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US, not China, keen on moon race

The moon is the only natural satellite of Earth. It is also the nearest celestial body to our planet, and selenology, or the study of the moon, is very important for scientists, as it can give them insights into other celestial bodies and advance planetary science. If we want to know the history of Earth, together with the history of our solar system, studying the moon is essential.

The exploration of the moon started in the 1950s. In those days, however, lunar missions were driven by politics, because the Soviet Union and the United States tried to achieve "the first" in every sphere of selenology. While the first moon flyby, the first impact, the first soft landing and the first orbiter of the moon were achieved by the Soviet Union, the US became the first country to land man on the lunar surface, which in a way ended the "moon race".

Since the lunar explorations by the Soviet Union and the US were politics-driven, they were not sustainable. So the US cancelled its Apollo program, and for more than half a century, no astronaut has landed on the moon.

The second tide of lunar explorations began in the 1990s. Apart from the US, countries like Japan, European states, China and India have sent probes to the moon. Unlike the moon race during the Cold War days, this time the purpose of lunar explorations is to achieve scientific and engineering goals.

Nowadays, countries capable of space exploration pay more attention to efficiency. Due to such explorations, water has been found in permanent shadow areas of the moon. And scientists are hopeful that on-site resource utilization technologies will help reduce the cost of lunar exploration, as the available water on the moon will not only sustain astronauts' life; it can also be used to produce propellant.

In regions near the "south pole" of the moon, scientists expect to find a large amount of water ice in permanent shadow areas. There are also long-duration sunlit areas near the "south pole", and scientists say human beings can set up permanent bases there, which will transform the exploration of the moon to exploitation of the moon.

Since the gravity on the moon is only one-sixth of that on Earth, propellant produced on the lunar surface will be much cheaper than that brought from Earth. We hope the moon can be an outpost of human beings in the future, and help scientists travel deeper into the solar system.

However, the US has said its Artemis program will use Orion spaceship and the space-launch system to carry astronauts to cislunar space. They will also build a cislunar space station called the "gateway". The US National Aeronautical and Space Administration has chosen SpaceX's starship for the manned human landing system with Blue Origin solution as a backup measure.

During the moon race in the 1960s, the Apollo program adopted a very risky method to send astronauts to the moon. The Artemis program, however, is paying greater attention to reliability and safety. But the program seems starved of funds, and that's the reason why it is challenging for the US to return to the moon.

During the news conference to mark the launch of the Shenzhou-16 manned flight mission recently, the China Manned Space Agency formally announced that it will send the first Chinese astronaut to the moon before 2030. This is an exciting piece of news for the Chinese people. In 2003, space hero Yang Liwei fulfilled Chinese people's dream to travel to outer space. A Chinese national walking on the moon will be the realization of an equally big dream.

Although only seven years are left to achieve this goal, China has made all the preparations. The launch vehicle to be used for China's manned lunar program is called "Long March-10", which is a new generation human-rated launch vehicle. It uses many proven technologies. For instance, the diameter of the core stage and the two boosters of Long March-10 is 5 meters, the same as that used in the Long March-5 series. This means a lot of infrastructure facilities of Long March-5 can also be used for this new rocket. The YF-100K rocket engine used in the new rocket is also a derivative of the very practical YF-100 series.

China will use the new-generation manned spaceship to send astronauts into lunar orbit. While this new spacecraft has already been tested on the maiden flight of Long March-5B rocket, the docking mechanism and other related technologies were used in the Tiangong Space Station.

To make it possible for a Chinese national to walk on the moon, China will develop a new spacecraft called the "Lunar Lander", which will be propelled into lunar orbit by Long March-10, and dock with the new spaceship in lunar orbit. The soft-landing technologies demonstrated in Chang'e-3, 4 and 5 robotic lunar missions can also be used in the manned Lunar Lander. Learning from the Chang'e-5 sample return mission, China has also mastered the lunar orbit rendezvous and docking technology, which is possibly the most difficult and risky part of the lunar mission.

But despite deciding to send astronauts to the moon, China will not join any moon race. The manned lunar program is to advance China's space technology and high-tech industry. Rather than competing with any other country, China is open to engaging in cooperation with other countries, because it knows such cooperation is important for becoming a leading country in the field of space science.

China has already engaged in high-level international cooperation on its robotic lunar and space station programs. And we are confident it will engage in cooperation with more countries on its manned lunar program.

The author is a senior space industry observer and vice-chair of the International Astronautical Federation's space transportation committee.
The views don't necessarily reflect those of China Daily.