CENTRE FOR AIR POWER STUDIES

In Focus

New Delhi

CAPS InFocus: 40/2024

22 August 2024

"National Space Day: 23 August 2024"

India Celebrates Its Inaugural National Space Day 2024

T H Anand Rao

Senior Fellow, Centre for Air Power Studies

Source: Source: newsonair.gov.in

Keywords: National Space Day, ISRO Achievements, Chandrayaan, Space Programme, Lunar Landing

August 23, 2024, is being celebrated as the maiden 'National Space Day' in India. The theme for this year's space day is "Touching Lives while Touching the Moon: India's Space Saga". The date has been carefully chosen to honour the momentous occasion of India's moon landing on the same day last year. Events are being conducted across the country to highlight India's remarkable achievements in space and the success of India's space programme, which has brought immense socio-economic benefits to the population. These events include quizzes, robotic challenges, hackathons, exhibitions, and seminars to create awareness about space and its benefits to mankind.[1]

Indian Space Research Organisation (ISRO) is the sole entity that has been responsible for the innumerable achievements in space for India. There have been many milestones, but the successful Chandrayaan-3 mission in August 2023 stands out as a beacon of hope for the future space exploration ambitions of the nation. Chandrayaan-3 has opened the windows to many possibilities that exist beyond Earth's orbit for India, mainly in the exploration of the Moon and Mars. This is the first step towards human presence on these planets. Apart from being the 4th nation to do a soft landing on the moon, India also became the First Nation to land near the South Pole. The capability to execute a safe moon landing means India can progress its moon exploration ambitions further for various purposes, like surveying the lunar surface for mineral resources, rare earth materials, water, etc. Eventually, this would lead to human habitation on the moon, and India cannot be a laggard in the lunar race. To complete the cycle of lunar missions, ISRO will have to work on return trips for sample collection. A successful sample return mission will give hope for further development of spacecraft for human moon landings.

The depth of India's space programme can be gauged by the statistics of the space missions carried out. To date, ISRO has achieved 95 space launches with 125 satellite missions. A total of 432 foreign satellites belonging to 34 countries have been launched, and 17 satellites have been realised by private players or students.[2] Some of the noteworthy milestones are:[3]

- PSLV - The Polar Satellite Launch Vehicle (PSLV) has been performing as the most reliable and versatile workhorse with a success rate of above 95 per cent.

- GSLV - Operationalisation of the Cryogenic engine technology and Geosynchronous Satellite Launch Vehicle (GSLV).

- LVM3 – The Launch Vehicle Mark3 is the 4th generation launch vehicle developed indigenously to carry 4-tonne class payloads to Geostationary Earth Orbit (GEO) and 6-tonne class payloads to Low Earth Orbit (LEO). This new-generation rocket has flown seven missions since 2014.

- Launch of 104 satellites in a single mission of PSLV in 2017.

- SSLV - Completion of development flights for Small Satellite Launch Vehicle (SSLV).

- The Scramjet engine was successfully flight-tested as a technology demonstrator in August 2016.

- RLV - Landing experiments have been successfully conducted on the Re-usable Launch Vehicle (RLV-LEX).

- Quantum Communication - The Department of Space demonstrated entanglement-based quantum communication over a 300-metre free space along with real-time cryptographic applications.

- Chandrayaan - Consecutive missions (Chandrayaan-1 to Chandrayaan-3) have been conducted, each with its unique achievements, resulting in the safe moon landing in the Chandrayaan-3 mission.

- Mangalyaan - The successful Mars Orbiter Mission (MOM), also called Mangalyaan, was achieved in 2013-2014.

- Earth Observation – The Cartosat, Risat and EOS series of satellites have enabled high resolution imagery, wile the Hyperspectral imaging satellite has taken remote sensing to the next level.

- NavIC - India became a regional player in navigation satellite systems through Indian Regional Navigation Satellite System (NavIC).

- Gaganyaan - Completion of various critical tests like the Pad Abort Test, Test vehicle mission, Integrated Main Parachute Air-drop Test, and Crew Module Atmospheric Re-entry Experiment.

- Aditya L1 – The first Indian solar observatory was launched in September 2023.

- SSA - ISRO has set up a Space Situational Awareness (SSA) control centre in Bangalore for the identification and tracking of space objects and predicting collisions.

- Space Reforms – The Indian National Space Promotion and Authorisation Centre (IN-SPACe) was established as a single window agency for all space activities of non-government entities. It plays a critical role in promoting commercial space activities and boosting the space economy. ISRO set up its commercial arm through New Space India Limited (NSIL), which is responsible for enabling Indian private industries to scale up production through technology transfers from ISRO. It also participates in the global commercial market by providing launch services and satellite services.

Amongst the several pan-India outreach activities and public engagements that are being planned to commemorate the national space day is a Bharatiya Antariksh Hackathon. The hackathon has been designed around 12 problem statements that have been identified in the fields of geospatial intelligence, space science, image processing, and artificial intelligence/machine learning. Through the hackathon, ISRO hopes to find novel solutions to complex issues while identifying new talent. Another spotlight event is the 'Robotics Challenge', which aims to identify the talent pool in universities and institutions in building robots that can compete in an extra-terrestrial environment, addressing real-life space robotics challenges.[4] ISRO is also conducting a pan-India space quiz, which is open to all age groups.

Despite the overwhelming success of India's space programme under the sole space organisation in the country—ISRO—there have been some inadequacies and missed opportunities that warrant mention. India's space programme, since the beginning, has been curated for socio-economic benefits and national development through scientific research and space exploration. This is captured adequately in the vision statement of ISRO. Consequently, the national security requirements of the nation were overlooked for several decades until the inadequacies of our space capabilities were experienced during the Kargil conflict. A separate organisation for defence space requirements was set up much later in 2019, and it will take many years to develop independent capabilities to support military space requirements. As for ISRO, it is still lagging in comparison to the leading space-faring nations in many areas of space technologies and infrastructure, such as Space Situational Awareness, Space stations, docking, in-orbit technologies like refuelling of satellites, heavy launch vehicles, persistence in surveillance capabilities, high-speed communication, space-based internet services, global navigation satellite systems etc.

The National Space Day is a testimony to the great efforts of India's space scientists, like Dr. Vikram Sarabhai, Prof. Satish Dhawan, and Prof. UR Rao. It highlights India's achievements in space and inspires the youth of the nation. The Space Day recognises significant achievements in space exploration and highlights advancements in space technology. The day is dedicated to inspiring future generations by generating interest in space science among students and enthusiasts. Furthermore, Space Day enhances public awareness about the benefits and importance of space exploration, giving a sense of national pride. It is a powerful reminder of the impact of space on our lives and the need for continued support and progress in this essential field.[5] The theme for this year's space day—'Touching Lives while Touching the Moon: India's Space Saga'—is apt and needs to be followed up with improvement in India's space landscape through various measures like more transparent policies, training programmes, job creation, promotion of the private space industry as well as looking through the prism of national security.

Notes:

[1] "Country To Celebrate National Space Day On August 23", *All India Radio,* August 14, 2024, at https://www.newsonair.gov.in/country-to-celebrate-national-space-day-on-august-23/#:~:text=On%2023%20August%20last%20year,as%20"National%20Space%20Day". Accessed on August 18, 2024.

[2] Indian Space Research Organisation, "Missions Accomplished", at https://www.isro.gov.in/Mission.html. Accessed on August 19, 2024.

[3] Indian Space Research Organisation, "The Modern Era of the Indian Space Programme", at https://www.isro.gov.in/media_isro/pdf/9Years_Space_Achievement_Feb2024.pdf. Accessed on August 19, 2024.

[4] "ISRO to organise hackathon to celebrate first National Space Day on Aug 23", *The Economic Times*, July 05, 2024, at https://economictimes.indiatimes.com/news/science/isro-to-organise-hackathon-to-celebrate-first-national-space-day-on-aug-23/articleshow/111517854.cms?from=mdr. Accessed on August 19, 2024.

[5] Department of Space, "National Space Day 2024: Embracing India's Space Saga With a Month of Inspiring Events", *Press Information Bureau,* August 02, 2024, at https://pib.gov.in/PressNoteDetails.aspx?NoteId=151986&ModuleId=3. Accessed August 18, 2024.