GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 1414

TO BE ANSWERED ON THURSDAY, JULY 31, 2025

STRENGTHENING INDIA'S SPACE PROGRAMME

1414. SHRI AKHILESH PRASAD SINGH:

Will the PRIME MINISTER be pleased to state:

(a) the current status of major satellite launch missions scheduled for this year and the manner in which these missions would strategically impact various sectors;

(b) the updates about collaborative projects with international space agencies and universities and the manner in which these partnerships are enhancing knowledge and technical expertise; and

(c) the ways in which space-based applications are being employed to improve agricultural productivity, increase the accuracy of weather forecasts and support timely disaster management in vulnerable regions?

ANSWER

MINISTER OF STATE IN THE MINISTRY OF PERSONNEL, PUBLIC GRIEVANCES & PENSIONS AND IN THE PRIME MINISTER'S OFFICE (DR. JITENDRA SINGH):

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(a) The major satellites scheduled for launch upto March 2026 are:

- NISAR: NISAR is a joint mission of ISRO and NASA. The main objectives of the satellite are to study land & ice deformation, land ecosystems, and oceanic regions of specific interest to the science community. NISAR mission will help to measure the woody biomass and its changes, track changes in the extent of active crops, understand the changes in wetlands' extent, map Greenland's & Antarctica's ice sheets, dynamics of sea ice and mountain glaciers, and characterize land surface

deformation related to seismicity, volcanism, landslides, and subsidence & uplift associated with changes in subsurface aquifers, hydrocarbon reservoirs.

- Oceansat-3A: To ensure the data continuity of Ocean colour and wind vector data to sustain the operational applications and improve the applications by providing additional datasets such as Sea Surface Temperature and more number of bands in Optical region and in Infrared region for atmospheric corrections.
- NVS-03: Third satellite in the second generation navigation satellites in Navigation with Indian Constellation (NavIC), to provide indigenous regional space-based navigation services.
- TDS-01: Technology demonstration communication satellite to demonstrate and derive flight heritage for electric propulsion for orbit raising, Indigenous 200W Ku-Band TWTA, opto quantum communication payload,
- GSAT-7R: To have on-orbit redundancy for operational continuity of the existing services and also enhancement over GSAT-7. The spacecraft shall be primarily used to cater wide maritime foot print.

The applications derived from these satellites are envisaged to support several sectors such as agriculture, weather prediction, climate change, secure communication, Positioning Navigation and Timing (PNT) services, oceanography, and other important national missions.

(b) Currently, space cooperative documents have been signed with 61 countries and five multilateral bodies. ISRO has realised joint satellite missions with other space agencies, accommodated other agencies' instruments in Indian missions, established ground station in other countries, exchanged data and expertise, carried out many joint experiments. Major collaborative projects that can be highlighted are:

- NASA-ISRO Synthetic Aperture Radar (NISAR) scheduled to launch from SDSC SHAR Sriharikota onboard ISRO Launch vehicle GSLV on July 30, 2025.
- ISRO has proposed for launching a 'G20 Satellite Mission for Environment and Climate Observation' announced by Hon'ble Prime Minister of India as a highlight of India's G20 Presidency for space community.
- ISRO will be collaborating with Japan's Aerospace Agency (JAXA) for the Joint lunar mission LuPEX/Chandrayaan-5.
- ISRO will be accommodating payloads from Russia & Sweden as part of its Venus Orbiter Mission (VOM)

In terms of academic collaborations, Department of Space has established a dedicated institute named “Indian Institute of Space Science and Technology (IIST) which offers undergraduate and post graduate programs related space technology and applications. IIST collaborates with international entities in faculty and student exchange programs and other joint activities.

The proposed international collaboration shall address the objectives of enhancing the capacity of the Indian space programme for advancing programmatic priorities, augmenting space science and earth observation data base, widening ground station networks, bettering products and services through joint experiments and creating platforms for inflow of expertise.

(c) Satellite data helps in monitoring crop health for timely and appropriate interventions. Very high-resolution satellite data is used for assessing the irrigation potential creation, for deciphering critical gaps to take corrective measures and thereby to achieve planned irrigation potential. Satellite data is also used in estimating the surface soil moisture and evapo-transpiration, to decide on the irrigation scheduling. Space inputs are used in assessing the post-kharif rice fallow areas suitable for growing pulses and oil seeds, for enhanced agricultural productivity. Space technology also is being used for generating value-added agro-met products, aiding the farmers for timely decisions on sowing, and other interventions. Satellite data also supports in mapping various aspects of soils such as soil texture, fertility etc., towards site-specific fertilizer recommendations to improve agricultural productivity.

Kharif sown area map is being generated using microwave satellite data, and is one of the major impact indicators as per National Drought manual 2020, towards operational implementation of national drought monitoring. Government-led initiatives such as the National Agricultural Drought Assessment and Monitoring System (NADAMS), developed by ISRO in collaboration with the Ministry of Agriculture and State agencies, utilize satellite data for drought monitoring at national level, which is important for managing agricultural productivity.

Space inputs are being used for weather monitoring and prediction in India. Weather prediction models that are run by India's weather agencies (such as IMD and NCMWRF) are

initialized using data from India's oceanographic (Oceansat series) and meteorological (INSAT-3DR/3DS) satellites. Satellite data derived land use/land cover (LULC) datasets enhance the model simulation accuracy.

Tropical cyclones, thunderstorms, and other extreme weather-producing systems are monitored and predicted using space-based observations from multiple satellites. With the introduction of satellite-based observations, the forecasting of extreme weather events has significantly improved.

Satellite data is being used for mapping & monitoring of major natural hazards or the damage caused by the natural hazards in India, including floods, cyclones, landslides, earthquake, forest fires, etc.

In recent years, major floods (riverine & cyclonic) are monitored and mapped by ISRO in about 15 States using satellite data. Flood Hazard Zonation atlases have been developed using historical satellite-derived flood data since 1998 for several major flood-prone states, including Assam, Bihar, Uttar Pradesh, West Bengal, Odisha, and Andhra Pradesh. Additionally, Flood Affected Area Atlas for India has been prepared, featuring historic satellite-derived flood inundation information. Operational Spatial flood early warning systems are developed for the Godavari and Tapi Rivers under National Hydrology Project and being run operationally since 2022 during monsoon periods.

Inventory of Landslides and damage assessment are done using high resolution satellite data, after major landslide triggering events. Landslide vulnerability atlas is prepared using the historic data on landslides mapped with the help of satellite data.

Forest fire locations are being monitored using satellite data, and forest fire alerts are being provided to the State & District Forest Officials through Forest Survey of India.

These space-based inputs are provided to MHA, NDMA and concerned State DMS Organisations, as well to NDRF, CWC, FSI, GSI, etc.

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