

NASA Is Studying How to Mine the Moon for Water

Mike Wall | [Space](#)



Lunar Flashlight mission will map the lunar south pole for volatiles.

Credit: Solar System Exploration Research Virtual Institute

There's a lot of water on the moon, and NASA wants to learn how to mine it.

Space agency scientists are developing two separate mission concepts to assess, and learn how to exploit, stores of [water ice on the moon](#) and other lunar resources. The projects – called Lunar Flashlight and the Resource Prospector Mission – are notionally targeted to blast off in 2017 and 2018, respectively, and aim to help humanity extend its footprint out into the solar system.

“If you're going to have humans on the moon and you need water for drinking, breathing, rocket fuel, anything you want, it's much, much cheaper to live off the land than it is to bring everything with you,” said Lunar Flashlight principal investigator Barbara Cohen, of NASA's Marshall Space Flight Center in Huntsville, Alabama. [[How to Build a Lunar Colony](#)]

[\(Infographic\)\]](#)

It's therefore important to "understand the inventory of volatiles across the whole moon and their purity, and their accessibility in particular," Cohen said in July during a presentation at the NASA Exploration Science Forum, a conference organized by the Solar System Exploration Research Virtual Institute at the agency's Ames Research Center in Moffett Field, California.

Solar sailing to the moon

Lunar Flashlight is working toward a possible launch date in December 2017, when it would blast off on the first test flight of NASA's [Space Launch System megarocket](#), along with several other piggybacking payloads.

Lunar Flashlight is a CubeSat mission, meaning the body of the spacecraft is tiny – about the size of a cereal box, Cohen said. But after it's deployed in space, the probe would get much bigger by unfurling an 860-square-foot (80 square meters) solar sail. [[Photos: Solar Sail Evolution for Space Travel](#)]

The spacecraft would then cruise toward the moon on a circuitous route, propelled along by the photons streaming from the sun. Lunar Flashlight would start orbiting the moon about six months after its launch, then spend another year spiraling down to get about 12 miles (20 kilometers) from the lunar surface.

The probe would then make about 80 passes around [the moon](#) at this low altitude, measuring and mapping deposits of water ice in permanently shadowed craters near the lunar poles. It would do this science work with the aid of its solar sail.

"We're going to use it as a mirror," Cohen said. "We're going to take the sunlight, bounce it off the [solar sail](#) into the permanently shadowed regions, and we're going to use a passive

infrared spectrometer to collect the light from the permanently shadowed regions in wavelengths that are indicative of water frost.”

Lunar Flashlight aims to find water ice that would be accessible to future explorers, be they human or robotic.

“What we’re looking for is water right at the surface,” Cohen said. “Could humans or their vehicles go into a permanently shadowed region and just scoop up the regolith and use what’s at the surface to be able to extract water ice?”

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