

# Japan's precision moon lander has hit its target, but it appears to be upside-down

January 25 2024, by Mari Yamaguchi

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This image provided by the Japan Aerospace Exploration Agency (JAXA)/Takara Tomy/Sony Group Corporation/Doshisha University shows an image taken by a Lunar Excursion Vehicle 2 (LEV-2) of a robotic moon rover called Smart Lander for Investigating Moon, or SLIM, on the moon. Credit: JAXA/Takara Tomy/Sony Group Corporation/Doshisha University via AP

Japan's space agency said Thursday that its first lunar mission hit the tiny patch of the moon's surface it was aiming for, in a successful demonstration of its pinpoint landing system—although the probe appears to be lying upside-down.

Japan became the fifth country in history to reach the moon when the Smart Lander for Investigating Moon, or SLIM, touched down on the moon early on Saturday. But trouble with the probe's solar batteries made it hard at first to figure out whether the probe landed in the target zone.

While most previous probes have used landing zones about 10 kilometers (six miles) wide, SLIM was aiming at a target of just 100 meters (330 feet). Improved accuracy would give scientists access to more of the moon, since probes could be placed nearer to obstacles.

One of the lander's main engines lost thrust about 50 meters (54 yards) above the moon surface, causing a harder landing than planned.

A pair of autonomous probes released by SLIM before touchtown sent back images of the box-shaped vehicle on the surface, although it appeared to be upside down.

After a few days of data analysis, the Japan Aerospace Exploration Agency, or JAXA determined that the spacecraft landed about 55 meters (60 yards) away from its target, in between two craters near the Shioli crater, a region covered in volcanic rock.



Journalists watch an image taken by Lunar Excursion Vehicle 2 (LEV-2) from the moon during a press conference on updates on the status of its spacecraft, including whether it successfully made a "pinpoint landing" on the Moon Thursday, Jan. 25, 2024, in Tokyo. Japan Aerospace Exploration Agency (JAXA) officials announced Thursday that the spacecraft which landed Saturday, landed only about 55 meters (60 yards) away from its target set in between two craters near the Shioli crater, a region covered in volcanic rock. Credit: AP Photo/Eugene Hoshiko

But after the landing mishap, the craft's solar panels wound up facing the wrong direction, and it cannot generate power. Officials said there is still hope the probe will be able to recharge when the moon enters its daytime in the coming days.

JAXA project manager Shinichiro Sakai said the images sent back were just like those he'd imagined and seen in computer renderings.

"Something we designed traveled all the way to the moon and took that snapshot. I almost fell down when I saw it," he said. For the pinpoint landing, Sakai said, he would give SLIM a "perfect score."

"We demonstrated that we can land where we want," Sakai said. "We opened a door to a new era."

LEV-1, a hopping robot equipped with an antenna and a camera, was tasked with recording SLIM's landing and transmitting images back to Earth. LEV-2 is a baseball-sized rover equipped with two cameras, developed by JAXA together with Sony, toymaker Tomy Co. and Doshisha University.



From left, Daichi Hirano, researcher at the Japan Aerospace Exploration Agency (JAXA), Hitoshi Kuninaka, director general of the Institute for Space and Astronautical Science (ISAS), Shinichiro Sakai, the Project Manager for Smart Lander for Investigating Moon (SLIM), and Masatsugu Otsuki, Associate Professor of Institute of Space and Astronautical Science of JAXA, prepare to pose for photographers with an image taken by Lunar Excursion Vehicle 2 (LEV-2) from the moon as background during a press conference Thursday, Jan. 25, 2024, in Tokyo. JAXA officials announced Thursday that the spacecraft which landed Saturday, landed only about 55 meters (60 yards) away from its target set in between two craters near the Shioli crater, a region covered in volcanic rock. Credit: AP Photo/Eugene Hoshiko

The two autonomous probes frame and select images independently, both using LEV-1's antenna to send them back to the base.

Daichi Hirano, a JAXA scientist who designed LEV-2, also known as Sora-Q, said it selected images containing SLIM and nearby lunar surface and transmitted the images through LEV-1, making the pair the world's first to achieve the mission. Despite the rush, the probes captured and transmitted 275 images.

Japan followed the United States, the Soviet Union, China and India to reach the moon's surface.

The project was the fruit of two decades of work on precision technology by JAXA.

JAXA has a track record with difficult landings. Its Hayabusa2 spacecraft, launched in 2014, touched down twice on the 900-meter-long (3,000-foot-long) asteroid Ryugu, collecting samples that were returned

to Earth.



Shinichiro Sakai, the Project Manager for Smart Lander for Investigating Moon (SLIM) speaks during a press conference on updates on the status of its spacecraft, including whether it successfully made a "pinpoint landing" on the Moon Thursday, Jan. 25, 2024, in Tokyo. Japan Aerospace Exploration Agency (JAXA) officials announced Thursday that the spacecraft which landed Saturday, landed only about 55 meters (60 yards) away from its target set in between two craters near the Shioli crater, a region covered in volcanic rock. Credit: AP Photo/Eugene Hoshiko



Shinichiro Sakai, the Project Manager for Smart Lander for Investigating Moon (SLIM) speaks as he hold a scale model of SLIM during a press conference on updates on the status of its spacecraft, including whether it successfully made a "pinpoint landing" on the Moon Thursday, Jan. 25, 2024, in Tokyo. Japan Aerospace Exploration Agency (JAXA) officials announced Thursday that the spacecraft which landed Saturday, landed only about 55 meters (60 yards) away from its target set in between two craters near the Shioli crater, a region covered in volcanic rock. Credit: AP Photo/Eugene Hoshiko



From left, Daichi Hirano, researcher at the Japan Aerospace Exploration Agency (JAXA), Hitoshi Kuninaka, director general of the Institute for Space and Astronautical Science (ISAS), Shinichiro Sakai, the Project Manager for Smart Lander for Investigating Moon (SLIM), and Masatsugu Otsuki, Associate Professor of Institute of Space and Astronautical Science of JAXA, bow with an image taken by Lunar Excursion Vehicle 2 (LEV-2) from the moon as background during a press conference Thursday, Jan. 25, 2024, in Tokyo. JAXA officials announced Thursday that the spacecraft which landed Saturday, landed only about 55 meters (60 yards) away from its target set in between two craters near the Shioli crater, a region covered in volcanic rock. Credit: AP Photo/Eugene Hoshiko

SLIM, nicknamed "the Moon Sniper," was intended to seek clues about the origin of the moon, including analyzing minerals with a special



camera.

SLIM was launched on a Mitsubishi Heavy H2A rocket in September. It initially orbited Earth and entered lunar orbit on Dec. 25.

Japan hopes to regain confidence for its space technology after a number of failures. A spacecraft designed by a Japanese company crashed during a lunar landing attempt in April, and a new flagship rocket failed its debut launch in March.

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Citation: Japan's precision moon lander has hit its target, but it appears to be upside-down (2024, January 25) retrieved 27 April 2024 from <https://phys.org/news/2024-01-japan-craft-successful-pin-moon.html>

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