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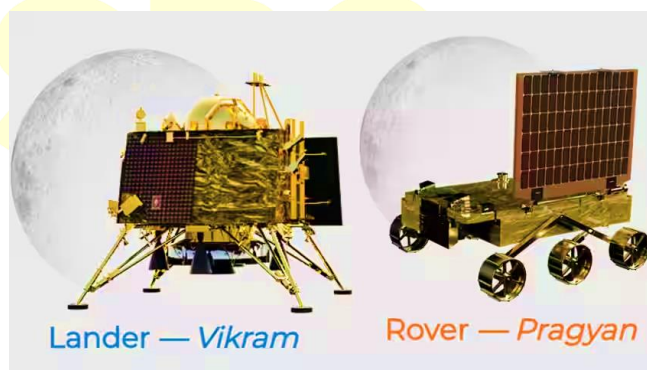
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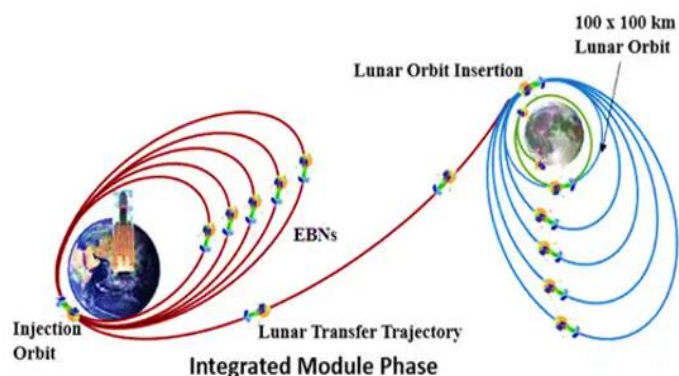
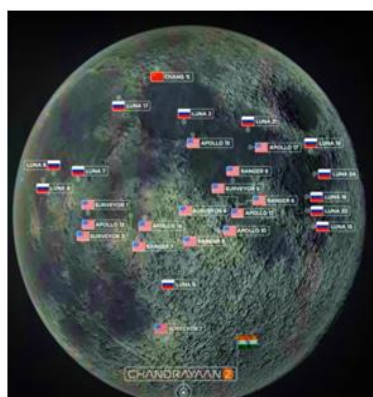
# Why ISRO Wants To Explore The Moon's South Pole Chandrayaan-3 Mission

## Why In The News?

- Set To Be Launched From Andhra Pradesh's Sriharikota On **July 14 At 2.35 PM, Chandrayaan-3 Is India's Third Lunar Mission**. It Is A Follow-Up To The 2019 Chandrayaan-2 Mission, Which Partially Failed After Its Lander And Rover **Couldn't Execute A Soft-Landing On The Moon**.
- The Chandrayaan-3 Will Reach The Lunar Orbit Almost A Month After Its Launch, And Its **Lander - Vikram, And Rover - Pragyaan**, Are Likely To Land On The Moon On **August 23**.

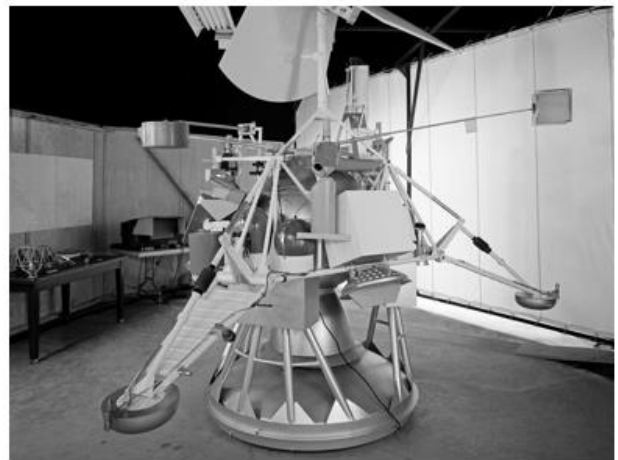


- Notably, The Landing Site Of The Latest Mission Is More Or Less The Same As The **Chandrayaan-2: Near The South Pole Of The Moon At 70 Degrees Latitude**. If Everything Goes Well, The Chandrayaan-3 Will Become The World's First Mission To Soft-land Near The Lunar South Pole.



## Previous Global Lunar Missions Landings

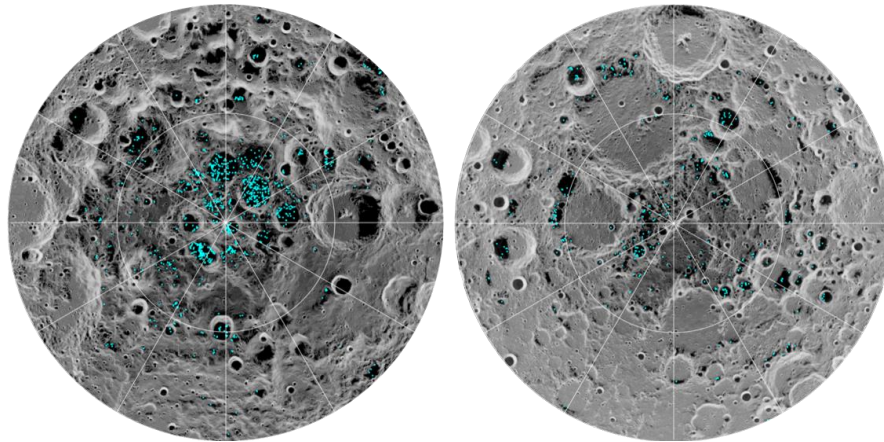
- All The Previous Spacecraft To Have Landed On The Moon Have Landed In The **Equatorial Region**, A Few Degrees Latitude North Or South Of The Lunar Equator.
- The Furthest That Any Spacecraft Has Gone From The Equator Was **Surveyor 7**, **Launched By NASA**, Which Made A Moon Landing Way Back On January 10, 1968. This Spacecraft Landed Near 40 Degrees South Latitude.



## No Spacecraft Has Ever Landed On Lunar South Pole

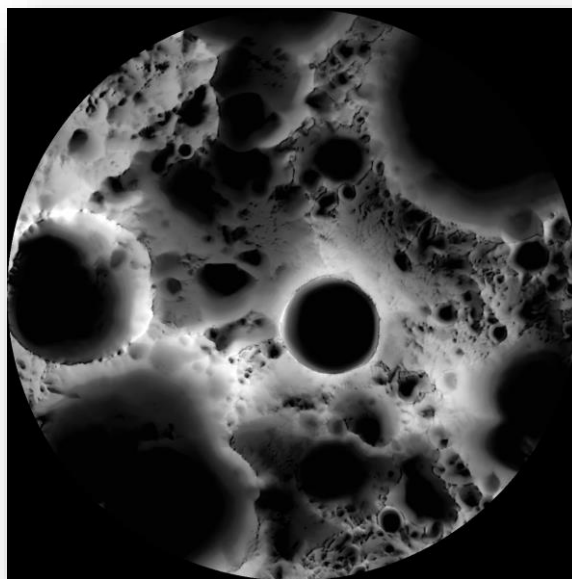
- There Is A Very Good Reason Why All The Landings On The Moon So Far Have Happened In The Equatorial Region. Even **China's Chang'e 4**, Which Became The First Spacecraft To Land On The Far Side Of The Moon - The Side That Does Not Face The Earth - Landed Near The 45-degree Latitude.
- **It Is Easier And Safer To Land Near The Equator.** The Terrain And Temperature Are More Hospitable And Conducive For A Long And Sustained Operation Of Instruments. The Surface Here Is Even And Smooth, Very Steep Slopes Are Almost Absent, And There Are Fewer Hills Or Craters.
- Sunlight Is Present In Abundance, At Least **On The Side Facing The Earth**, Thus Offering A Regular Supply Of Energy To Solar-powered Instruments. The **Polar Regions Of The Moon**, However, Are A Very **Different, And Difficult, Terrain**. Many Parts Lie In A Completely Dark Region Where Sunlight Never Reaches, And **Temperatures Can Go Below 230 Degrees Celsius**.
- Lack Of Sunlight And Extremely Low Temperatures **Create Difficulty In The Operation Of Instruments**. In Addition, There Are **Large Craters** All Over The Place, Ranging From A Few Centimeters In Size To Those Extending To Several Thousands Of Kilometres.





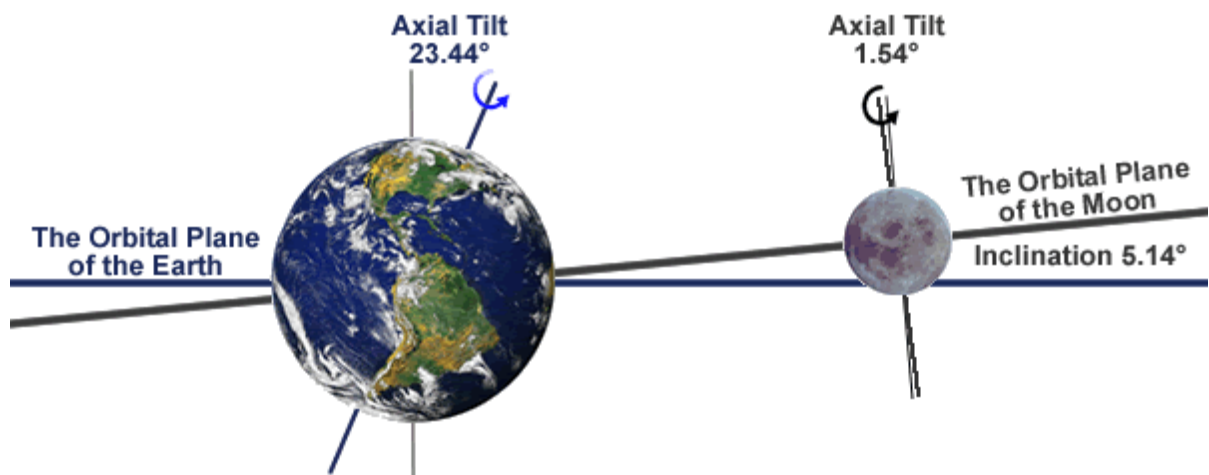
## Why Scientists Want To Explore The Lunar South Pole?

- Due To Their Rugged Environment, The **Polar Regions Of The Moon Have Remained Unexplored**. But Several Orbiter Missions Have Provided Evidence That These Regions Could Be Very Interesting To Explore.
- There Are Indications Of The Presence Of Ice Molecules In Substantial Amounts In The Deep Craters In This Region - **India's 2008 Chandrayaan-1 Mission** Indicated The Presence Of Water On The Lunar Surface With The Help Of Its Two Instruments Onboard.
- In Addition, The Extremely Cold Temperatures Here Mean That **Anything Trapped In The Region Would Remain Frozen In Time**, Without Undergoing Much Change. The Rocks And Soil In Moon's North And South Poles Could Therefore Provide Clues To The Early Solar System.



## Not All Lunar Polar Regions Receive Sunlight

- Unlike The Earth, Whose Spin Axis Is Tilted With Respect To The Plane Of The Earth's Solar Orbit By 23.5 Degrees, The **Moon's Axis Tilts Only 1.5 Degrees.**
- Because Of This Unique Geometry, Sunlight Never Shines On The Floors Of Several Craters Near The Lunar North And South Poles.
- These Areas Are Known As **Permanently Shadowed Regions, Or PSRs.**



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