

China's Moon Village Plans

With Chang'e-6 mission success including the first sample return from the far-side of the Moon, China demonstrated its capability to implement Phase IV of the Chinese Lunar exploration program without any major delays. Chang'e-6 is considered a “game changer” and a decisive milestone for the Chinese Lunar exploration program.

The goal: To have the Chinese International Lunar Research Station (ILRS) operational by 2035.

Phase IV Lunar Exploration

Phase IV [1] is the development of an autonomous lunar research station near the Moon's south pole. The program entered active development in 2023 following the successful completion of the previous three phases.

Chang'e 6, launched on 3 May 2024 and completed its unprecedented sample return mission on June 25, 2024.

Chang'e 7, expected to launch in 2026, is a mission that will explore the south pole for resources. The mission will include an orbiter, a lander, and a mini-flying probe. Chang'e-7 will carry a total of 21 scientific payloads, including 6 *international payloads*, aiming to conduct detailed exploration of the environment and resources in the south polar region of the moon. Mission objectives include fixed-point landings. In situ observations of the permanently shadowed crater will be made by the mini-hopping probe, which will carry water molecule and hydrogen isotope analyzers.

International payloads are:

- Lunar Surface Material Hyperspectral Imager (jointly developed by the Egyptian Space Agency and the Bahrain National Space Science Agency),
- Moon-based Dual-channel Earth Radiation Spectrometer (developed by the Physical Meteorological Observatory in Davos, Switzerland),
- Space Weather Global Monitoring Sensor Device (Developed by the Ministry of Higher Education, Research and Innovation of Thailand and the National Astronomical Research Institute of Thailand),
- Laser Corner Reflector Array (developed by the Italian National Institute of Nuclear Physics-Frascati National Laboratory),
- Lunar Dust and Electric Field Probe (developed by the Russian Academy of Space Sciences)
- Moon-based Astronomical Observation Telescope (developed by the International Association of Lunar Observatories). [2]

Chang'e 8, expected to launch in 2028, will verify in-situ resource development and utilization technologies. It may include a lander, a rover, and a flying detector, as well as a 3D-printing experiment using in situ resource utilization (ISRU) to test-build a structure, It will also transport a small sealed ecosystem experiment. It will test technology necessary to the construction of a lunar science base.

Crewed Mission Phase Activities

2019, China was reviewing preliminary studies for a crewed lunar landing mission in the 2030s and possibly building an outpost near the lunar south pole with international cooperation.

2021, China and Russia announced they will be building a Moon base together, also formally invited more countries and international organizations to join their International Lunar Research Station (ILRS) project being developed by the two nations, as an alternative to the American *Artemis*

Program. China announced on April 24, 2021 the International Lunar Research Station Cooperation Organization (ILRSCO) with members including: China, Russia, South Africa, Belarus, Azerbaijan, Venezuela, Pakistan and Egypt.

2023, July 12, at the 9th China (International) Commercial Aerospace Forum in Wuhan, Hubei province, Zhang Hailian, a deputy chief designer with the China Manned Space Agency (CMSA), publicly introduced a preliminary plan to land two astronauts on the Moon by the year 2030.

2023, December, successful launch of the modified Long March-5 rocket, using a 18.5 m fairing, yielding a new Chinese altitude record. [3]

2024, increase the Long March-5 launch frequency to 4 launches per year and keep this intensive launch frequency for the coming years which is high for such a heavy-lift rocket.

2024, in February the China Manned Space Agency (CNSA) introduced the names for the two future moon exploration vehicles, the crewed spacecraft Mengzhou ('Dreamship') and the crewed Moon lander Lanyue ('embrace the Moon'). [3]

2030: First Chinese crewed Moon landing

2035 and thereafter: International Moon base and application



ILRS is a complex experimental research facility to be constructed with a possible attraction of partners on the surface and/or in the orbit of the Moon designed for multi- discipline and multi-purpose scientific research activities, including exploration and use of the Moon, moon-based observation fundamental research experiments and technological verification with the capability of long term robotic operation with the prospect of subsequent human presence. [4]

Reference:

[1] Wikipedia https://en.wikipedia.org/wiki/Chinese_Lunar_Exploration_Program

[2] Wikipedia https://en.wikipedia.org/wiki/Chang%27e_7

[3] China Rundschau, KW 10 2024

[4] Image: ILRS User Guide

<https://www.cnsa.gov.cn/english/n6465652/n6465653/c6812150/content.html>