

PARLIAMENT QUESTION: NATIONAL MISSION ON INTERDISCIPLINARY CYBER-PHYSICAL SYSTEMS (NM-ICPS)

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The Department of Science and Technology (DST) is implementing the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), with a total outlay of Rs 3660 crore for a period of nine years. The Mission, launched in 2018, aims to strengthen India's capabilities in emerging cyber-physical technologies such as Artificial Intelligence (AI), Machine Learning (ML), Internet of Things (IoT) & Internet of Everything (IoE), Data Analytics, Robotics and Autonomous Systems, Cybersecurity, Quantum Technologies, etc.

Under the Mission, 25 Technology Innovation Hubs (TIHs) have been established in premier academic institutions across the country to undertake activities under the following four broad categories:

- Technology Development;
- Human Resource Development (HRD) and Skill Development;
- Innovation, Entrepreneurship and Start-up Development; and
- International Collaborations.

Further, during 2025–26, four (04) best-performing TIHs have been upgraded as Technology Translation Research Parks (TTRPs) at IIT Kanpur, IISc Bengaluru, IIT (ISM) Dhanbad and IIT Indore, focusing on Cybersecurity, Robotics & AI Systems, Mining Technologies (Exploration to Beneficiation of Minerals) and Digital Healthcare, respectively, to accelerate technology translation and commercialization.

The cumulative outcomes achieved through the TIHs established under the Mission demonstrate significant progress in technology development, startup incubation, and industry partnerships, including development of more than 1100 technologies and 1300 technology products, and incubation of over 1130 start-ups.

A few of the remarkable technologies and initiatives developed/supported under the Mission are as follows:

- 5G-Advanced ORAN Massive MIMO Radio Unit (32TR RU) developed by the TIH at IIIT Bengaluru, enabling high-speed, reliable and cost-effective connectivity, particularly for unconnected and remote areas.
- Smart Mining and Edge-AI Monitoring Solutions developed by the TIH at IIT (ISM) Dhanbad, enabling reliable long-range drone connectivity (up to 50 km) for safe and efficient monitoring of mining operations.
- AI-enabled Smart Monitoring and Advisory Solutions developed by the TIH at IIT Bombay, comprising AI and IoT-based technologies for agricultural monitoring, decision support and productivity enhancement.

- BharatGen: A Suite of Generative AI Technologies for India, supported under Mission, is a strategic initiative led by IIT Bombay in collaboration with a consortium of leading academic institutions for developing indigenous, multimodal AI foundation models tailored to India's linguistic and sectoral requirements. The initiative is building sovereign AI capabilities through India-centric datasets and foundational models across multilingual text, speech and document intelligence. Key technologies developed under the initiative include Param-2, a 17-billion-parameter multilingual foundation model supporting all 22 Scheduled Indian languages, Shrutam speech-to-text and Sooktam text-to-speech models supporting 12 Indian languages, and Patram (DocBodh Framework) for conversational multilingual access to complex Indian documents. The initiative aims to strengthen India's indigenous AI ecosystem and enable secure, inclusive and locally relevant AI applications across strategic and public-interest sectors.

The Department has taken several measures to promote the adoption of cyber-physical technologies in strategic sectors under the NM-ICPS. As part of these measures, the Mission activities have been reorganized around priority Cyber-Physical Systems (CPS) verticals, each anchored by a Lead TTRP/TIH. These include Healthcare led by IIT Indore, Agriculture & Water Technologies led by IIT Bombay, Mining led by IIT (ISM) Dhanbad, Cybersecurity led by IIT Kanpur and Mobility & Autonomous Systems led by IISc Bengaluru. The identified verticals provide a focused framework for technology development, pilot deployments, industry partnerships, and translation of indigenous cyber-physical technologies to promote their adoption in strategic sectors such as manufacturing, healthcare, agriculture and smart infrastructure.

The roadmap under NM-ICPS focuses on strengthening research, innovation and technology commercialization through enhanced industry partnerships, promotion of translational research, and scaling up validated cyber-physical technologies for wider societal adoption. In this direction, four TTRPs have been established under the Mission to accelerate technology translation, commercialization and industry engagement in strategic sectors such as healthcare, smart manufacturing, mining and cybersecurity. In addition, enhanced funding support has been provided to three Technology Innovation Hubs (TIHs) at IIT Madras, IIT Hyderabad and IIT Bombay to strengthen translational research and technology commercialization. Through the coordinated efforts of the TTRPs and TIHs, the Mission aims to accelerate the transition of research outcomes and successful pilot deployments into scalable technologies and commercially viable solutions, while promoting innovation, entrepreneurship and skill development.

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.

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