



Chandrayaan 2 and Outer Space Treaty

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This article is based on **“Raja Mandala: The moon and the law”** that appeared in The Indian Express on 23rd July 2019. It talks about the need for comprehensive space law, in the context of the new space-age gold rush.

Though the US was the first country to land humans on the moon (Apollo missions), India's Chandrayaan-1 was the first spacecraft that unveiled the evidence of water in the moon's craters in 2008. After the success of Chandrayaan 1 mission, Chandrayaan 2 has been one of the most anticipated missions of ISRO.

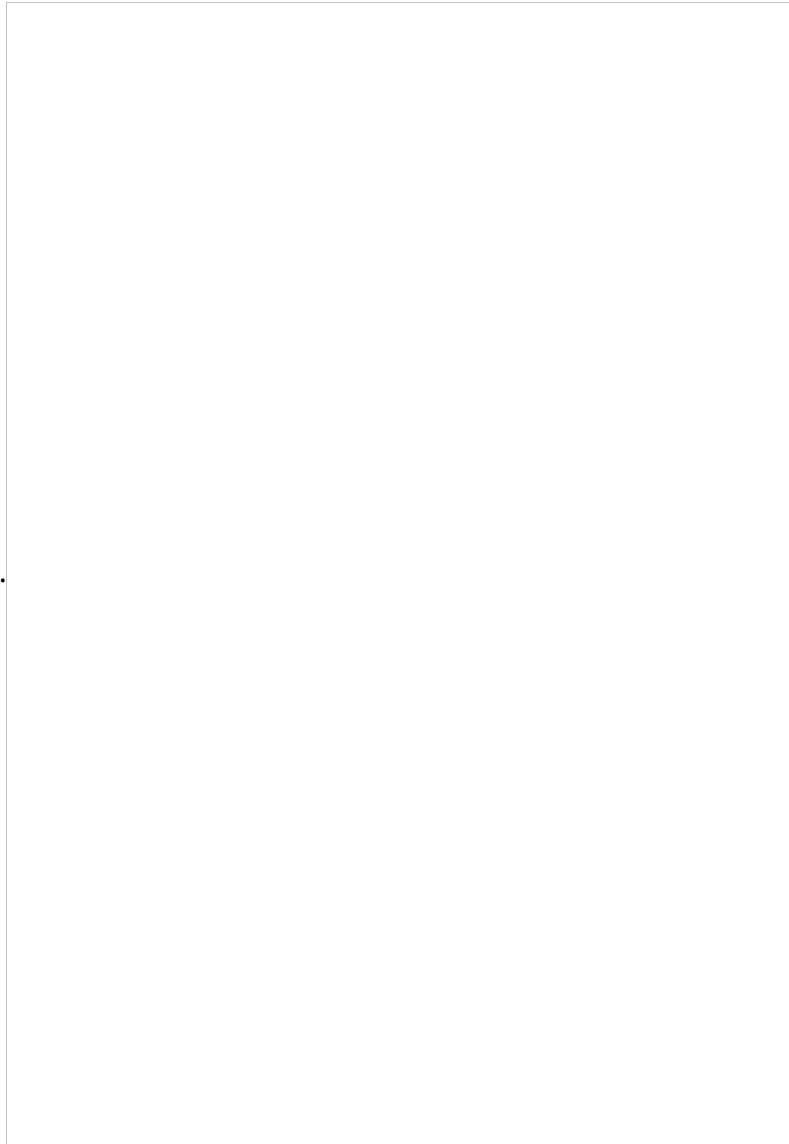
With the success of Chandrayaan 2, India will become the fourth country to soft-land a vehicle on the moon (after the US, Russia and China). For India it is more than symbolism, as the mission envisages a larger aim, however, it poses a bigger question of space sovereignty.

Chandrayaan 2 mission



- ISRO had planned the Chandrayaan 2 for 2014. The mission was supposed to be a joint mission along with Russia in which Russia was to provide the lander and rover system, but Russia failed to deliver.
 - This resulted in a delay in the programme but Russia's non-participation made ISRO design and develop the entire lander-rover system indigenously.
 - This would make ISRO more self-sufficient in the long run.
- ISRO would be undertaking five to six orbit raising manoeuvres, known as earth orbit burns, to take the Chandrayaan 2 close to the moon.
- Subsequently, the lunar orbit burns will be done to establish the orbiter 100 km above

the moon surface.



- This would be followed by the soft landing of the lander.
 - This landing is going to be the most critical part of this mission, (ISRO is calling “15 minutes of terror”) as the velocity of the lander has to be reduced to zero.
 - A soft landing is not an easy task as Israel’s attempt for a soft landing on the moon had resulted in failure.
- The lander-rover system on the moon would function only for one moon day (equivalent to 14 Earth days) and during this period the rover could travel a maximum distance of 500 metres on the moon’s surface.
- Through Chandrayaan 2, India will be the first country to do soft landing on the moon's south pole.
 - The lunar south pole is chosen because **it has places where the sun never sets.**
 - These places are called **“Peaks of Eternal Light”** (points on any celestial body that receive sunlight through the year)
 - Near permanent sunlight facilitates the **establishment of lunar stations** with an assured supply of solar energy.

- Some of these peaks are fortunately located next to areas that are in permanent darkness and hold significant reserves of lunar ice.
- Having easy access to water is obviously critical to a sustainable human presence on the moon.
- Water can also be broken down into hydrogen and oxygen, which in turn can be turned into rocket fuel.

With moon's low gravity, space vehicles need a lot less fuel than on earth for take-off. That could make the moon a convenient way-station from which human explorers could travel to other celestial bodies.

What are the issues in Lunar exploration now?

- After the discovery of water on the moon and "Peaks of Eternal Light, the moon rush on the earth aimed at the lunar south pole, has become a new phenomenon. For example:
 - China's Chang'e 4 soft-landed in the Von Karman crater on the dark side of the south polar region.
 - The US lunar programme, revived by the Trump Administration, now aims to put man back on the moon in the next decade.

NASA's focus is on the south pole and if it succeeds, it will be the first manned crew to arrive at the south pole.
 - Jeff Bezos (owner of Amazon) unveiled the Blue Moon project that seeks to land men and women on the moon in the next few years.
- This **quest for space mining will trigger a new era of conflict and cooperation** and lead to a new space race. According to the US Chamber of Commerce, the commercial space industry is estimated to be \$1.5 trillion industry by 2040.
- The international law of outer space is now defined by the **1967 Outer Space Treaty (OST)**.
 - The OST affirms that outer space and celestial bodies like the moon cannot be the sole property of any nation. The claims of sovereignty, occupation etc. are not applicable in case of outer space.
 - It calls the exploration and use of outer space, the province of all mankind.
- **However, there is a contradictory provision in outer space treaty.**
 - The OST wants states to show "due regard to the corresponding interests of all other States Parties to the Treaty".
 - If the principle of respecting "corresponding interests" means "non-interference" in the pre-existing lunar activity of another state, this could end up with up **de-facto ownership for those who first established infrastructure on the moon.**
 - Further, the Outer Space Treaty has **no provision for effective dispute resolution.**
 - Also, OST **does not specify who owns the resources of the moon.**

- In a law approved in 2015, the US has authorised its citizens to own, transport and sell resources exploited on the moon.
- Luxembourg has passed a similar law to attract companies interested in space mining.

The 20th century Cold War space race was between the US and the Soviet Union. However, the 21st-century competition is projecting geopolitical, economic and commercial interests well beyond the limits of our atmosphere as the world enters into a new space-age gold rush.

In this context, India needs to match the extraordinary success of its scientists with the sustained diplomatic effort at the highest level to take up international space cooperation as a strategic priority and to develop a stronger political voice for India in shaping new rules for the moon and outer space.

Drishti input

India needs to match the extraordinary success of its space program with the sustained diplomatic effort at the highest level to take up international space cooperation as a strategic priority. Comment?
