hindustantimes.com
@hindustantimes @entweets @hindustantimes @hindustantimes
■VOL XCIX NO 203■PRICE ₹6.00/WITH HINDUSTAN ₹10.50 (₹9.50 IN FARIDABAD)/WITH MINT ₹15.50■28 PAGES + 14 PAGES OF HT CITY. AREA SPECIFIC PAGES EXTRA.

Hindustan Times
FIRST VOICE. LAST WORD.

Pragyan rover's Moon excursion

This hand-out screen grab taken and released by the Indian Space Research Organisation (Isro) on August 25 shows the Pragyan rover being manoeuvred from the Vikram lander to the surface of the Moon. India is the first country to explore the lunar south pole. ISRO

MOON LANDING DONE, ISRO SETS SEP 2 TARGET FOR SOLAR MISSION

Soumya Pillai
letters@hindustantimes.com

NEW DELHI: The Indian Space Research Organisation (Isro) is likely to launch the Aditya-L1, the country's first solar orbiter, between September 1 and 5, officials have said, close on the heels of its spectacular success with the Chandrayaan-3 mission that saw the country's lunar lander make a pitch perfect landing.

The Aditya-L1 mission will allow India's scientists to study the sun for the first time with the hope that it could unlock new insights about the centre of our solar system.

"A few dates have been sent to the ministry for approval. The first slot is September 2, and if that does not work, then we will try for alternate dates within the range," a senior Isro official said on Friday. →Pg6

Isro: Pragyan rover successfully travels 8 mtrs on lunar surface

Soumya Pillai
letters@hindustantimes.com

NEW DELHI: The Pragyan rover rolled out over the surface of the Moon and covered a distance of 8 metres, the Indian Space Research Organisation (Isro) said on Friday, two days after the historic landing of the Chandrayaan-3.

The seemingly short but symbolically staggering distance — no country has till now reached close to the Moon's south pole with its spacecraft intact — travelled by the rover came after it unfolded its solar panels and drew power from the sun in preparation for its landmark mission. "All planned rover movements have been verified. The rover has successfully traversed a distance of about 8 metres. Rover payloads LIBS and APXS are turned ON. All payloads on the propulsion module, lander module, and rover are performing nominally," Isro said, in a statement on Friday.

Isro also released the first video of the rover rolling out of the Vikram lander in the early hours of Thursday. "...and here is how the Chandrayaan-3 rover ramped down from the lander to the lunar surface," it posted on X (formerly Twitter). In another post, the space agency said, "A two-segment ramp facilitated the roll-down of the rover. A solar panel enabled the rover to generate power..."

Pragyan, roughly 92cm in length and 75cm in width, has on board two spectrometers that can analyse the composition of moon rocks and dust. Officials from the department of space also confirmed that Prime Minister Narendra Modi is scheduled to meet Isro chief S Somanath and the team of Chandrayaan-3 scientists on Saturday. After the meeting, the Pragyan rover is also expected to raise the Tricolour on the lunar surface in the presence of the PM.

Senior officials of the space agency said that the Pragyan rover emerged from the lander around 10.30pm on Wednesday, around four hours after the lander successfully landed on the lunar surface. After testing the inclination, temperature, terrain and ensuring that the dust kicked off by the landing had settled, the rover was finally rolled out early on Thursday — around 1.30am.

On Friday, the two rover payloads — Laser Induced Breakdown Spectroscope (LIBS), deployed to study the qualitative and quantitative elemental analysis and to derive the chemical composition and infer mineralogical composition to further our understanding of lunar-surface, and Alpha Particle X-ray Spectrometer (APXS), to determine the elemental composition (Mg, Al, Si, K, Ca,Ti, Fe) of lunar soil and rocks around the lunar landing site — were set to action.

"On Thursday, the rover moved within the observational area. We have not received the first set of data yet. Once all payloads are turned on, which should happen by Saturday, we will start getting initial data," a senior official said.

First solar mission likely to be launched between Sept 1 and 5

Soumya Pillai
letters@hindustantimes.com

NEW DELHI: The Indian Space Research Organisation (Isro) is likely to launch the Aditya-L1, the country's first solar orbiter, between September 1 and 5, officials have said, close on the heels of its spectacular success with the Chandrayaan-3 mission that saw the country's lunar lander make a pitch perfect landing.

The Aditya-L1 mission will allow India's scientists to study the sun for the first time with the hope that it could unlock new insights about the centre of our solar system. "A few dates have been sent to the ministry for approval. The first slot is September 2, and if that does not work, then we will try for alternate dates within the range," a senior Isro official said on Friday.

The official said the rocket integration for the Aditya-L1 is currently underway at the Sriharikota space station and the official date of launch is likely to be announced by the end of August.

The spacecraft is meant to be placed in a halo orbit around Lagrange point 1 (L1) of the sun-earth system, which is about 1.5 million km from the earth.

Earlier, the mission was conceived as Aditya-1 with a 400 kg class satellite carrying one payload, the Visible Emission Line Coronagraph VELC, that was to be launched in an 800-km low earth orbit. However, since a satellite placed in the halo orbit around the first lagrangian point (L1) of the sun-earth system has the major advantage of continuously viewing the sun without any accultation/eclipses, the Aditya-1 mission was renamed as Aditya-L1 mission.

ADITYA-L1 MISSION WILL ALLOW INDIA'S SCIENTISTS TO STUDY THE SUN FOR THE 1ST TIME

A Lagrange Point is a spot in space where the force of gravity of the nearest celestial entities cancel each other out, helping an object remain in equilibrium.

Isro scientists said the instruments of Aditya-L1 are tuned to observe the solar atmosphere mainly, the chromosphere and the corona — two outermost layers of the star. The instruments will observe the local environment at L1 and carry out remote sensing and observation.

"The spacecraft carries seven payloads to observe the photosphere, chromosphere and the outermost layers of the sun (the corona) using electromagnetic and particle and magnetic field detectors. Using the special vantage point L1, four payloads directly view the sun, and the remaining three payloads carry out in-situ studies of particles and fields at the Lagrange point L1, thus providing important scientific studies of the propagatory effect of solar dynamics in the interplanetary medium," Isro's mission document said.

"The suits of Aditya-L1 payloads are expected to provide the most crucial information to understand the problem of coronal heating, coronal mass ejection, pre-flare and flare activities and their characteristics, dynamics of space weather, propagation of particles and fields."

{ IN GREECE } MODI ADDRESSES INDIAN DIASPORA

PM: Tricolour on Moon showed India's abilities

HT Correspondent
letters@hindustantimes.com

NEW DELHI: Prime Minister Narendra Modi, during his address to the Indian diaspora in Greece on Friday, said that India has shown its capability to the world by hoisting the tricolour on the Moon. The prime minister said that the country's science and technology and innovation are creating a wave globally.

Modi also talked about several development feats achieved by his government in the last nine years and emphasised that never before has so much investment been made in the infrastructure sector."Over 25 lakh (2.5 million) km-long optical fibre cable has been laid in India since 2014 which is more than six times the distance between the Earth and the Moon.... India has taken indigenous 5G technology to around 700 districts in record time," he said, drawing cheers from the audience.

The world's highest-altitude rail bridge and motorable road besides the biggest cricket stadium and the tallest statue are in India now, he said.

Top global bodies like the World Bank and the International Monetary Fund (IMF) are praising the Indian economy with leading companies vying with each other to invest in India, he said.

Referring to the successful landing of Chandrayaan-3 on the lunar surface earlier this week, Modi said, "By hoisting the Tiranga (on the moon), we have made the world aware of India's capabilities. Congratulatory messages are pouring in from across the world... When the achievement is this big, its celebration also continues. Your faces say that wherever you might be in the world, India beats in your heart. I congratulate you once again on the grand success of Chandrayaan-3."

The PM invoked ancient ties between the civilisations of India and Greece, and praised the roles of Sikh gurus in strengthening their relations.

Prime Minister Modi at a business lunch hosted by Greek Prime Minister Kyriakos Mitsotakis in Athens on Friday. ANI

India's galactic ambitions hold crucial lessons

Isro's extraordinary journey shows the importance of combining fundamental science and exploration with application, and taking on audacious and ambitious goals despite all constraints. For society, there is much to learn

The successful Chandrayaan-3 touchdown of Vikram has been uplifting and motivating for all. The moon-landing is a metaphor for what we all can learn from the Indian Space Research Organisation (Isro). Great organisations set ambitious goals and focus on them. They develop and put in place detailed processes for every task. While processes are important, they ensure that these don't hold the organisation hostage. Flexibility and lots of room for innovation are essential.

K VijayRaghavan

They develop an organisational culture that is thoroughly professional, yet collegial, and one which keeps the success of the team as important, and above navel-gazing individualism. They recognise that teams need strong leaders who can develop programmes and be clear-headed in a crisis.

By definition, exploring frontiers is fraught with hurdles — both anticipated and unanticipated — coming both from the complications of having to work under extreme conditions and from having to deal with difficult local operational realities. Beating the odds is done not by the chance purchase of a winning ticket but by the painstaking pursuit of science, technology, engineering, and management. Despite all of this being in place, every groundbreaking effort will face many pitfalls, until earlier frontiers become routine and newer ones are explored. That humans see and accept this, and are inspired by and support extraordinary efforts at exploration, is a testament to our spirit, and has been a key component to our survival as a species.

There are two inseparable sides to the Isro coin. Missions that are of immediate and direct use for the country and explorations through science and technology, whose use and applications may not be apparent now or ever. Decades ago, in the early days of Isro, the goals of getting rockets launched and satellites into orbit were key. India's first launch was on November 21, 1963 from Thumba, near Thiruvananthapuram. Our first satellite, Aryabhata, was designed and fabricated in India and launched from the Soviet Union in April 1975.

Isro has come a long, long way since. Working with the ministry of earth sciences, the agency has transformed India's use of remote-sensing tools in climate, weather and ocean science and technology. National and global efforts now allow a detailed mapping of our terrestrial landscape and of our biodiversity.

Isro's communication satellites have transformed education, communication and entertainment. None of this was in the sights of the agency in 1963, but the fact that new frontiers will arise and will have to be explored was. Its ambitions and goals were not constant but kept expanding.

Over the past few decades, the exploratory, commercial and societal value of space exploration has amplified far beyond what was imagined. Several countries have joined the space club and the competition is stiff.

For Isro to have a presence and be a significant player required a rejig of its function. To its enduring credit, the agency has accomplished this difficult restructuring task in an impressively rapid manner. With the creation of the Indian National Space Promotion and Authorisation Centre (IN-SPACe), the private sector will have a very major role in all aspects of space exploration and application. IN-SPACe is a single-window, independent, nodal agency with the responsibility to enable the building of launch vehicles and satellites, and providing space-based services. The resources and facilities of Isro are now available to the non-governmental sector. Through IN-SPACe, Isro will also partner in the development of new facilities and resources.

The Indian Space Research Organisation has transformed India's use of remote-sensing tools in climate, weather and ocean science and technology PTI

IN-SPACe will work with educational and research institutions, thus broadening the science and tech reach in space exploration. The department of space has also started a company, New Space India Limited (NSIL), that will market all of Isro's technology developments — from circuits and systems to launch technologies and satellite capabilities. The results of these steps will enable academia, industry and start-ups to dive deep into space science and technology in a manner that will ensure that India continues to be a major player in space, 20 years from now.

There are two lessons. The first, from the Aryabhata era, is to not hesitate to get started on tasks which most people will dissuade you from taking up. This well-meaning advice ranges from saying that there are more important things to be done to warning that such adventures are beyond one's reach and are useless. Of course, there are always more important and immediate tasks, but, as Isro has shown, exploration and development of indigenous capability pays back on important and immediate tasks.

The other lesson is from IN-SPACe and NSIL, the impact of whose creation we will see amplifying steadily. This lesson is to avoid complacency, to judge every changing environment, and keep evolving and to not forget to connect science to innovation and society.

Today, both lessons are important in every sphere of our lives. By consciously combining fundamental science and exploration with application, by taking on audacious and ambitious goals despite all the internal and external constraints, and by changing to keep relevant and effective, there is much to be inspired by, and learn from Isro. Society is a key partner. As funders of frontier exploration, citizens and governments must see value in such efforts.

K VijayRaghavan is former principal scientific adviser and DAE Homi Bhabha Chair Professor, National Centre for Biological Sciences, TIFR.
The views expressed are personal