

**GOVERNMENT OF INDIA
DEPARTMENT OF SPACE**

Sub: Monthly Summary of Department of space for the month of May, 2024

PART- I (Unclassified)

I. Important policy decisions taken and major achievements during the Month

A. Space Transportation:

- Hot test of the PS4 engine powering the fourth stage of PSLV realised through Additive Manufacturing (AM) route was successfully carried out for a duration of 665 seconds under sea level condition on May 09, 2024.

Advantages obtained in realisation through the AM route are reduction in the number of parts, elimination of welded joints, significant savings in the raw material, and reduced overall production time. The realisation of the engine was done through an Indian industry.

- Towards the indigenous semi-cryogenic engine development, two short durations (2.5 seconds each) ignition trials were successfully conducted on May 02, 2024 & May 21, 2024 at Semi-cryo Integrated Engine Test facility (SIET), on a Pre-Burner Ignition Test Article (PITA), which is a lower level engine configuration involving only minimal engine subsystems.

Smooth and sustained ignition of the preburner was demonstrated, confirming the adequacy of the modified sequence which is vital for the ignition of the semi-cryogenic engine.

B. Space Applications:

I. Earth Observation:

- Agriculture Technology project (for State governments): end-of-season crop outlook information has been generated for Maharashtra. Machine learning model is trained using historical data on crop yield for wheat in Madhya Pradesh.
- Development of hydro-informatic products and services (National Hydrology Project, NHP, for MoJS): Actual Evapo-Transpiration products, Hydrological drought products and snow cover products are generated and published. GLOF modelling has been completed for the fifth prioritized glacial lake in Indus basin.
- Urban Waterbody Information System (UWaIS, for MoH&UA): Land Use / Land Cover change assessment has been completed for selected (prioritized) waterbodies in 28 towns.
- Monitoring the WDC-PMKSY 2.0 projects using geospatial technologies (for MoRD): Based on user feedback, an improved version of the Mobile App for WDC2.0 has been released.
- 74,116 satellite data products are downloaded by the users from Bhuvan & Bhoonidhi under open & free data access facility.

II. Disaster Management Support:

- NDEM V5.0: New Modules are developed & integrated to visualize avalanche alerts from DGRE, water level data from CWC, and Tsunami alerts; Storm Surge; Swell Surge & High Wave alerts etc. from INCOIS.
- Pre-flood season satellite database is prepared for India using Resourcesat-2 /2A AWiFS and RISAT-1A MRS data.
- Operational near real time forest fire alert generation & dissemination is ongoing for the forest fire season; 2024. Nainital, Garhwal and Almora are identified to be the worst affected districts due to the Uttarakhand forest fire during April – May, 2024.
- 18 IRS data products were disseminated to Sentinel Asia for Disaster Management Support.

III. Satellite navigation

- IEC 61108-7 standard for maritime navigation and radiocommunication equipment and systems based on L1-band SBAS released in May, 2024.
Indian SBAS system GAGAN is included in the standard.

C. Human Spaceflight:

- Service Module propulsion system - System Demonstration Model (SM- SDM) Phase - 3 priming test successfully carried out for a duration of 151 seconds.
- For Service Module propulsion system of G1 mission, 5 nos. of 440N LAM engines and 16 nos. of 100N RCS thrusters delivered for flight integration. Integration of propellant tanks and propulsion modules completed with G1 SM structure after completing the functional tests.
- For Crew Module propulsion system of G1 mission, system integration, electrical harnessing and T&E for water calibration carried out.
- For TV-D2 mission, Interface generation on CM structure is completed for propulsion system.
- First retraction trial with newly configured cryo arm completed at Second Launch Pad, SDSC for induction of C32 in HLVM3.
- CES Jettisoning Motor (CJM) burst test successfully completed at SDSC. Low-altitude Pitch Motor (LPM) static test completed at HAT chamber, SDSC.

D. Space Sciences:

- A series of solar flares from the active sunspot group AR13664 during May 07-09, 2024 unleashed some of the Halo and large Coronal Mass Ejections (CMEs) in the interplanetary space, which eventually commenced a severe geomagnetic storm on 10 May, being the strongest geomagnetic storm of about two decades.
- During the aforementioned event, ISRO mobilised all its observation platforms and systems – ground based as well as space-based – to record the signatures of this event.
- Aditya-L1, Chandrayaan-2 and XPoSats made observations during the event and the recorded signatures have been analyzed. NARL GNSS receiver

network recorded dramatic Total Electron Content (TEC) variations in different phases.

- Studies were conducted to mitigate the Source-side Channel Vulnerability in Quantum Key Distribution (QKD), further highlighting that continuous variable-based QKD protocols are vital for secure communication.
- Potential landing sites characterization studies were conducted in the lunar south pole ridge region, connecting two Permanently Shadowed Regions (PSRs): de-Gerlache and Shackleton. These studies shall be useful as an input towards the proposed ISRO-JAXA LUPEX mission.
- New multi-wavelength airglow imager observations have been started at NRSC, Shadnagar, Hyderabad to study the latitudinal coupling processes in the mesosphere-ionosphere-thermosphere system, particularly during the dramatic space-weather events.

E. Capacity Building:

- YUVIKA-2024: Residential student training programme was organised during May 13, 24 with 355 students covering all states/UTs across various ISRO Centres.
Secretary, DOS / Chairman, ISRO inaugurated the programme and interacted with YUVIKA students.
- ISRO initiated the Space Educators Training and Knowledge Upgradation (SETU) programme under Antariksha Jigyasa: Online training on Space Technology and its applications for school teachers. Around 1226 teachers have registered.
- ISRO provided course curriculum and teaching resource through Space Tutor for organising one-week Space Education program for 120 nos. of Eklavya Model Residential Schools (EMRS) students by Ministry of Tribal Affairs. The programme was inaugurated on May 24, 2024 in the presence Secretary, DOS/ Chairman, ISRO and Secretary, Ministry of Tribal Affairs and other senior officials.
- During the month, four patents were granted and one patent application is filed at IPO.
- A systems Engineering Workshop was organized during 28th – 31st May for middle-level scientists/engineers. 30 participants across ISRO Centers participated in the workshop.

F. Training:

| SI No | Name of the course | Duration of the training | Number of participants |
|--------------|---|---------------------------------|-------------------------------|
| 1. | One - week certificate course on 'Cloud Computing using GEE for spatio-temporal data analysis' | April 29, 2024 - May 03, 2024 | 10 |
| 2. | Three day certificate course on 'Exposure training for the Middle Management Officers of Indian audit and Accounts department | May 06 - 08, 2024 | 19 |

| | | | |
|---|--|-------------------------------|--|
| 3. | Eight weeks ISRO-Sponsored NNRMS Course (Ongoing) | May 13, 2024 - July 7, 2024 | 57 |
| DLP/online virtual mode courses and programmes | | | |
| 4. | Applications of Geospatial Technology in Paleochannel Studies (in Hindi) | May 20 - 24, 2024 | 1553 participants from 286 network institutions |
| 5. | Exploration of the Solar System | April 24, 2024 – May 10, 2024 | 16238 participants from 318 network institutions |
| 6. | Forest carbon and water cycle monitoring and modelling | May 13-17, 2024 | 1396 participants from 238 network institutions |

G. Safe & Sustainable Space Operations:

- Daily SOPA (Space Object Proximity Analysis) and re-assessment of close approach situation were performed for 24 LEO and 30 GSO satellites. One collision avoidance maneuver was conducted for IRNSS-1C on May 27, 2024.
- The risks associated with close conjunctions of CH2O and KPLO on May 24, 2024 were mitigated by coordination with KARI team. Two orbit maintenance maneuvers (OM-83 and OM-84) were executed for CH2O.
- Regular monitoring of space weather alerts was carried out and timely alerts were issued to spacecraft operations team on the extreme geo magnetic storm during 9-11th May, 2024.
- Atmospheric re-entry prediction was carried out for 54 large objects.
- Regular activities are being carried out towards Post Mission Disposal(PMD) of Scatsat-1. 6 PMD maneuvers have been executed and the perigee of the Scatsat-1 is reduced from 710 km to 630 km altitude.
- Documents for Space debris mitigation for low-lunar orbit and decision criteria for collision avoidance maneuvers were made and submitted to IADC. A meeting was held with ESA's RAMSES mission team to discuss potential areas of collaborations in planetary defence for ISRO.

H. International Cooperation:

- Agreement between the European Organisation for the Exploration of Meteorological Satellites and ISRO on cooperation in meteorological satellite data application, exchange and redistribution was concluded on May 02, 2024
- International Astronautical Federation (IAF) has selected the CHANDRAYAAN-3 Team to receive the IAF World Space Award-2024.
- Secretary, DOS/Chairman, ISRO /virtually participated in the BRICS Heads of Space Agency meeting on May 23, 2024 and delivered the talk on the topic of Existing and Prospective BRICS projects.
- US Ambassador, H.E. Eric Garcetti visited ISRO HQ on May 24, 2024 and met Chairman, ISRO/Secretary, DOS & other Senior Officials of ISRO / DOS.

- A team of JAXA officials along with partnering Industry representatives (M/s. MHI) visited ISRO HQ during May 21-22, 2024 and held a Technical Interface Meeting on the proposed joint Lunar Polar Exploration Mission (LuPEX).
- A delegation from French Institute for Advanced Studies in National Defence (IHEDN) visited ISRO HQ on May 31, 2024. An overview of Indian space program was made and the delegation had interactions with ISRO HQ/ DOS officials.

I. IN-SPACE Activities:

- IN-SPACE Authorization was issued to M/s. Agnikul Cosmos Pvt Ltd, Chennai for sub-orbital launch of AGNIBAAN Suborbital Technology Demonstration (SOReD), Mission-01. Agnibaan SOReD Successfully Launched on May 30, 2024 from SDSC SHAR.
- IN-SPACE received the Geospatial World Forum Leadership Award for Public Policy: Enabling Industry Development, presented at the 2024 Geospatial World Forum in Rotterdam.
- IN-SPACE represented India in the 33rd Plenary Meeting of ISO/TC-20/SC-14 Space Systems and Operations at Berlin, Germany and contributed to various standards development activities.
- Released the following documents for further processing:
 - Detailed Project Report: Establishment of Common Technical Facilities at Space Manufacturing Clusters
 - Detailed Operation Guidelines: Implementation of Earth Observation Satellite System through Public Private Partnership.
 - Detailed Operation Guidelines: Technology Adoption Fund (TAF) for Indian Space Sector
- IN-SPACE has registered two additional Indian Entity who wish to disseminate/sell the primary data pertaining to Indian territory and Ground Sampling Data (GSD) > 30 cm commercially from the Earth Observation / Remote Sensing satellites.
- IN-SPACE has signed an MOU with the following NGEs:
 - M/s. GalaxEye Space Solutions Pvt Ltd for Remote Sensing Satellite Design Reviews, testing support, and related requirements, including ISRO support for its payload intended to be accommodated on POEM.
 - M/s. Thrustworks Dynetics, Pune for 'Design Review, Testing support for Rocket engine and subsystems'.
 - M/s. PierSight Space Private Ltd., for Technical Support for testing satellites/payloads, Systems/sub-systems, providing launch and post launch support activities
- All the payloads, planned to be flown onboard POEM PSLV C60, are undergoing Environmental Level Tests. Advisory notes issued to 3 NGEs for making ITU filing through WPC Wing of DoT.
- Short term Course on Mission Design and Avionics Development for Launch Vehicle under the skill development programme conducted from May 19-24,

2024 at Indian Institute of Space Science and Technology, Thiruvananthapuram.

- Empanelment of Management Consultancy Firm at IN-SPACe finalized and uploaded on IDP.

J. NSIL Activities:

- NSIL released a RFQ to invite responses from Indian industries for the production of LVM3 launch vehicles under a Public-Private Partnership Model
- As part of realization of 15 nos. of SSLV, NSIL floated 25 tenders for various items required for realizing SSLVs. The major items include payload fairing components, Payload cooling umbilical systems, SS1 separation system hardware etc.
- NSIL Signed Launch Service Agreement (LSA) with a foreign customer for SOWA-1 Satellite (rideshare basis) onboard PSLV - Anvesha mission.

a. Satellite building - GSAT-20 (GSAT-N2):

- Payload adaptor fit check for spacecraft has been completed at URSC
- NSIL selected an Indian Insurance provider for the insurance of GSAT-N2 Mission through limited tender Process
- Dynamic test of Spacecraft has been carried out successfully

b. Satellite Communication:

- NSIL received bids for supply, Installation & Commissioning of IT infrastructure and Software development for establishing Vessel Communication and Support System (VCS) for Monitoring, Control and Surveillance (MCS)
- NSIL is in discussion with Telangana Govt. and Karnataka Govt. to provide satellite services for continuing their Tele-Education Services. Toward this, NSIL has submitted the satellite specifications to meet their requirements
- NSIL participated in ITU/ Space Policy-related activities to understand the role of satellite operators and frequency coordination in India
- Two Allotment letters for long-term usage on GSAT-30 satellite have been issued for TV/teleport applications

c. Earth Observation:

- NSIL started EO data dissemination on 'commercial' basis through Bhoonidhi portal.

d. Mission Support and Ground Segment:

- NSIL is in process of providing TTC support for launch vehicle tracking to a foreign customer through ISTRAC ground station.
- NSIL is in discussion with a foreign customer for providing TTC support for deep space missions.

e. Technology Transfer:

- NSIL signed Technology Transfer Agreements (TTAs) with two Indian industries for transferring SCPC Modem technology

2. No of Cases of 'Sanction of Prosecution' pending for more than three months: NIL

3. Particulars of cases in which there has been a departure from the Transaction of Business Rules or established policy of the Government: NIL

4. Status of ongoing Swachhta Abhiyan (progress under Special Campaign):

As per the guidelines of Government, Department has chalked out an action plan for implementation of Swachhta Pakhwada 2024 during 1st to 15th February, 2024 and communicated to DDWS and uploaded on Swachhta Samiksha portal.

Based on this action plan, DOS/ISRO Centres/ Units/ ABs/ CPSEs have observed Swachhta Pakhwada 2024 from 1st to 15th February, 2024 with active participation of senior officials, employees, housing colony residents, CIFS personnel, etc. The photograph of events carried out during Pakhwada were uploaded on Swachhta Samiksha Portal.

5. Status of Rationalisation of Autonomous Bodies:

EMC has recommended that NARL be governmentalized. The recommendations of the committee in respect of NARL is under review.

All the AB's under the Department namely, IIST, PRL, NARL & NESAC have been brought under Treasury Single Account.

6. Vacancy position of senior level appointments in the Ministry/Department including Autonomous Bodies/PSUs:

The detailed status regarding all the posts pertaining to Department of Space has been updated on AVMS. The status of updation of vacancy as on 31.05.2024 is as follows:

- Total number of posts required to be entered on AVMS: - 25
- Number of posts filled as on date: - 18
- Number of posts totally vacant as on date: - 07
- Number of posts under premature repatriation – 00
- Number of posts under additional charge arrangement: - 01
- Number of posts that would fall vacant during the next 06 months: -

7. List of cases in which ACC directions have not been complied with :- NIL.

* * *