

Health & Technology

'Stronger than ever': India set for fresh Moon launch attempt

India seeking to be the 4th nation to land a spacecraft on Moon

SRIHARIKOTA, India: India will make a second attempt today to send a landmark spacecraft to the Moon after an apparent fuel leak forced last week's launch to be aborted. The South Asian nation is bidding to become just the fourth nation after Russia, the United States and China to land a spacecraft on the Moon.

The mission comes 50 years after Neil Armstrong became the first person to step foot on the moon, an occasion celebrated by space enthusiasts globally on Saturday. The fresh launch attempt for Chandrayaan-2 — Moon Chariot 2 in some Indian languages including Sanskrit and Hindi—has been scheduled for 2:43 pm (0913 GMT) today, the Indian Space Research Organisation (ISRO) said.

"Chandrayaan 2 is ready to take a billion dreams to the Moon — now stronger than ever before!" it said on Thursday. The first launch attempt was scrubbed just under an hour before the scheduled lift-off because of what authorities described as a "technical snag". Local media, citing ISRO officials, said that issue was a fuel leak. The agency tweeted Saturday that a rehearsal for the launch was completed successfully. Chandrayaan-2 will be launched atop a Geosynchronous Satellite Launch Vehicle (GSLV) MkIII, India's most powerful rocket.

Experts said setbacks were to be expected in such missions given their complexity, and that it was more prudent to delay the launch instead of taking risks that may jeopardise the project.

"In such an ambitious and prestigious mission like Chandrayaan, one cannot take a chance even if a small flaw is detected," Rajeswari Pillai Rajagopalan, head of space policy at the New Delhi think tank the Observer Research

Foundation, told AFP. Former NASA scientist Kumar Krishen said India's space agency should be praised for taking on ambitious projects like Chandrayaan-2. "We should keep in mind that space exploration is risky as many systems have failed in the past and many lives lost," he said.

National pride

Aside from propelling India into rarefied company among spacefaring nations, Chandrayaan-2 also stands out because of its low cost. About \$140 million has been spent on preparations for the mission, a much smaller price tag compared with similar missions by other countries—whose costs often run into billions of dollars. Chandrayaan-2, and India's space program as a whole, are a source of national pride in India.

Prime Minister Narendra Modi has outlined an ambitious plan to launch a crewed space mission by 2022, and India hopes to seek out commercial satellite and orbiting deals. The new mission comes almost 11 years after the launch of India's first lunar mission—Chandrayaan-1 — which orbited the Moon and searched for water. The rocket carrying Chandrayaan-2 will launch from the Satish Dhawan Space Centre at Sriharikota, an island off the coast of the southern state of Andhra Pradesh. The spacecraft will carry an orbiter, lander and a rover, which has been almost entirely designed and made in India.

The orbiter is planned to circle the Moon for about one year, imaging the surface and studying the atmosphere. The lander, named Vikram, will head to the surface near the lunar South Pole carrying the rover. Once it touches down, the rover will carry out experiments while being



BANGALORE: In this file photo, Indian Space Research Organization (ISRO) scientists work on the orbiter vehicle of 'Chandrayaan-2', India's first moon lander and rover mission planned and developed by the ISRO, in Bangalore. India will make a second attempt today to send a landmark spacecraft to the Moon after an apparent fuel leak forced last week's launch to be aborted. — AFP

controlled remotely by ISRO scientists. It is expected to work for one lunar day, the equivalent of 14 Earth days, and will look for signs of water and "a fossil record of the early solar system". — AFP

The exploration of space in 10 key dates

PARIS: From the Soviet Union's pioneering satellite to the first man on the Moon 50 years ago, here are 10 key dates in space exploration.

1957: Sputnik

On October 4, 1957, Moscow launches the first artificial space satellite, Sputnik 1, ushering in the Cold War tussle for the cosmos. The beach ball-sized aluminium sphere takes 98 minutes to orbit the Earth and sends back the first message from space, simple "beep-beep-beep" radio signals.

On November 3, Sputnik 2 carries the first

living being to fully orbit the Earth, a small street dog called Laika. She dies after a few hours.

1961: Gagarin, first man

On April 12, 1961, Soviet cosmonaut Yuri Gagarin becomes the first man in space, completing a single, 108-minute orbit. Twenty-three days later, Alan Shepard is the first American in space when he makes a 15-minute trip on May 5. The Cold War rivals are only joined in space by a third country in 2003 when China sends up Yang Liwei onboard Earth orbiter Shenzhou V.

1969: On the Moon

On July 21, 1969, US astronaut Neil Armstrong is the first man to step onto the Moon, his teammate Edwin Aldrin joining him around 20 minutes later. Between 1969 and 1972, 12 astronauts—all American—walked on the Moon as part of NASA's Apollo program.

1971: Space station

On April 19, 1971, the Soviet Union launches the first orbital space station, Salyut 1. Construction of the still-operating International Space Station (ISS) starts in 1998. The biggest man-made structure in space, it orbits Earth 16 times a day. The ISS, in which 16 countries participate, took over from the Russian space station Mir, which was brought back to Earth in 2001 after 15 years in orbit.

1976: Mars

On July 20, 1976, US spacecraft Viking 1 becomes the first to successfully land on Mars and send back images of the Red Planet. The robot Opportunity explored Mars between 2004 and 2018, with NASA's Curiosity Rover still active there. About 40 missions have been sent to Mars, more than half failing.

1981: Space Shuttle

On April 12, 1981, the US space shuttle

Columbia, the first reusable manned spacecraft, makes its first voyage. It is followed by Challenger, Discovery, Atlantis and Endeavour, which serve the ISS until the shuttle program winds up in 2011. The United States has since depended on Russia to transport its astronauts to the ISS. Two US shuttles were destroyed in flight, with the loss of 14 astronauts: Challenger in 1986 and Columbia in 2003.

1990: Hubble

On April 25, 1990, the Hubble is the first space telescope to be placed into orbit, at 547 kilometres (340 miles) from Earth. Thirteen meters (42 feet) long, Hubble revolutionizes astronomy, allowing scientists to observe the planets and most distant stars and galaxies.

2001: Space tourist

On April 28, 2001, Italian American multi-millionaire Dennis Tito, 60, becomes the world's first space tourist. He pays Russia \$20 million to

stay on the ISS for eight days. In all, seven space tourists have taken Russian flights to the ISS.

2008: Private SpaceX

On September 29, 2008, US company SpaceX is the first private venture to successfully launch a rocket into Earth's orbit, the Falcon 1. SpaceX's Dragon cargo ship on May 22, 2012 becomes the first commercial spacecraft to visit the ISS.

2014: Comet landing

On November 12, 2014, the European Space Agency places a small robot, Philae, on a comet more than 500 million kilometers from Earth. The first comet lander is part of a mission aiming to explore the origins of the Solar System. The man-made object that is furthest away from the Earth is the unmanned US spaceship Voyager 1, launched in September 1977 and still travelling. In August 2012 it made it into interstellar space, about 13 billion miles from Earth. — AFP

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