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Successful Chandrayan-3 Mission on Rare South Pole: Soft LandingofVikramRover ,VariousAspectsofChandryanan-3,Wonderful In formations Conveyed and Joyous Country

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Absract

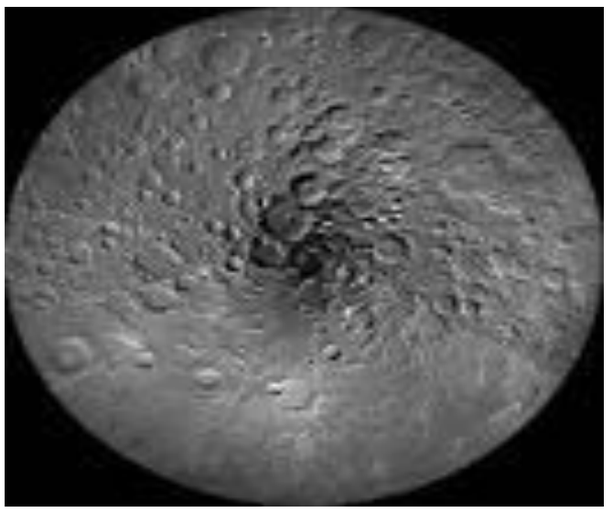
Chandrayaan- 3, the third Indian planetary exploration mission, will carry out high resolution remote sensing studies of the moon tofurtherour understanding about its origin and evolution.High spatial resolution. Aterrain mapping camera will provide high resolution three- dimensional images of the moon surface and will be complemented by a laser ranging instrument that will provide lunar altimetry.Threepayloads – a high energyX- ray spectrometer,a sub-keVatom reflecting analyser, and miniature imaging radar – willbe used for the first time for remote sensing exploration ofa planetary body. A radiation dose monitor will reveal on energetic particle flux enroute to the moon and in lunar orbit.

Keywords: Aspects,Vikram,Joyous,Radiation,etc.

Introduction-

An Indian Deep Space Network andan Indian Space Science Data Center have been established as a part of Chandrayaan3 mission and will cater to the Lunar study.The current decade has seen a revival in the field of planetary exploration, and in particular in lunar exploration, with several new initiativesbyvariousnational space agencies including the Indian Space Research Thepossibilityof an Indian missionto the moon was mooted in the late nineties and was dis- cussed extensively in different academic forums during1999 and2000.On the basis of recommendationsfromthese forums, ISRO constituted a National Task teamtolook into both the technological feasibility and scientific return from such a mission.

Organization (ISRO). Even though the need for further exploration of the moon has been discussedinthelatenineties,arenewedeffortinthisdirectionhasformallybegunin2003,



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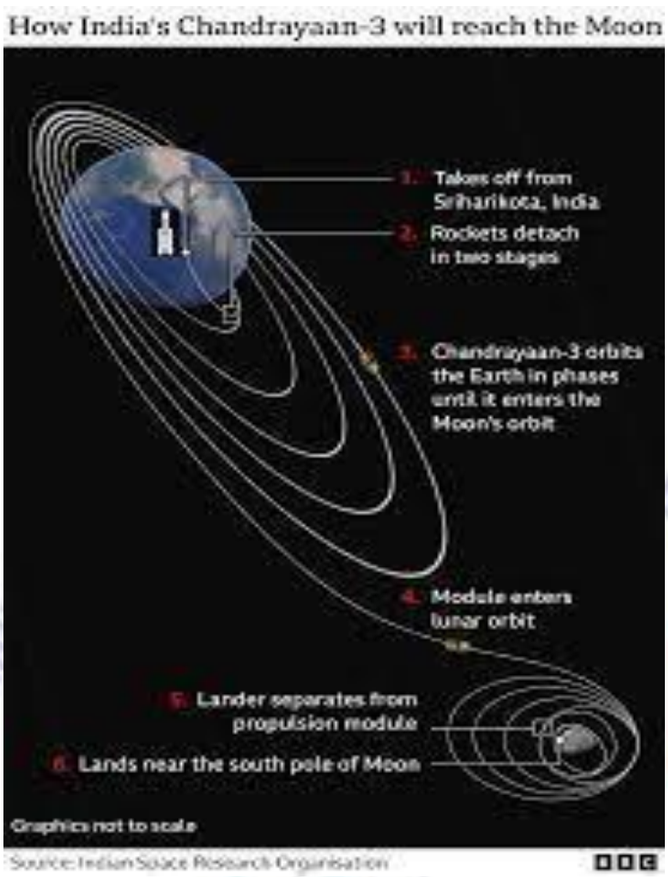
The recommendations of the task team were deliberated at length and ISRO formally proposed Chandrayaan-1 Mission to the Government of India in early 2003 and it was Government of India in early 2003 and it was is special section describe in detail the scientific objec- tives and significant characteristics of each individual payload.

ExperimentalandDiscussion-

However, relating these differences to different types of lunar mate- rial became possible only through laboratory studies of ing the late sixties andearlyseventies.These studies led to a broad understanding of theevolutionofthemoon and led to the suggestion that an impact of a mars-sized object on the early earth resulted in the formation of themoon.A calendar of events for the first one andhalfbillionyearsoflunarevolutionwasdrawnup based on the nature,chemicalcomposition and ages of the returned lunar samples. However, both the remote sensing and surface exploration of themoonbythe ApolloandLunamissionswererestrictedtotheequato-rial region of the moon. The nextmajoradvancecame with the launch of the Clementine and Prospector remote sensing missionstothemoonin1994and1998respec-tively,whichprovidedthe first setofdata onlunar min-eralogyand chemistry ata global scale. Whilethesedata provided newinsight on lunar evolution, they alsoraised many new questions. Further, the mineralogical and chemical mappingsofthelunar surface were done with either low spectral resolution (mineralogy) or with low spatial resolution (chemical composition).Theneed for studieswithhigh spectraland spatial resolutionswasobviousfor furthering our understanding of the origin and evolution of the moon. The Chandrayaan-3 mission aimedto achieve this goal by carrying out remote sensing ob- servations over a wide range of the electromagnetic spec-trum for simultaneous mineralogical, chemical

Global interest in long duration missiontothemoonand the possibility of using moon as a base for further explorationofthe solarsystemalsobroughtintofocusthepossibleindigenouslunarresourcesthat maybeuti- lized during such missions. Expected excess of volatiles, including water ice, mixed with the near surface materialin permanently shadowed lunar polar region, is a prime candidate in this regard. The Chandrayaan-3 transport on the moon using radioactive radon and its decay products astracers,andalso probe permanently shadowedbaseofdeepcratersinthe lunar polar region using radio waves to look for possi- ble presence of water ice in such areas. Devoid of an atmosphere and global magnetic field, the



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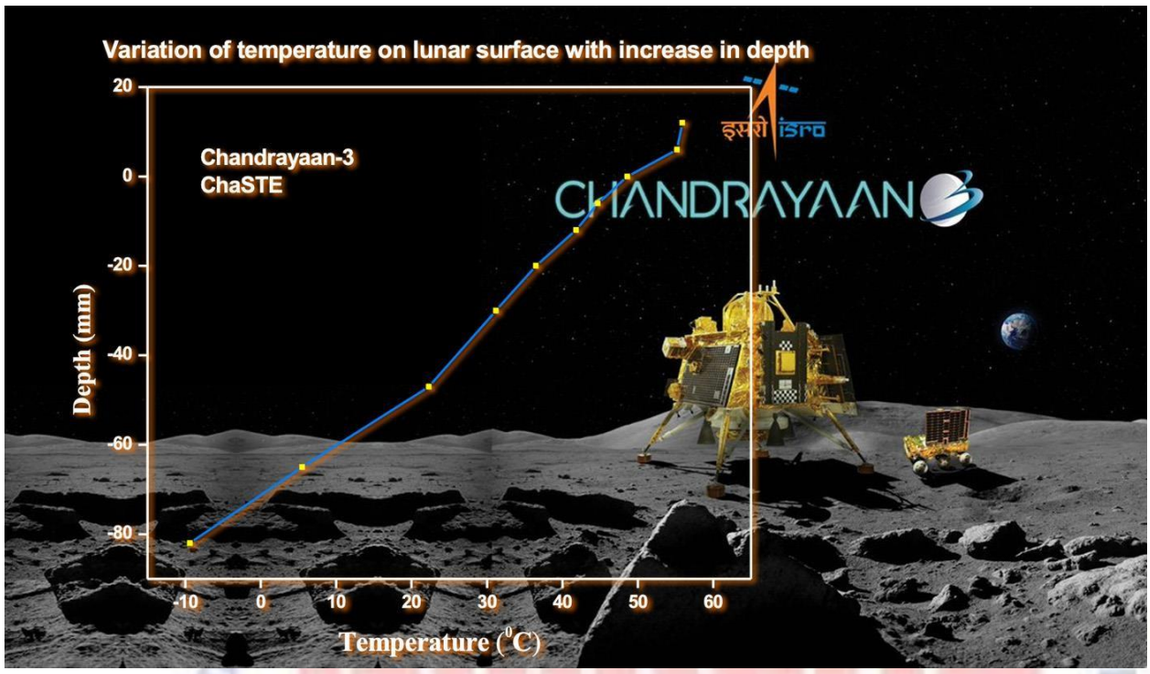
moonalsoprovidesfreeaccesstoenergeticparticlesofbothsolarandgalacticinorigin.These studiesare based on novelapproachesthat will be adopted for planetary exploration for the first time. Asuiteofbaselinepayloads,identifiedinitiallytomeetthescientificobjectives,



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A suite of baseline payloads,identified initially tomeet the scientific objectives, include a Terrain Mapping Cam-era (TMC), a Hyper-Spectral Imager(HySI),aLow **e**nergy **x**-ray**s**pectrometer,

(iii) direct estimationof lunarsurfaceconcentrationof the elements Mg, Al, Si, Ca, Ti and Fe with spatial reso- lution of An impact probecarryingamass spectrometer, an imaging system and a radar altimeter will complement these baseline payloads and will be a techno- logical forerunner for future proposed lunar landing mis- sions.

Conclusion-

ISRO also offered possibility for the international sci- entific community to participate in the Chandrayaan-3 MoonMineralogyMapper: MMM) for extendingthe wavelength coverage beyondthat of theHySI by the ESA. NASA provided Mini-SAR, deve- loped by Applied Physics Laboratory Hopkins UniversityandNAWC,andtheMoonMineralogyMap- per,developedbyBrown University

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And the Jet Propul- sion Laboratory. Two of theAOpayloads, C1XSand SARA, have Indian collaborations and realized with significant technical and scientific contributions from the ISRO Satellite Center, Bangalore, and the Vikram Sarab-hai Space Center (VSSC), Thiruvananthapuram respec- tively.TheChandrayaan-3 spacecraft integrated with all the flight payloadsHopkins University andNAWC,andtheMoonMineralogyMap- per,developedbyBrownUniversityandtheJet Propul- sion Laboratory.Two of theAOpayloads,C1XSand SARA, have Indian collaborations and realized with significant technical and scientific contributions from the ISRO Satellite Center, Bangalore, and the Vikram Sarab-hai Space Center (VSSC), Thiruvananthapuram respec- tively. A schematic ofthe Chandrayaan-3 spacecraft withthe location ofthe ten payloads and theMoonImpact ProbeisshowninInthefollowing,thebasic characteristicsofTheChandrayaan-3 spacecraftintegrated with all the flight payloadslookforsignatureof waterice mixed

JoyousPeople

withinthe topmeterofthelunarsurfacematerial.Mini-SARwilltransmitRightCircular Polarization(RCP)andreceivebothLeftCircularPolarization(LCP)andRCP,anduti-lizesaunique hybridpolarizationarchitecture,whichallowsdeterminationoftheStokesparametersofthereflected signaltoinferpossiblepresenceofwaterice.Thismissionhasbroughtusasourceofenergy. The SARsystem has apixelresolution of150mand8kmswath.Thiswillbethefirstsystematic approach to look for water ice in the lunar polar.

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