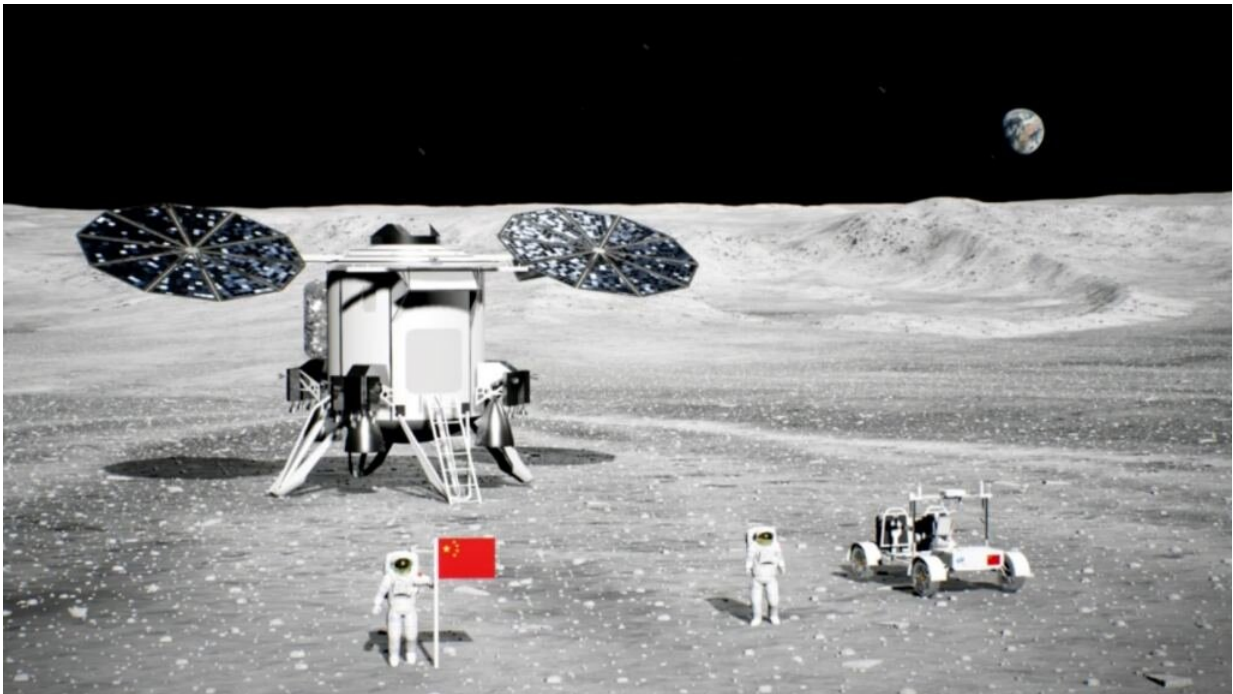


# China will use two rockets to put humans on the moon

July 19 2023, by Matt Williams

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Schematic diagram of China's proposed lunar lander. Credit: China Manned Space Engineering Office

As of 2019, China began conducting preliminary studies for a crewed lunar mission that would take place by the 2030s. Two years later, the China National Space Agency (CNSA) and Roscosmos announced a partnership to create an International Lunar Research Station (ILRS) around the South Pole-Aitken Basin. The proposed timeline for

development came down to three phases: Reconnaissance (2021–25), Construction (2025–35), and Utilization (2035–onward). Earlier this year, China announced that its space agency would send the first crewed mission to the lunar surface by 2030.

On July 12, during the 9th China (International) Commercial Aerospace Forum in Wuhan, China, Chinese officials offered additional information about its crewed lunar exploration program. This included Deputy chief engineer Zhang Hailian of the China Manned Space Engineering (CMSE) office announcing the preliminary plan for China's first crewed [lunar mission](#). As Zhang illustrated with a series of animations, the mission will consist of two carrier rockets launching all the necessary elements to the moon, which will then rendezvous in orbit and land on the surface to conduct science operations.

This mission architecture is similar to that of Artemis III, NASA's proposed mission that will land the "first woman and first person of color" on the moon, who will also be the first astronauts to touch the [lunar surface](#) since the Apollo Era ended over 50 ago. NASA's current mission architecture calls for an Orion spacecraft (with a crew of four) and the Human Landing System (HLS) provided by SpaceX (the Starship HLS) to launch separately, rendezvous in lunar orbit, and two astronauts to transfer aboard the HLS and use it to land on the surface.

Once surface operations are complete, the two-person crew will return to orbit using the Starship HLS, where they will rendezvous again with the Orion, transfer aboard, and fly back to Earth. The mission is scheduled for 2025 but may be subject to delays depending on several factors. Nevertheless, it will be followed by many more Artemis missions that will culminate with the creation of an orbiting platform (the Lunar Gateway) and a lunar base around the South Pole-Aitken Basin (the Artemis Base Camp).

## China's mission architecture


Similarly, China plans to launch two Long March-10 rockets (currently in development) carrying the lunar lander and crewed spacecraft separately. These will conduct rendezvous and docking maneuvers in [lunar orbit](#), allowing the taikonauts to transfer to the lander, descend, land in a predetermined area, and spend the next few days conducting scientific investigations and sample collection. Once complete, the taikonauts will take off in the lander's ascent vehicle and dock with the spacecraft, which will be used for the return trip to Earth.

During the speech, Zhang presented pictures of some mission elements, including the Long March-10 (CZ-10) rockets, the lunar lander, and the lunar rover. The design for the next-generation CZ-10 was first presented at the National Museum of China in February 2022 as part of the "30 Years of China's Manned Spaceflight" exhibit. This rocket is highly anticipated since, like the Long March-9 (also in development), China has announced it will be "entirely reusable." As of 2023, engineers have successfully tested the YF-100K first-stage engine and other components, with an inaugural launch targeted for 2027.

Zhang's slideshow included schematic diagrams of the CZ-10s profile featuring its three first-stage core rockets, each equipped with seven YF-100K engines. There were also images of the first stage (and its launch abort system) and the [lunar lander](#) with the third stage launch vehicle attached. The lander has a familiar configuration that resembles the one depicted inside China's Manned Lunar Deep Exploration Project Office last year. This design was part of a mural depicting many different crewed lunar mission elements and features the same squat four-legged profile with twin fan solar panels.

The schematic of the crewed lunar rover shows a two-seat vehicle with the engine in front and what appears to be mast-mounted instruments.

Then there's a cutaway view of the lunar laboratory (image above), which consists of two connected modules (both powered by twin fan solar panels) docked with a surface vehicle that appears to be transferring crew. In the background, there's another vehicle that has a large parasol-like device mounted on it—which bears a striking resemblance to NASA's proposed Kilopower Reactor Using Sterling TechnologY (KRUSTY) concept.



**China's moon mission plans for 2024 and beyond**

*Chang'e-6 mission*  
 Date: Around 2024  
 Tasks: To take the **first ever** samples from the far side of the moon and bring them back to Earth.

*Chang'e-7 mission*  
 Date: Around 2026  
 Tasks: To land on the south pole of the moon, as the **first ever** spacecraft to do so, and look for evidence of water.

*Chang'e-8 mission*  
 Date: Around 2028  
 Tasks: To cooperate with Chang'e-7 to establish a basic type of international lunar scientific research station at the south pole of the moon and conduct experiments on the exploration and utilization of lunar resources.

*Manned lunar mission*  
 China plans to land its taikonauts on the moon **before 2030** to carry out scientific exploration.

Sources: China Manned Space Engineering Office, China Media Group

CGTN

Credit: Li Wenyi, China Manned Space Engineering Office

## **Chang'e Program**

During the Forum, details were shared by Wu Weiren, the chief designer of the lunar exploration program, about the future of the Chinese Lunar Exploration Program (Chang'e) and how these will contribute to the realization of the ILRS. This includes the Chang'e-6 lunar probe, which is scheduled to launch sometime next year and will conduct the first-ever sample return from the far side of the moon. The Chang'e-7 mission, which will launch around 2026, will be the first lander and rover to search for evidence of water around the lunar south pole.

By 2028, Chang'e-7 will be joined by the Chang'e-8 mission to establish a basic research station, conduct scientific experiments, and investigate the presence and utilization of lunar resources—aka In-Situ Resource Utilization (ISRU). The Chang'e-8 mission will also test construction methods, examine potential base sites, and investigate the challenges of radio communications around the lunar south pole, said Wu. This station is scheduled for completion by 2030, coinciding with the arrival of the first crewed mission, and will be the predecessor of the ILRS (scheduled for completion by 2035).

These plans may be subject to delays as a result of the conflict in Ukraine, which has led to worsening relations between Russia and its space exploration partners. This includes the termination of multiple cooperative agreements between Roscosmos and the ESA and the seizure of the Baikonur Cosmodrome by the state of Kazakhstan in March 2023. It could also impose delays on the development of Russia's planned Angara-5 super-heavy launch vehicle, a vital part of Roscosmos' commitment to the ILRS and the country's plans for future lunar

exploration.

However, it is clear that China is more than capable of going it alone at this point with the ILRS. Not only are they making tremendous strides with their Manned Lunar Deep Exploration program, but the CNSA was already shouldering most of the financial and logical burdens associated with the base's construction.

Provided by Universe Today

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