India lost communication with its lander just above the surface [Updated]

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- On Friday, India’s Vikram lander will attempt to make a soft landing on the Moon’s surface. This gallery highlights how that will happen.
- Vikram begins its descent from a 35km x 101km orbit.
- Four outer engines will control its movement at this altitude.
- The landing site will be nearly 600km down range.
- For this phase, the spacecraft will use a KA-band altimeter, a laser altimeter, and a lander position-detection camera to inform its flight computer.
- The lander position-detection camera is shown at work.
- As it enters the fine braking phase, the spacecraft will rely on two engines, each with 800 Newtons of thrust.
- During this stage, the lander will use a laser altimeter, a second KA-band altimeter, and a lander horizontal-velocity camera.
- At 400 meters, it will begin to select a precise landing site.
- More lasers, more cameras.
- Hopefully it’s going slower now.
- Final descent.

- Just the central engine for this last portion of the descent.
- Hopefully.

4:45pm ET Update: According to the Indian Space Agency, ISRO, the lander's descent proceeded normally until an altitude of 2.1km above the Moon. After this time communication was lost with the spacecraft. Data from the descent will be analyzed to further assess what went wrong with the landing attempt.

Original post: In late July, an Indian rocket launched the Chandrayaan-2 mission from a spaceport in the Bay of Bengal. This is the second spacecraft India has sent to the Moon and the first to attempt a soft landing. Since launching, the Chandrayaan-2 spacecraft has spent the last six weeks spiraling toward lunar orbit, reaching it, and releasing a lander that will attempt to reach the surface.

India seeks to make history with its Vikram lander—until now, only the US, Russian, and Chinese space agencies have ever successfully landed on the Moon. Friday is the day for this landing attempt, which should begin around or shortly after 3:30pm ET (19:30 UTC).

However, as an Israel-backed private company found out in April, softly landing a spacecraft on the lunar surface can be very difficult. The Beresheet vehicle's main engine failed about 10km above the Moon and thereafter struck the Moon at a velocity of around 130 meters per second.

The Chandrayaan-2 mission's lander is named after Vikram Sarabhai, a prominent Indian scientist who is considered the founder of the country's space program. The 1.47-ton lander, which has solar panels, is designed to survive for one lunar day—about two weeks on Earth—during which time it will study the lunar surface and its potential as a source for water ice.

The lander has three scientific experiments as well as a rover named Pragyan, which translates into "Wisdom" in Sanskrit. The

27-kg rover, with six wheels, should be able to traverse up to 500 meters across the Moon. It will also hope to survive for a full lunar day with on-board solar power.

From its present orbit, 35 km x 101 km, the Vikram lander will begin its descent on Friday. To safely reach the Moon, the lander has several instruments to help guide it down to the surface, including cameras to help its on-board flight computer determine its position and horizontal velocity and to help avoid hazards. It also has three altimeters.

Ideally, the Indian space agency says Vikram will touch down on the lunar surface at a speed of 2 meters per second. It will target a landing site on high plain between two craters, at 70.9 degrees south, and 22.7 degrees east. The Indian space organization, ISRO, has said it will stream the landing attempt on YouTube:

[embedded content]
Vikram landing attempt.
Listing image by ISRO

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