India loses communication with lunar lander shortly before scheduled landing on the Moon

What was supposed to be India's first soft landing on the Moon today appeared to end in failure when the country's robotic Vikram lander seemingly crashed into the lunar surface during its powered descent to the ground. If it had been successful, India would have become the fourth country to land a spacecraft intact on the Moon. But for now, only the United States, Russia, and China hold that title.

The Vikram lander was a critical part of India's Chandrayaan-2 mission — a project aimed at learning more about the unexplored and highly intriguing south pole of the Moon. Numerous lunar spacecraft have gathered enough evidence about this region to suggest that significant amounts of water ice might be hiding on the south pole, likely in frigid craters that are in permanent shadow. India's goal with Chandrayaan-2 was to land vehicles in this region to get a better understanding of the area's composition and learn just how much water ice might be lurking there.

data of the lander showed the vehicle to be slightly off course

Vikram was carrying a rover called Pragyan, and together the two vehicles were meant to explore the south pole region in up-close detail using a series of instruments, including a seismometer to measure lunar quakes and X-rays to help figure out the composition of the dirt (and potential water ice). But just a few minutes before Vikram was scheduled to touch down on the Moon, data of the lander from inside India's mission control center showed the vehicle to be slightly off course.

When Vikram was about 1.3 miles (2.1 kilometers) above the surface, India lost communication with the lander. India has yet to give official confirmation on whether or not the lander did, indeed, crash.

Date of Vikram's trajectory during its descent to the Moon Image: ISRO

The apparent crash is, in fact, the second time that India has sent a spacecraft hurtling into the Moon's surface. The first time was deliberate in 2008, during India's first mission to the Moon called Chandrayaan-1. The project sent an impactor probe on a crash course into the lunar dirt, to learn more about the material that got kicked up. For this follow-up mission, India hoped to keep the lunar lander and rover combo alive on the Moon for an extended period of time. The two bots were supposed to survive for the length of an entire lunar day — about two weeks, when the Moon is bathed in constant sunlight. The duo would have ceased operations when the lunar nighttime began, when the Moon is draped in darkness and surface temperatures plummet, sometimes below -200 degrees Fahrenheit (-130 degrees Celsius).

Even without the lander and rover, the Chandrayaan-2 mission isn't a complete loss. Vikram and Pragyan launched along with an orbiter on July 22nd, and the trio spent most of August traveling out to the Moon together. They inserted themselves into lunar orbit on August 20th, and Vikram later separated from the orbiter and started spiraling closer to the lunar surface. In the meantime, the orbiter is still in orbit around the Moon, and helped to gather details of the crash when India lost contact with Vikram during its descent. The orbiter is meant to last up to a year in lunar orbit, studying the Moon's surface with a series of cameras, instruments, and X-rays.

India is proud of our scientists! They've given their best

> *and have always made India proud. These are moments to be courageous, and courageous we will be!*
>
> *Chairman @isro gave updates on Chandrayaan-2. We remain hopeful and will continue working hard on our space programme.*
>
> *— Narendra Modi (@narendramodi) September 6, 2019*

Though numerous lunar landings have happened since the 1960s, touching down on the Moon is still relatively difficult. It requires the precise firing of a vehicle's rocket engine to lower it down to the very small world, which doesn't have an atmosphere. An Israeli nonprofit demonstrated just how challenging this feat is in April, when it attempted to land a privately funded lunar lander on the Moon's surface. A glitch caused the lander's engine to shut down too early, and the spacecraft accidentally slammed into the surface.

[embedded content]

Many other organizations and entities around the world are also hoping to reach the Moon. Various private companies in the US are all striving to land robotic vehicles on the Moon in the next couple of years, while NASA has vowed to return people to the lunar surface by 2024 with the agency's Artemis mission. (NASA has its sights set on the lunar south pole for that landing.) Vikram and Pragyan could have helped with all of these efforts, especially if they revealed easily accessible water ice in the south pole region. Or they could have shown that the region is much more barren than scientists hoped.

For now, the questions about the Moon's water ice remain unanswered, and they might for some time — until the next landing attempt on the south pole.

https://www.theverge.com/2019/9/6/20853462/india-chandrayaan-2

-lunar-landing-moon-vikram-crash-communication-failure