ministry of Ecology and Environment (MEE), at a press conference on April 27.

Information provided by MEE shows that China has carried out a series of fundamental, groundbreaking and long-term ecological protection and restoration work, creating a world-renowned ecological and green development miracle, and embarking upon a path of ecological protection and restoration with Chinese characteristics.

Since 2020, MEE has completed the on-site survey of pollution discharges into the rivers in the middle and upper reaches of the Yellow River, covering Qinghai, Sichuan, Gansu, Ningxia, Shanxi, Shaanxi, and Inner Mongolia, and found over 17,000 into - river pollution threats. Since March, MEE has conducted traceable inspections for a total of 48 enterprises suspected of discharging illegally. See page 3

Scientists Capture First-ever Image of Black Hole's Accretion, Jet

By Staff Reporters

An international research team led by the Shanghai Astronomical Observatory (SHAO) of the Chinese Academy of Sciences has recently generated a picture that displays the accretion of the M87 black hole and the powerful jet it expelled, the first of its kind in the world. The result was published online in the journal *Nature* on April 26.

Many astronomers have successfully captured images of the M87 black hole's bright and 5,000 light-year-long jet before. However, for the first time, they have revealed a link between the black hole's accretion and the jet.

The very- long- baseline interferometry (VLBI) observations of M87 with the Global Millimetre VLBI Array (GMVA) were conducted from April 14 to 15, 2018, complemented by the phased Atacama Large Millimeter/submillimeter Array (ALMA) and the Greenland Telescope (GLT). The aperture of the telescope is equivalent to the diameter of the Earth. See page 2

WEEKLY REVIEW

Tianzhou-5 Separates from Space Station

China's Tianzhou-5 cargo craft, tasked with supporting the Shenzhou-15 crewed space mission, separated from the orbiting space station combination on May 5 and switched to independent flight, according to the China Manned Space Agency.

New Breakthrough in Hybrid Potato Breeding

Scientists from Agricultural Genomics Institute at Shenzhen under the Chinese Academy of Agricultural Sciences used evolutionary genomics to identify deleterious mutations in potato, which may help shorten the breeding process and cultivate more and better potato varieties. The study was published online in the journal *Cell*.

More Frequent Flash Droughts in Warmer Future

Based on data concerning drought events between 1951 and 2014, Chinese scientists predicted that flash droughts, or the rapid onset of drought, will be more frequent worldwide in the warmer future, according to the study published in the journal *Science*.

New Graphic

