

## Astronauts complete first cave training

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Twenty-eight participants recently completed the country's first cave-survival training for astronauts, according to the China Manned Space Agency.

The nearly monthlong training, organized in Chongqing's Wulong district by the Astronaut Center of China, featured more than 10 activities, including environmental monitoring, cave mapping, simulated communication between astronauts and ground control, and psychological and behavioral exercises, the agency said in a news release on Monday.

The astronauts were divided into four groups, each spending six days and five nights in a natural cave where the average temperature was 8°C and humidity went up to 99 percent. The training involved tasks such as cave exploration, scientific research, resource management and daily maintenance. The astronauts navigated extremely narrow passages, climbed and rappelled down cliffs, endured prolonged cold and damp conditions, and faced intense physical challenges. They also had to overcome psychological hurdles such as fears of darkness and sensory deprivation.

Wu Bin, a project leader at the Astronaut Center of China, said the training aimed to enhance the astronauts' risk response capabilities, self-reliance, teamwork, emergency decision-making, on-site investigation abilities, physical endurance, and psychological resilience in extreme environments. "It also served as a comprehensive assessment of the astronauts' overall operational readiness," he added.

Jiang Yuan, an astronaut instructor at the center, emphasized that psychological resilience is crucial for space missions. "Caves are typical examples of extreme confinement and isolation, with core

psychological challenges including sensory deprivation, uncertain risks and limited social interaction. Cave training provides valuable scientific insights into studying and supporting astronauts' mental health under extreme conditions," she said.

Astronaut Ye Guangfu, who in 2016 participated in a weeklong underground training exercise organized in Italy by the European Space Agency, said the cave-survival mission in Wulong helped strengthen the astronauts' comprehensive abilities to handle extreme environments and provided strong support for future long-duration space station missions and crewed lunar exploration.

After completing the training in Wulong, astronaut Zhu Yangzhu said the drill simulated the loneliness and the unknowns of deep-space exploration, testing both their physical and mental limits.

"It deepened our understanding of teamwork and further strengthened our emergency response capabilities and psychological resilience, providing valuable experience for future missions," he added.

According to the news release, the Astronaut Center of China plans to continue these rigorous training programs in the future, both for new recruits and those who have not yet participated, to further enhance Chinese astronauts' ability to adapt to extreme environments and accomplish their tasks.

Pang Zhihao, a spaceflight technology expert and veteran space writer, said that it is necessary for astronauts to undergo challenging survival training.

"Spaceflights sometimes involve many unpredictable factors, so crew members must be well prepared for any kind of emergency during their mission. For example, they should know how to survive in tough terrain such as deserts and mountains, in case their return capsule lands in these places, and find a way out," he said.

Astronauts need to learn and hone their skills of exploring unfamiliar locations, selecting or setting up shelters, obtaining and processing edible materials, and contacting search-and-rescue personnel, among other survival expertise, Pang added.



Astronauts participate in a cave-survival training program in December in Chongqing's Wulong district. XINHUA