

Low-cost Moon mission puts India among lunar pioneers

SRIHARIKOTA, India: India will step up the international space race tomorrow when it launches a low-cost mission to become only the fourth country to land a probe on the Moon. Just five days before the 50th anniversary of man's first lunar landing, Chandrayaan-2 — or Moon Chariot 2 — will blast off from a tropical island off Andhra Pradesh state after a decade-long build-up.

The mission will also highlight how far space travel has advanced since Neil Armstrong's giant leap for mankind during the Apollo 11 mission. India has spent about \$140 million to get Chandrayaan-2 ready for the 384,400 kilometers trip from the Satish Dhawan Space Centre to the scheduled landing on the lunar South Pole on September 6.

The United States spent about \$25 billion—the equivalent of more than \$100 billion in current prices—on 15 Apollo missions, including the six that put Armstrong and other astronauts on the Moon. China landed its Chang'e 4 lunar craft in January, and spent \$8.4 billion on its entire space program in 2017, according to international Organization for Economic Cooperation and Development figures. And Russia—the first country to land an unmanned Moon rocket in 1966 — spent more than \$20 billion at today's values on lunar missions in the 1960s and 70s.

Spiced-up space race

Almost the entire Chandrayaan-2's orbiter, lander and rover have been designed and made in India. India will use its most powerful rocket launcher, GSLV Mk III, to carry the 2.4-ton

orbiter, which has a mission life of about a year. The spacecraft will carry the 1.4-ton lander Vikram—which in turn will take the 27-kilogram rover Pragyan—to a high plain between two craters on the lunar South Pole.

Indian Space Research Organization (ISRO) chief K. Sivan said Vikram's 15-minute final descent "will be the most terrifying moments as we have never undertaken such a complex mission". The solar-powered rover can travel up to 500 meters and is expected to work for one lunar day, the equivalent of 14 Earth days. Sivan said the probe will be looking for signs of water and "a fossil record of the early solar system".

Despite the relatively small budget, the mission does raise questions about how funds are allocated when the country is still battling hunger and poverty. But national pride is at stake: Prime Minister Narendra Modi has vowed to send a manned mission into orbit by 2022. Most experts say the geo-strategic stakes are small—but that India's low-cost model could win commercial satellite and orbiting deals. "The fundamental question that we should ask ourselves in this context is not whether India should undertake such ambitious space ventures, but whether India can afford to ignore it," said K. Kasturirangan, a former ISRO chief. India has to aim to be a leader in space, he added. Rajeswari Pillai Rajagopalan, head of space policy at the Observer Research Foundation, a New Delhi think tank, said Chandrayaan-2 will enhance the nation's reputation "at a time when the global and particularly, the Asian space programs are becoming increasingly competitive". — AFP

Mediterranean sharks risk 'disappearing'

PARIS: Sharks—the sea's top predators for millions of years—are at risk of disappearing from the Mediterranean as overfishing and plastic pollution choke populations of the endangered hunters, conservationists warned Friday. The World Wildlife Fund (WWF) said that more than half of shark and ray species in the Mediterranean were under threat, and that almost a third of them have been fished to the brink of extinction.

Its report, released ahead of Shark Awareness Day, singled out Libya and Tunisia as the worst culprits, with each country's fishery hauling in about 4,200 tons of sharks a year—three times that of the next biggest Mediterranean fisher, Italy. While some species are targeted for food, many of the sharks fished in the Mediterranean are by catch caught up in nets set for other fish. The WWF said it had

recorded more than 60 shark species entangled in fishing nets across the Mediterranean.

In addition, the explosion of plastic pollution is endangering shark populations, either through the animals ingesting or becoming entangled in refuse items. Sharks have been around for more than 400 million years and are particularly vulnerable to population decline due to their slow maturation and long gestation periods. WWF said a lack of international cooperation and regulation meant it was nearly impossible to actively monitor shark conservation efforts.

The IUCN Red List of endangered species counts 79 endangered shark and 120 endangered ray species. But an even bigger problem could be difficulty in tracking sea-based populations; the IUCN says it currently lacks sufficient data on nearly 200 shark species to make a classification. "Sharks are at risk of disappearing from the Mediterranean," said Giuseppe Di Carlo, director of the WWF's Mediterranean Marine Initiative. "Their rapid decline is the most serious signal of the status of our sea and of irresponsible fishing practices. "All Mediterranean countries are responsible for this. Sharks have been part of our sea and culture for thousands of years, we need to act quickly to ensure they remain in the future." Di Carlo added. — AFP

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