

# EVA STALIN IAS ACADEMY - BEST IAS COACHING IN CHENNAI

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## India lights up the dark side of the moon

Chandrayaan-3's lander touches down precisely at 6.03 p.m., sparking celebrations

The success belongs to all of humanity. We can aspire for the moon and beyond: PM

Communication link established between lander and mission centre in Bengaluru

Rover will do chemical analysis of the lunar surface in the next 14 days

**Hemanth C.S.**  
BENGALURU

India has become the fourth country to successfully land on the moon as the Chandrayaan-3's lander module, with the rover in its belly, successfully made a soft landing on the lunar surface on Wednesday.

Precisely at 6.03 p.m., the lander touched the lunar surface and there were euphoric celebrations at the Mission Operations Complex (MOX) at ISRO Telemetry, Tracking, and Command Network (ISTRAC), Bengaluru, as India joined an elite list of countries — the U.S., Russia and China — to achieve this



**Perfect landing:** The Chandrayaan-3's landing site as clicked by the Vikram lander on Wednesday. **ISRO**

feat. India has also become the first nation to touch down on the polar region of the moon. "We have achieved soft landing on the moon, India is on the moon," ISRO Chairman S. Somanath said. He said the lander had achieved most of the

nominal conditions of landing, including the velocity of touchdown.

### 'Exciting days ahead'

"The velocity was less than 2 metres per second, this gives us a lot of confidence that the health of lander is very good to carry out all the planned experiments, including the Pragyan rover coming out. We are looking for exciting 14 days from now," Mr. Somanath said.

The ISRO said a communication link was established between the lander and MOX-ISTRAC, Bengaluru.

It also shared images taken by the

lander's horizontal velocity camera during the descent.

The successful landing on Wednesday has erased the painful memories of failure of the Chandrayaan-2's Vikram lander in 2019. During the descent, the Vikram lander gave up at an altitude of 2.1 km before touchdown and crashed on the lunar surface. It subsequently lost

communication with the ground stations.

However, this time everything went to plan.

Around 5.44 p.m., the powered descent of the lander module was initiated. The powered descent is divided into four phases — rough braking phase, attitude hold phase, fine braking phase and terminal descent phase. Vikram completed each of these

phases seamlessly and 19 minutes later, at 6.03 p.m., the lander made a safe and soft landing on the moon.

Following the successful landing, Prime Minister Narendra Modi addressed the nation from South Africa, and said India's successful moon mission was not India's alone. "This is a year in which the world is witnessing India's G-20 Presidency. Our approach

of 'One Earth, One Family, One Future' is resonating across the globe. This human-centric approach that we represent has been welcomed universally. Our moon mission is also based on the same human-centric approach."

He added that this success belonged to all humanity. And it would help moon missions by other countries in the future. "I am confident that all countries in the world, including those from the Global South, are capable of achieving such feats. We can all aspire for the moon and beyond," he said.

"India has reached the South Pole of the moon where no country could reach to date with the dedication and talent of our scientists," Mr. Modi said.



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## India lights up the dark side of the moon



**Proud moment:** Celebrations of the success of Chandrayaan-3 in Visakhapatnam. V. RAJU

The lander will deploy the rover which will carry out in-situ chemical analysis of the lunar surface during the course of its mobility. The lander and the rover with a mission life of one Lunar day (14 Earth days) have scientific payloads to carry out experiments on the lunar surface.

The Chandrayaan-3 mission was launched on July 14 from the Satish Dhawan Space Centre in Sriharikota.

Chandrayaan-3 consists of an indigenous lander module, propulsion module and a rover with an objective of developing and demonstrating new technologies required for inter-planetary missions.

The objectives of the mission are to demonstrate safe and soft landing on lunar surface, to demonstrate rover roving on the moon and conduct in-situ scientific experiments.

The soft landing took place days after Russia's Luna-25 spacecraft crashed into the moon after spinning out of control.

## C.R. Rao, who pioneered several fundamental statistical concepts, dead

**Jacob Koshy**  
NEW DELHI

Calyampadi Radhakrishna Rao, 102, one of the world's most eminent statisticians who spent nearly all of his professional career in India, died in the U.S. on Wednesday.

Having taught and researched at the Indian Statistical Institute (ISI), Kolkata, Dr. Rao pioneered several fundamental statistical concepts such as the Cramer-Rao inequality and Rao-Blackwellization concepts that appear in undergraduate textbooks on statistics and econometrics.

C.R. Rao was born on September 10, 1920, at Hadagali in Ballari district of present-day Karnataka in a Telugu family.

He joined the ISI as a student when it was set up by P.C. Mahalanobis during the early years of statistics as a subject when it was yet to be taught as a distinct subject at the postgraduate level.

He was sent by Dr. Ma-



C.R. Rao

halanobis to Cambridge University, U.K., to use certain statistical techniques for anthropological analysis, and from where he earned a doctorate under the supervision of Ronald Fischer, among the pioneers of the field.

### 'Pillar of ISI'

On returning to the Indian Statistical Institute in India, where Dr. Rao spent the next 40 years of his career, he conceived and established several undergraduate and graduate programmes in statistics and was instrumental in establishing several bu-

reaus of the Indian Statistical Institute in various States.

Dr. Rao was also a member of several government committees for the development of national statistical systems, statistical education and research in India.

"He was a pillar of the ISI, inspiring generations of students and researchers who themselves became iconic figures like S.R. Srinivasa Varadhan and K.R. Parthasarathy. He had won every conceivable award and honour," Congress spokesperson Jairam Ramesh posted on X, formerly Twitter.

After his retirement, Dr. Rao moved to the U.S. and worked at several universities.

Former U.S. President George Bush conferred on him the National Medal of Science.

He was awarded India's highest honours the Padma Bhushan and Padma Vibhushan in 1969 and 2001, respectively.



# India welcomes consensus-based approach to expand BRICS: PM

One of the main topics at BRICS is Russia's quest to create an alternative to the G-7-driven global political-economic model; however, unlike their counterparts in Russia and China, Indian officials have not spoken aggressively for de-dollarisation

**Kallol Bhattacharjee**  
NEW DELHI

India welcomes the expansion of the BRICS grouping through a consensus-based approach, Prime Minister Narendra Modi declared in Johannesburg on Wednesday. Addressing the plenary session of the 15th BRICS Summit in the historic South African city, he urged member states to take advantage of India's digital solutions and to work for the welfare of the Global South.

The current BRICS members are Brazil, Russia, India, China, and South Africa, whose names make up the group's acronym.

"125 countries participated in the Global South Summit that we organised this January. We have proposed that the African Union should be made a member of the G-20. I am confident that all BRICS partners will support these



**Close ties:** Narendra Modi, second from right, with other BRICS leaders during the Retreat Meeting in Johannesburg on Wednesday. ANI

ideas. India fully supports the idea of expansion of the membership of the BRICS and welcomes a consensus-based process," Mr. Modi said.

#### Global South focus

The plenary session was also attended by Brazilian President Luiz Inacio Lula da Silva, Chinese President Xi Jinping, and the host,

South African President Cyril Ramaphosa, alongside other delegates. Russian President Vladimir Putin participated in the summit virtually, with the physical leadership for the Russian delegation being provided by Foreign Minister Sergey Lavrov. When the leaders posed together for a "family photograph", Mr. Ramaphosa held hands

with Mr. Modi and Mr. Lavrov on his left and Mr. Xi and Mr. Lula da Silva to his right.

Continuing with India's priorities in its G-20 Presidency year, Mr. Modi kept the focus of his speech on the prospects of the Global South and the African Union, which is being represented at the BRICS Summit by the east African

nation of Comoros.

One of the main issues that is forming the backdrop of the expansion-related dialogue at BRICS is Russia's quest to create an alternative to the G-7-driven global political-economic model. This has acquired urgency since the western nations unleashed economic sanctions against Moscow after Mr. Putin launched the war against Ukraine in February 2022.

This process has also drawn from India's demand for changes in global multilateral systems to make them more responsive to the needs of the Global South. However, unlike their counterparts in Russia and China, Indian officials have not spoken aggressively for de-dollarisation, though New Delhi has entered into local currency agreements with a few trading partners like the UAE. This indicates a difference among the founding members.



episteme at Science City in Ahmedabad. RTU SA/KONMAR, R. SAKSHI, DINAKARAN, YOGI, VIJAY SINGH

# Moon now in India's orbit

India becomes the fourth country to demonstrate the soft landing on moon

The entire mission operations from launch till landing happened flawlessly

Pragyan Rover is designed to carry out two important experiments

Praise comes in from all quarters for the technological triumph after 2019 setback



Team of ISRO officials and scientists celebrating the successful landing of Chandrayaan-3 on the moon.

## ISRO has two payloads to conduct elemental analysis and mineralogical composition study

With Vikram, the lander module of Chandrayaan-3, successfully landing on the surface of moon on Wednesday, the focus has now moved to the rover in its belly, Pragyan.

The officials at the Mission Operations Complex (MOC) at ISRO Telemetry, Tracking, and Command Network (ISTRAC) here are ready to roll out the rover, which will carry out in-situ chemical analysis of the lunar surface on the moon.

"The Pragyan rover may come out in the next few hours or it may take one day also to come out depending on the conditions," ISRO Chairman S. Somnath said.

He said that once out, the rover would carry out two important experiments.

It has two payloads - the LASER Induced Breakdown Spectroscopy (LIBS) and the Alpha Particle X-ray Spectrometer (APXS).

The objective of the LIBS is to conduct qualitative and quantitative elemental analysis and to derive the chemical composition and infer mineralogical composition to further the understanding of the lunar surface.

The APXS will determine the elemental composition of the lunar surface.

## ISRO has two payloads to conduct elemental analysis and mineralogical composition study

Soon after the ISRO achieved the historic feat of landing on the lunar South Pole, Mr. Somnath introduced the key members who enabled India to achieve the task flawlessly.

P. Veeramuthuvel, Project Director, Chandrayaan-3, said, "It is a great moment of happiness, it gives me immense satisfaction on achieving this goal as project director of this mission. The entire mission operations from launch till landing happened flawlessly as per the timeline and we have become the fourth country to demonstrate the soft landing on the moon and the first country to go to the South Pole of the moon."

Thanking the navigation guidance and control team, propulsion team, sensors team and all the mainframe subsystems teams, who have brought success to the mission, Mr. Veeramuthuvel also expressed his gratitude to the critical operations review committee for thoroughly reviewing the mission operations right from launch till date.

"The target was on spot, because of the review process," he said, as he acknowledged the contribution of Chandrayaan-3 project executives working across various ISRO centres.

Seethakanti, Mission Director, Chandrayaan-3, said, "It gives me immense pleasure to be part of Chandrayaan-3 and as mission director, I would like to thank each and every team member who has supported in carrying out all the mission operations flawlessly. Calling it a memorable moment, Kalpana K., Associate Project Director, Chandrayaan-3, said, "We have achieved our goal flawlessly after rebuilding our spacecraft. It has been breath in and out for our team."

Mr. Sankaran, Director of U.R. Rao Satellite Centre, said, "Today we have achieved what we set out to achieve in 2019. It was delayed by four years but we have done it." He was referring to the failed landing of Chandrayaan-2 in 2019. "As the Prime Minister mentioned, we will now be looking at putting man in space, putting spacecraft around Venus and landing a craft on Mars," he said. (With PTI inputs)

## Opposition leaders congratulate ISRO for dedication, ingenuity

### The Hindu Bureau NEW DELHI

Opposition leaders across the political spectrum congratulated the Indian Space Research Organisation, with Congress president Mallikarjun Kharge calling it "a collective success of every Indian and a testament to the vision of Jawaharlal Nehru."

West Bengal Chief Minister and Trinamool president Mamata Banerjee said that India is now in the super league of space.

Former Congress chief Rahul Gandhi and Congress general secretary Jagan Mohan Reddy, in their congratulatory messages, underscored the point that space research has been a "sign of continuity" since it started in 1962.

"Chandrayaan-3's soft landing on the uncharted lunar South Pole is the result of decades of tremendous ingenuity and hard work by our scientific community. Since 1962, India's space programme has continued to scale new heights and inspire generations of young dreamers," Mr. Gandhi said in a post on X.

CPBM general secretary Sitaram Veerayudh said "six decades of commitment, hard work and dedication" for the successful landing.

He called the event a tribute to "scientific temper, reason and rationality."

In a message to President Droupadi Murmu and Prime Minister Narendra Modi, the Russian leader described the Russian success of the mission as a proof of

## It's a truly momentous occasion, says President

### Press Trust of India NEW DELHI

President Droupadi Murmu on Wednesday said that the landing of Chandrayaan-3 on the lunar surface was "a truly momentous occasion" which happens once in a lifetime and it has made the whole country proud.

After watching the live telecast of the landing of Vikram lander on the moon, Murmu conveyed her congratulatory video message to the Indian Space Research Organisation and everyone associated with the Chandrayaan-3 mission.

"There are days when history is made. Today with the successful moon landing of the Chandrayaan-3 mission, our scientists have not only made history but also re-made the idea of geography. It is truly a momentous occasion. The kind of event that happens once in a lifetime making India proud. I congratulate ISRO and everybody involved in this mission and wish them greater accomplishments ahead," she said in the video message.

Vice-President Jagdeep Chandhar said it was a historic feat signalling the rise of India.

Home Minister Amit Shah said India had become the first to touch the



Droupadi Murmu

South Pole of the moon. "I express my heartfelt gratitude to ISRO and our scientists for their undeterred efforts to make this mission a historic success."

The Council of Scientific and Industrial Research headquarters in New Delhi erupted in joy as Chandrayaan-3's lander touched the lunar surface.

The CSIR gathering was attended by Minister of State for Space Jitendra Singh and Principal Scientific Adviser Ajay Sood. "While others fantasise (on the moon), we have felt the moon. While others stuck in flight of dreams, Chandrayaan-3 has actualised the dream. Tricolour flies high in lunar skies affirming India's resolve, as articulated by PM Modi, 'Sky is not the limit,'" Mr Singh said.

(With inputs from Jacob Kishor)

## A testament to India's progress in science: Russia

### The Hindu Bureau NEW DELHI

Russian President Vladimir Putin was among the first world leaders to congratulate India after Chandrayaan-3 made a soft landing on the moon's surface.

In a message to President Droupadi Murmu and Prime Minister Narendra Modi, the Russian leader described the Russian success of the mission as a proof of

progress that the Indian space programme has made over the decades.

"This is a big step forward in space exploration and certainly a testament to the impressive progress made by India in the area of science and technology," Mr. Putin said in his message.

Russian Ambassador to India Denis Alipov also congratulated India on the success and said, "A historic triumph unfolds as Chandrayaan-3 lands flawlessly on the moon's South Pole. Humanity's quest for

space exploration takes a monumental leap forward. Kudos to the brilliant minds behind this remarkable feat!" he said.

Russia's own moon mission failed earlier last week as the Luna-25 mission ended in a crash last week.

Napal's Foreign Minister N.P. Sanao also congratulated India and said, "This is not only a moment of national pride for our Indian friends but also an important milestone in the advancement of space science and technology, which ultimately contributes to making our lives better."

It is all the more significant because India is the only nation to have achieved the lunar landing on the South Pole of the moon. This will help scientific research

**JUSTICE D.Y. CHANDRACHUD**  
Chief Justice of India

So very pleased for the scientists at ISRO. They have taught us that a setback is not a failure. It's a lesson to learn from

**OMAR ABDULLAH**  
National Conference  
Group Leader

ISRO has set a global standard by reaching the moon and landing at a designated location at a predetermined time

**NADIARAV NAIR**  
Former Chairman of ISRO

What a way to demonstrate new technologies and achieve India's first soft landing on another celestial body. Well done. I am thoroughly impressed

**JOSEPH ASCHBACHER**  
Deputy General, European Space Agency

I am truly thrilled that India is at the forefront of space exploration and the pursuit of sustainable living on the moon. Filled with enthusiasm for lunar exploration

**SINEETA WILLIAMS**  
Deputy Ambassador, Australia

Congratulations to India on being the 4th country to successfully soft land a spacecraft on the moon. We're glad to be your partner on this mission!

**BILL NELSON**  
NASA Administrator