GOVERNMENT OF INDIA

DEPARTMENT OF SPACE

RAJYA SABHA

UNSTARRED QUESTION NO. 3814

TO BE ANSWERED ON THURSDAY, APRIL 03, 2025

UPDATES ON THE SPACE APPLICATIONS CENTRE OF ISRO

3814. DR. SASMIT PATRA:

Will the PRIME MINISTER be pleased to state:

(a) chronological details of the birth, growth and development of space applications centre in Indian Space Research Organisation (ISRO);

(b) details of the activities undertaken by space applications centre in the last five years;

(c) the manner in which ISRO is helping space applications centre's development through resources and manpower, details thereof; and

(d) the future roadmap for the growth of space applications centre of ISRO?

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 genesis of the Centre dates back to 1966, with establishment of the Experimental Satellite Communication Earth Station (ESCES), by late Dr. Vikram A Sarabhai in Ahmedabad. In 1972, the different units of ISRO in Ahmedabad pursuing research in applications of space technology were merged to form Space Applications Centre (SAC). A unique experiment called the Satellite Instructional Television Experiment (SITE) was conducted by SAC/ISRO during 1975-76. Hailed as 'the largest techno-social experiment in the world', SITE demonstrated the potential of satellite technology as an effective mass communication media, aimed at socio-economic development of rural India.

Space Applications Centre (SAC), is a major and unique multi–disciplinary research and development Centre of the Indian Space Research Organisation (ISRO). SAC

today stands high in each of its endeavour with its strong space research & development capabilities and continues to deliver world-class technologies and applications for various national, strategic, societal and technology demonstration missions of ISRO. These applications are in diverse areas and primarily meet the communication, navigation and remote sensing needs of the country. Located at Ahmedabad, SAC is spread across three campuses having multi-disciplinary activities apart from Delhi Earth Station (DES), which is located in New Delhi.

SAC has state-of-the-art electronic and mechanical fabrication facilities, highly sophisticated payload integration, climatic & environmental test facilities, systems reliability area, image processing and analysis facilities and project management support group.

(b) SAC is the lead centre in the development of key payload technologies for Earth Observation, Communication, Navigation and Space Exploration. Further, the Centre also develops various applications that cater to various user ministries in the field of Agriculture, Meteorology, Fisheries, Oceanography, Environment, Forest, Railways, Urban development etc.

The notable technologies that were developed by the Space Applications Centre for spacecraft payloads including S-Band SAR for NASA-ISRO Synthetic Aperture Radar (NISAR) mission, C-Band and X-Band Microwave Radars for RISAT series, Lander/Rover Cameras, Ka Radar Altimeters, Hazard Detection and Avoidance Sensors for Lunar Landing for Chandrayaan-3, demonstration of spectrum sensing, ADS-B, GNSS-R reflectometry, Pseudolite systems for RLV, High resolution Electro-optical payloads, Ka-band payload for high throughput satellites (50 Gbps), spread-spectrum modems for Gaganyaan crew communication system, Indian Atomic clock-Indian Rubidium Atomic Frequency Standard (IRAFS) for NavIC and Travelling Wave Tube Amplifiers (TWTA) for Communication satellites. Currently, a large number of payloads are under various stages of realization at SAC including, GSAT-7R, HRSAT Series, Resourcesat-3 series, Oceansat-3A, G20- Satellite, Indian Mauritius Joint Satellite (IMJS), GSAT-N3, IDRSS-2, payloads for Quantum Communication.

Various downstream applications developed and demonstrated for users include National Drought Portal for Krishi-Decision Support System (DSS), application

development for Yield Estimation System based on Technology (YES-Tech) program under Pradhan Mantri Fasal Bima Yojana (PMFBY), Geospatial Energy map portal of India, Sea Ice Advisories for polar expedition routes for National Centre for Polar and Ocean Research (NCPOR), System for national scale Crop Yield Estimation, Very short range weather forecast, Value added Agro-Met products for Gramin Krishi Mausam Sewa (GKMS), Hybrid weather prediction system for customized station specific weather forecast (transferred to Bihar Mausam Sewa Kendra (BMSK) for operational use), Satellite and in situ based data assimilative technique for ocean wave forecasting (transferred to Indian National Centre for Ocean Information Services (INCOIS) under the Ministry of Earth Sciences (MoES), Hyderabad), High Resolution Rapid Refresh (HRRR) methodology for using Doppler Weather Radars (DWR) data (transferred to India Meteorological Department (IMD), New Delhi), Satellite-based ocean drift model for search and rescue (transferred this application to National Operational Data Processing and analysis Centre (NODPAC)/ Indian Navy, Kochi), Monitoring of fishing boats with keel lengths <24m which is now being rolled-out nationally, Locomotive-mounted satcom terminals for tracking of trains for safety-of-life & train information, real-time aircraft tracking for aviation safety & fleet management, authentication geo-fixes for Unique Identification Authority of India (UIDAI) – Aadhar enrolment operatives, Indus river-level monitoring system, high-accuracy NavIC receivers for e-tolling applications for National Payments Corporation of India (NPCI).

(c) SAC objectives are realized and met with a well-planned strategy for a sustained capacity building through skilled human resources, establishment of state-of-the-art facilities, industry and academia participation and international cooperation under a well-defined policy support of ISRO. SAC has been proactively enhancing and upgrading the skills and competencies of internal human resource through standard as well as tailored training and development programs. SAC has systematic capacity enhancement plans at individual level to meet the organizational objectives, which also includes non-training interventions such as conferences, seminars, workshops at national as well as international levels. Higher education in premier academic institutions is also a part of the capacity enhancement strategy.

SAC has built a strong partnership with over 300 small, medium and large scale industries and commercial organizations specialized in various fields including RF,

Digital, Optical, Microwave, Mechanical, Electrical, Antenna, Scientific software, specialized materials etc. are presently associated with SAC. SAC has a well-established academia partnership programs for research in the areas associated with space technology, space science and exploration including RESPOND, STC etc.

SAC has state-of-the-art highly sophisticated payload integration laboratories, electronic & Mechanical fabrication facilities, environmental test facility, image processing, and analysis facilities.

(d) SAC has outlined a detailed technology roadmap, as a part of space vision 2047. It is envisioning a new paradigm of space borne observations for Earth system and Planetary studies with special emphasis on developing advanced Radars, LIDAR, Hyperspectral and Terahertz technologies with high quality analysis-ready data products and also advanced techniques for geophysical parameters retrieval and customised web-based solutions to meet various User requirements in the domain of Agriculture, Forestry, Coastal Zone Management, Meteorology, Fisheries, Urban Planning, Oceanography etc.

SAC has defined roadmap for development of Quantum technologies including Space Based Quantum Communication, Quantum Sensing and Quantum computing.

SAC has evolved roadmap for competitive & advanced Satellite Navigation (SATNAV) services and achieve larger penetration of NavIC applications across strategic, civilian and scientific domains; secure and self-reliant Satellite Communication (SATCOM) systems and applications; NavCom systems and applications for various Users all of which will be enabled by indigenous technology, products & services and propelled by Indian Industries/NGEs.

SAC has defined roadmap for state-of-the art capability and self-reliance in design and development of crew centric systems for Human Space Programme and ensure crew safety through specific human-rated R&QA practices.

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