

# Probe will bring back moon rocks and soil

Chang'e 5, China's newest lunar probe, will bring 2 kilograms of lunar soil and rock samples back to Earth before the end of 2017, the project's chief said Thursday.

"The monthlong Chang'e 5 mission will be the most sophisticated lunar expedition China has ever made," Hu Hao, director of the national Lunar Exploration Center, told China Daily. "It will face a lot of challenges such as the great number of demanding maneuvers and the complicated condition of its landing site."

The center is under the State Administration of Science, Technology and Industry for National Defense.

Hu said that Chang'e 5 will be launched atop a Long March 5 heavy-lift carrier rocket at the Wenchang Space Launch Center in Hainan province.

The 8.2-metric ton probe has four components, an orbiter, lander, ascender and re-entry module. After the probe reaches lunar orbit, the components will separate into two parts, with the orbiter and re-entry module remaining in the orbit while the lander and ascender descend toward the moon's surface, Hu said.

The lander and ascender will make a soft landing – using small rockets to slow descent – and get to work of such tasks as using a drill to collect underground rocks and a mechanical arm to gather lunar soil.

After two days, the ascender's rocket will elevate it to lunar orbit to dock with the re-entry module. It will transfer lunar samples to the module, which will carry them to Earth. The samples are to be distributed to scientists around the country for research.

If the mission is successful, the third phase of China's lunar exploration program will be finished ahead of schedule, Hu said, also a deputy to the 12th National People's Congress. The third phase is to be concluded before 2020, according to earlier plans.

China's most recent lunar mission took place in December 2013 when the Chang'e 3 probe carried the nation's first lunar rover, Yutu or Jade Rabbit, to the moon. The mission marked the mankind's first soft-landing on the moon in nearly four decades.

Chang'e 3's success marked the completion of the second phase of China's lunar exploration program. It followed the successful Chang'e 1 mission in 2007 and Chang'e 2 in 2010.

Designers and engineers are now carrying out tests on Chang'e 5 and work is proceeding well, Hu said.

The Chang'e 5 mission will pave the way for the nation's future manned expedition to the moon, Hu said.

Ye Peijian, one of China's leading space scientists, told Xinhua News Agency on Wednesday that the fourth phase of the country's lunar exploration program will unfold in 2018 as the Chang'e 4 probe will be launched to carry out the world's first soft-landing on the far side of the moon. He added that China also plans to explore the two lunar poles in the near future.

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## [Fossils point to life on Earth 4 billion years ago](#)

Tiny fossils that scientists say are the oldest ever found offer evidence of life on Earth 3.8 to 4.3 billion years ago, when our planet was still in its infancy, researchers reported on Wednesday.

Even at the more primitive end of the spectrum, "the microfossils we discovered are about 300 million years older" than any runners-up, said Dominic Papineau, a professor at University College London, who made the discovery.

Dating puts the fossils "within a few hundred million years" of the formation of the solar system, he said.

The results were published in the peer-reviewed journal Nature.

The emergence of life not long after Earth formed would suggest it also could emerge on watery worlds outside our solar system at comparable stages of formation, the scientists said.

"If life happened so quickly on Earth, then could we expect it to be a simple process that could start on other planets?" asked the lead author, Matthew Dodd, a graduate student at the London Centre for Nanotechnology.

Earth and Mars are believed to have had liquid water on their surfaces at the same time, he noted.

"We could expect to find evidence for past life on Mars 4 billion years ago," Dodd said.

But it may be that Earth was "just a special case", he added.

The tiny fossils – half the width of a human hair and up to half a millimeter in length – take the form of blood-red tubes and filaments formed by ocean-dwelling bacteria that fed on iron.

Locked inside white, flowerlike quartz structures known to harbor fossils,

they were found along what were once warm-water vents on the ocean floor, most often in deep waters.

Such iron-rich, hydrothermal systems still exist and are home to bacteria that may be similar to those unearthed by Dodd and his colleagues.

The site of the discovery, the Nuvvuagittuq Supracrustal Belt in Canada, contains some of the oldest sedimentary rocks known on Earth.

Scientists say they formed between 3.77 and 4.29 billion years ago, and may have been the habitat for the planet's first life-forms.

It is still not known when, or where, life on Earth began, but these deep-sea vents are seen as a good candidate.

Earth is thought to be about 4.57 billion years old, scientists said.

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## **China launches experiment satellite 'TK-1'**

China on Friday launched an experiment satellite, "TK-1", from northwestern Jiuquan Satellite Launch Center.

The satellite, carried by the rocket "KT-2", blasted off from the launch center at 7:53 a.m. Friday, and it later entered its intended orbit.

"TK-1" is the first satellite independently developed by China Aerospace Science & Industry Corp. (CASIC) and will be used for remote sensing, telecommunications and experiments in minisatellite-based technologies.

The "KT-2" rocket is one of the five carrier systems in the CASIC commercial space plan. It features high carrying efficiency and adaptability, according to the CASIC.

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