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Isro aims to revive lander, rover during lunar sunrise

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NEW DELHI: With a new lunar dawn on the horizon, Indian Space Research Organisation (Isro) scientists are now gearing up for their ambitious attempt to revive Chandrayaan-3's Vikram lander and Pragyan rover after two weeks of "sleep" to see if it survived the frigid temperatures of the lunar night.

The "hopeful" reboot of the modules on Thursday and Friday will offer the chance for a bonus extension over and above what has already been an entirely successfully completed mission, Isro scientists said.

S SOMANATH SAID THEY ARE HOPING THAT WHEN THE SUN RISES, THE EQUIPMENT ON CHANDRAYAAN-3 WILL FIRE BACK ON

S Somanath, Isro chairman, said that they are hoping when the sun rises on the Shivshakti Point, where lander and rover are parked, the equipment will come back to life. The teams will be attempting to revive the instruments on September 21 and 22 — at lunar dawn. "We can only hope to see the equipment back to life on September 22," Somanath said.

Isro officials said that before the equipment on-board Vikram and Pragyan were put to sleep — in a phased manner starting September 2 — the batteries, that are powered by sunlight, were left charged and solar panels were oriented in a way that they receive light at dawn.

If the on board instruments survive the low temperatures of lunar night – around -200°C – it can come back to life and continue collecting more data from the lunar surface. MORE ON →P2

{ LUNAR MISSION } ISRO'S AMBITIOUS ATTEMPT BEGINS TODAY

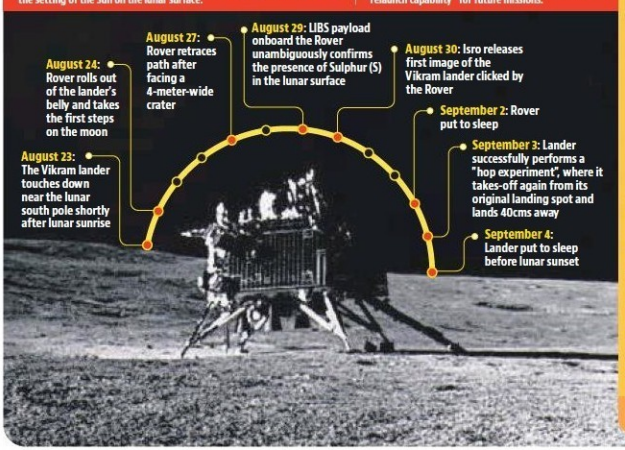
Waking Chandrayaan up again

With a new lunar dawn on the horizon, Isro scientists are gearing up for an ambitious attempt to "awaken" the Chandrayaan-3 modules again after waiting out the frigid temperatures of the lunar night. A look at what they are planning. By Soumya Pillai

A SUCCESSFUL MISSION COMPLETION

Chandrayaan-3 has already completed all its mission objectives. After landing on the Moon on August 23, and 14 days of experiments, the Vikram lander and Pragyan rover were put to sleep at 8am on September 4 – with the setting of the Sun on the lunar surface.

On September 3, before being put to "sleep", the Vikram lander achieved a milestone by successfully "hopping" on the lunar surface in a manoeuvre that confirmed the "relaunch capability" for future missions.



Trying for a bonus reboot

Since the mission already stands completed, Isro scientists say if achieve a revival of the Vikram lander and Pragyan rover it will be a bonus over what they have already accomplished.

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"We can only hope to see the equipment back to life on September 22," he said.

Plans for executing a 'reboot'

Before the equipment on-board Vikram and Pragyan were put to sleep in a phased manner starting Sept 2 scientists ensured three things they hoped would give them a chance at revival:

- The batteries were fully charged before being put to sleep
- The solar panels were oriented in a way that they receive light as soon as the sun rises
- The receiver was left on, so that the instruments are able to brave the low temperatures of lunar night (14 Earth days)

Today, when sunlight on the landing spot is bright enough to power the instruments, teams from ISRO Telemetry, Tracking and Command Network (ISTRAC) will issue commands to revive instruments. If the machines get charged again, the mission gets a new lease of life.

The main challenge: A frigid night

The feat, however, is not be as easy as it sounds particularly due to how cold it gets in the lunar night – particularly at the pole (Chandrayaan landed very close to the lunar south pole).

-200°C to -250°C Nighttime temperatures on the lunar surface

ABSENCE OF RHUs: Other spacecrafts have successfully braved such temperatures — for instance, China's Chang'e 4 in 2019 revived after braving -190°C — but these crafts were equipped with a key instrument that Chandrayaan-3 is not carrying: Radioisotope Heating Unit (RHU). It is a small device that use the decay of plutonium-238 to generate heat to keep spacecraft components warm so that the equipment can survive long enough in the cold space environment to complete its mission.

"If we had RHUs, we would not be hopeful, we would be confident of a revival," said a senior Isro official.