

PARLIAMENT QUESTION: SPACE VISION 2047

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Key space-based applications undertaken during 2026 by ISRO/DoS are:

- **For Agriculture:** Satellite-based national level crop sown and harvest area mapping for 2 crop seasons; All-India mapping of Kharif rice, Wheat, Jute crops; national level crop yield estimation for rice and wheat crops, technology support for State level mapping of crops for Maharashtra (Soybean, Cotton, Paddy) and Madhya Pradesh (Soybean, Wheat, Gram, Mustard, Paddy), Insurance unit level estimation of crop yield in 10 States to support Pradhan Mantri Fasal Bima Yojana (PMFBY); Jute crop surveillance in the major jute-growing states of India, namely Assam, Bihar, Odisha, and West Bengal.

- **For Disaster Management:** Near-real-time monitoring and mapping of floods, landslides, cyclones, forest fires, Glacial Lake Outburst Floods (GLOFs), droughts, and other natural disasters using data from Earth Observation satellites. The outputs are uploaded to the BHUVAN and National Database for Emergency Management (NDEM) portals.

Satellite and numerical model-based search and rescue tool installed at Naval Operations Data Processing and Analysis Centre (NODPAC), Indian Navy, Kochi for their operations.

- **For Climate Monitoring:** Climate-related parameters, such as Chlorophyll-a concentration, sea surface wind currents, wind stress, and surface-level winds derived from the EOS-06 satellite mission (using Ocean Colour Monitor-3 and Scatterometer sensors); and Cloud products from INSAT-3DS are periodically updated and disseminated through the National Information System for Climate and Environment Studies (NICES) web portal. Satellite based Extreme Weather Nowcasting tool has been developed and deployed for assessment towards operational implementation in IMD/MoES.

- **For other developmental sectors:** Using Geospatial technology, Planning and monitoring of Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) activities; Watershed Development Component-Pradhan Mantri Krishi Sinchayee Yojana (WDC-PMKSY); Pradhan Mantri Awas Yojana- Housing for All (Urban) (PMAY-HFA(U)); status of road network of the rural parts of India under Pradhan Mantri Gram Sadak Yojana (PMGSY); assets created under Rashtriya Krishi Vikas Yojana (RKVY), Green cover along the National Highways; Unique Identification Authority of India (UIDAI); etc. have been carried out.

The integration of satellite-based services with Central Ministries/Departments, State Governments and local authorities are strengthening through:

- The integration of Indian satellite data and indigenous space platforms in many of the National flagship programmes carried out by Central Ministries, State Governments and local authorities.
- Implementing the Forecasting Agricultural output using Space Agro-meteorological and Land based observation-2.0 (FASAL 2.0) project funded by MoA&FW, GeoCrest on the ISRO-Visualisation of Earth Observation Data and Archival System (VEDAS) portal for operational crop monitoring and yield assessment.
- Generating and providing crop yield estimates for various major crops.
- Supporting State Departments by providing technical inputs, geo-spatial solutions to assist in natural resources management, monitoring of developmental activities, planning of new activities.
- Providing near-real-time satellite-derived geospatial products to Central Ministries, State Disaster Management Authorities (SDMAs), District Administrations, and line departments under the Disaster Management Support (DMS) Programme.
- Carrying out training, capacity-building programmes for stakeholders to facilitate the adoption of space-based information for agricultural and natural applications; disaster preparedness, response, damage assessment, and recovery planning.
- ISRO/DoS has signed more than 15 MoUs with Central Departments/Ministries and State Departments for implementation of technology in Crop mapping, Climatic & Disaster risk assessment, satellite data-based Weather Forecasting, Water Resources monitoring, mapping and monitoring of mining activities, etc.
- Satellite Communication forms a part of flagship government programmes like BharatNet and Digital India to expand the communication reach with enhanced capacity for good governance including Gram panchayats. The extended reach of BharatNet using space technology bridges the digital divide, improves administrative coordination, promotes more connected governance and thus supports evidence-based decision-making. In addition, it caters to the emerging applications like broadband services to home and enterprise users, ubiquitous secure services to government users, wide connectivity for strategic services, DTH television, Very Small Aperture Terminal (VSAT) services, In-Flight and Maritime Connectivity (IFMC), societal applications (like tele-education, tele-medicine and disaster management).

To expand access to geospatial and Earth observation data for research, industry and public institutions a number of measures are implemented. These includes:

- Providing open and free access to Indian Earth Observation (EO) data, having coarser than 5m Ground Sampling Distance (GSD), to all users under the ambit of Indian Space Policy-2023. All the products derived from free data are also disseminated free of charges to all the users.

- EO data having GSD finer than 5m are provided free of charge to Government Users and at fair price to non-Government users.
- Enhancing the web-based interfaces, streamlining data regulations, and offering operational users near-real-time products. Space-based observations are distributed in real time for various applications through portals such as Meteorological and Oceanographic Satellite Data Archival Centre (MOSDAC) and VEDAS.
- Providing On-Demand Processing Platform to users to support their cloud-based processing requirements.
- To encourage and accelerate the use of space-based observations in various applications by research; industry and public institutions, ISRO/DoS organizes training programmes and workshops as part of capacity building.

The roadmap for scaling up the use of indigenous space technologies to support national development goals under Space Vision 2047 are in the following areas:

- **Earth Observation Applications:** Future Earth Observation applications and infrastructure requirements are identified and presented in National Meet-2025, held on 22nd August 2025 at New Delhi. These infrastructure requirements are compiled in 'Outcome Report of National Meet - 2025 Leveraging Space Technology & Applications for Viksit Bharat 2047'. The development of indigenous technologies to meet these requirements is taken up as R&D activities by respective ISRO/DoS Centres.
- **Satellite communication:** Indigenous space technologies are being developed to adopt new technological solutions such as Flexible payloads, Direct-to-Device (D2D), Non-Terrestrial Network (NTN) using 5G/6G standards, NB-IoT over satellite for M2M communication, for enhancing digital applications. Multi-orbit compatible broadband terminals in higher frequency bands with beamforming capabilities are being indigenised. Development of ground station network infrastructure for optical and laser communication considering future HTS feeder link requirements and establishment of operational quantum key distribution (QKD) systems are under progress. Indigenous sovereign N-GSO constellations are being planned to provide broadband service.
- **Satellite Navigation:** NavIC-Navigation with Indian Constellation as the primary positioning, navigation, and timing (PNT) service across transportation, logistics, aviation, maritime, railways, defence, agriculture, disaster management, and smart city applications. Receiver technologies will be developed for NavIC-based Precise Point Positioning (PPP) and Real-Time Kinematics (RTK). This will pave the way for adoption of NavIC in high-accuracy applications. Integration of NavIC into current and upcoming telecom technologies like 5G/6G is also planned. Indigenous development of NavIC-enabled GNSS Baseband ASICs (Application-Specific Integrated Circuits) is also a priority, promoting self-reliance in chipset manufacturing. Adoption into industry standards is a critical component for accelerating adoption in the market. This aspect will also be aggressively pursued. The main focus on expanding the NavIC constellation, enhancing signal diversity, accuracy and global coverage, promoting mass adoption through integration in consumer

devices and critical infrastructure, supporting domestic chipsets and receiver manufacturing, and fostering a vibrant private-sector ecosystem for application development. There will also be steps for extending service for lunar PNT.

This information was given by the Minister of State (Ind. Charge) Science & Technology; Earth Sciences and Minister of State PMO; Personnel, Public Grievances and Pensions; Department of Atomic Energy and Space Dr. Jitendra Singh in a written reply in Lok Sabha today.

NKR/AK

(रिलीज़ आईडी: 2298175) आगंतुक पटल : 1338
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