

**GOVERNMENT OF INDIA
MINISTRY OF SCIENCE AND TECHNOLOGY
DEPARTMENT OF SCIENCE AND TECHNOLOGY
LOK SABHA
UNSTARRED QUESTION NO. 4318
ANSWERED ON 18/03/2026**

TECHNOLOGY TRANSLATION RESEARCH PARKS (TTRP)

4318. SHRI KESINENI SIVANATH:

Will the Minister of SCIENCE AND TECHNOLOGY be pleased to state:

- (a) the details of the institutions supported under the Technology Translation Research Parks (TTRP) initiative;**
- (b) the details of funds allocated and utilised by such institutions, year-wise;**
- (c) the details of the number and list of major research projects being undertaken by the supported institutions and the sectors of focus;**
- (d) the current status of commercialisation and application of the emerging technologies supported through such projects in the country, especially Andhra Pradesh, institution-wise; and**
- (e) the details of criteria used for selecting institutions under TTRP initiative and whether the Government plans to expand this initiative and if so, the details thereof?**

ANSWER

**MINISTER OF STATE (INDEPENDENT CHARGE) OF THE
MINISTRY OF SCIENCE AND TECHNOLOGY AND EARTH SCIENCES
(DR. JITENDRA SINGH)**

(a) Under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), the Department of Science and Technology (DST) has supported four (04) Technology Translation Research Parks (TTRPs) in 2025. Details of these TTRPs are as follows:

S. No	Name of TTRP	Host Institute (HI)	Focus Area of the TTRP
1	I-HUB for Robotics and Autonomous Systems Innovation Foundation	IISc Bengaluru	Robotics & AI Systems
2	IHUB NTIHAC Foundation	IIT Kanpur	Cybersecurity
3	Technology Innovation in Exploration & Mining Foundation	IIT (ISM) Dhanbad	Mining (Exploration to Beneficiation of Minerals)
4	IITI Drishti CPS Foundation	IIT Indore	Digital Healthcare

(b) For the financial year 2025-26, details of funds allocated and utilised by the TTRPs are given below:

S. No.	Name of TTRP	Allocated (amount in crores)	Utilised (amount in crores)
1	I-HUB for Robotics and Autonomous Systems Innovation Foundation, IISc Bangalore	60	44.17
2	IHUB NTIHAC Foundation, IIT Kanpur	32.5	29.86
3	Technology Innovation in Exploration & Mining Foundation, IIT (ISM) Dhanbad	43.43	14.01
4	IITI Drishti CPS Foundation, IIT Indore	40.15	24.03

(c) A total of 98 major research projects are being undertaken by the TTRPs. The TTRP-wise number of projects is as follows:

- **I-HUB for Robotics and Autonomous Systems Innovation Foundation: 08 projects**
- **IHUB NTIHAC Foundation: 56 projects**
- **Technology Innovation in Exploration & Mining Foundation: 07 projects**
- **IITI Drishti CPS Foundation: 27 projects**

The details of these research projects are provided in Annexure-I.

(d) Out of 98 projects mentioned in part (c) above, 10 projects have resulted in development of technologies/ technology products. The institution-wise status of commercialisation and application of the emerging technologies supported through such projects in the country is as follows:

- **I-HUB for Robotics and Autonomous Systems Innovation Foundation: 03**
- **IHUB NTIHAC Foundation: 01**
- **Technology Innovation in Exploration & Mining Foundation: 01**
- **IITI Drishti CPS Foundation: 05**

In Andhra Pradesh, IITI DRISHTI CPS Foundation, IIT Indore has supported the project “OASIS: Online Aerial Image-based Surface Information System” in collaboration with the Indian Institute of Information Technology Design and Manufacturing (IIITDM) Kurnool, Andhra Pradesh. The project has developed a semi-supervised semantic segmentation model for real-time drone-based object detection and classification. The technology is commercialised through the start-up

Bhoodrishti Pvt. Ltd., with application in sectors such as smart cities, defence, and border surveillance.

(e) Selection of institutions under TTRP initiative was done following a comprehensive review of the Technology Innovation Hubs (TIHs) under NM-ICPS during FY 2024-25, to assess their progress, outcomes, and readiness for long-term sustainability by a Third-Party Evaluation (TPE) Committee constituted for the purpose. Based on the outcomes of this evaluation, the top performing TIHs were invited to submit proposals for establishing TTRPs. The proposals were subsequently examined by the Scientific Advisory Committee (SAC) against criteria such as alignment with national priorities and NM-ICPS objectives, financial sustainability and operational roadmap, existing industry collaborations and commercialisation potential, capability to build a broad cyber-physical systems (CPS) research and skilling ecosystem, and synergy with existing TIH infrastructure and resources. Based on the SAC's recommendations, the Mission Governing Board (MGB) approved the establishment of the TTRPs as detailed in part (a) above.

The TTRPs are encouraged to further strengthen translational research, technology development and industry engagement in their respective focus areas, while expanding activities related to technology validation, prototyping and sector-specific applications. These efforts facilitate wider adoption of CPS technologies and support their deployment for public and societal use, leveraging the existing TIH ecosystem.

List of the major research projects being undertaken by the TTPRs under NM-ICPS

- I. I-HUB for Robotics and Autonomous Systems Innovation Foundation, IISc Bengaluru: Focus area- Robotics & AI Systems**
 - 1. Development of Autonomous Drones and VTOL UAV Systems for Demanding Environments**
 - 2. Automated Fleet Management and Charging Systems for UAVs**
 - 3. High-Performance Actuators and Modular Robotic Manipulators**
 - 4. Collaborative Robotic Systems for Adaptive Physical Rehabilitation**
 - 5. High-Precision AI-Enhanced Autonomous Navigation Modules**
 - 6. Frontline Health Worker Assistant**
 - 7. Intelligent Dengue Surveillance in Action**
 - 8. AI-powered Impact-based heat stress forecasting**

- II. IHUB NTIHAC Foundation, IIT Kanpur: focus area- Cybersecurity**
 - 9. Real-time Intelligent System Design for Secure Digital Communication**
 - 10. Cloud based Smart Video Surveillance System with Application Layer Cyber Physical Systems Security**
 - 11. Reliable and Privacy Preserving Data Auditing for FOG assisted Cyber Physical Systems (FOG-CPS)**
 - 12. Predictor and Analyzer of Security Threats (PAST): A model-based risk analysis framework for critical interconnected infrastructures**
 - 13. Smart Cyber-Physical Security of Electric Powertrains in Autonomous e-Mobility Systems**
 - 14. Development of Cognitive Cyber Physical (C2PS) Testbed**
 - 15. Novel Security Framework for Internet of Drones**
 - 16. Design and Implementation of Secure Service and Attribute-based Authorization Model in Dynamic and Constrained-specific IoT Environment**
 - 17. Securing Deep Neural Networks against Adversarial Attacks in Medical Imaging**
 - 18. Mitigation of cyber-attacks in power systems using non-linear control system design**
 - 19. Design and Implementation of Lightweight Key Management Protocol for Securing Industrial Control Systems**
 - 20. Design and development of Cybersecured Smart Power interface for Energy - Local area network (E-LAN)**
 - 21. Blockchain and Microgrid: Implementation of a Peer-to-peer Energy Marketplace in India for the Average Joe**

- 22. Design and Implementation of a Secure Scan Test Architecture to Counter Scan-based Side-channel Attacks**
- 23. Development of Machine Learning Models Resistant to Cyber Physical Attacks**
- 24. Cybersecurity of critical infrastructure: National-level Medical Grid System**
- 25. Malware Analysis using Machine Learning Techniques for Industrial Control System**
- 26. Bot Prevention in Cyber Physical Systems**
- 27. Neuro-memristive PUF for Biometric Sensing Chip**
- 28. Smart data agent for location management and privacy**
- 29. A fault attack resistant crypto-accelerator for ultra-lightweight encryption protocols of GIFT family in RISC-V architecture.**
- 30. Risk Averse Resilience Framework for Critical Infrastructure Security**
- 31. Secure Drones: Analyze, Deploy, and Decide Cryptographic Modules in UAVs**
- 32. Detecting collusion and data manipulation attacks in smart-grid networks**
- 33. Synthetic Data Generation using Machine Learning Algorithms in Cyber Physical Systems**
- 34. Development of a complete authentication system using printed RRAM based PUFs**
- 35. Team-HackIT: A Web-Based Testbed for Multiplayer Cyber Deception Experiments**
- 36. Security Enhancement of SELinux/SEAndroid Policies**
- 37. Vulnerability discovery and liveness detection for improving the security in biometric authentication systems**
- 38. Siegebriker II: End-to-middle Covert Internet Communication Using Programmable Network Hardware (Deceptive Communication Strategies)**
- 39. Programmable cryptosystem for 5G telecommunication networks**
- 40. Internet Data over the Cellular Voice Channel -- Deceptive Communication Strategies**
- 41. Verified Communication Protocol Implementation for Internet of Things**
- 42. SecAI HSM- Machine Learning based malware and botnet prevention Hardware Security Module on Unmanned Aerial Vehicles**
- 43. Steps towards human-centered audit process for cybersecurity audits in the safety-critical sector in India**
- 44. Digital Twin-based Intrusion Detection System Using Federated Learning for IoMT**
- 45. Intrusion Detection in Network Slices and Software-Defined Networking**

46. **Design and Development of Real-Time Anomalous Electrical Power Consumption Detection Tool for Critical Devices of Cyber-Physical Systems**
 47. **Scalable and Adaptable Scheme for Intrusion Detection in Smart Power Networks**
 48. **Design and Analysis of Multivariate Digital Signature as post-Quantum candidate in NIST**
 49. **Development of AI-Enabled National Portal for Efficient Search of Missing People**
 50. **A Scalable Consensus and Energy Efficient Blockchain Enabled Healthcare System**
 51. **Enhancing Electric Vehicle Security- AI-Powered Detection and Prevention of Cyber Attacks**
 52. **System design for an acoustic-based attack on UAV and its mitigation mechanism**
 53. **A Multi-Layer Approach for Secure UAV Networks**
 54. **Cyber Threat Intelligence based Advanced Persistent Threats Detection and Attribution System for Critical Infrastructure of Cyber Physical Systems**
 55. **Study of NAVIC and Opti Flow based Drone Systems in GPS Denied Environment**
 56. **Proactive and Generalized Deepfake Defense Mechanisms to Reinforce Cyberspace**
 57. **Designing a Cybersecured LoRaWAN Framework-Enhancing Jamming Mitigation and Device Authentication**
 58. **Design and Validation of Secure CAN-XL protocol IP core for Software defined Vehicles**
 59. **Targeted Cryptanalysis of Multisource Encrypted Data**
 60. **Design and Implementation of a Decentralized Data Auditing Platform using Algebraic Signature and Zero-Knowledge Protocol (ZKP)**
 61. **Multi-Authority ABAC Framework for Secure Cross-Domain IoT Resource Sharing**
 62. **Adversarial Machine Learning Analysis Framework for Medical Imaging**
 63. **Cybersecurity Analysis of Networked Microgrid**
 64. **Blockchain and Microgrid: Implementation of a P2P Energy Marketplace in India**
- III. Technology Innovation in Exploration & Mining Foundation, IIT (ISM) Dhanbad: focus area- Mining (Exploration to Beneficiation of Minerals)**
65. **Design and development of an advanced CPS-based solutions and AI/ML/Deep learning algorithms for mineral exploration**

66. **Pathways to Net-Zero Mining: Integrating Green Energy, Autonomous Technologies and the Circular Economy in Mineral Resource Management**
67. **Artificial Intelligence & Machine Learning in Mineral administration**
68. **To develop a world-class supply chain observatory for critical mineral supply chain resilience**
69. **Development of Ground-Based Synthetic Aperture Radar (GBSAR) System**
70. **Establishing the Asia-Pacific Clean Energy Supply Chain (APCESC)**
71. **Digital Mining Infrastructure for Indian Mines**

IV. IITI Drishti CPS Foundation, at IIT Indore: Focus area - Digital Healthcare

72. **SWASTi-DT: A Digital Twin for monitoring Space Weather Effects on orbiting satellites.**
73. **Simuliware: A digital twin based low-cost shopfloor simulation solution for MSMEs**
74. **iGLU : Intelligent Glucose Measurement Device**
75. **Remote multimodal point-of-care health diagnostic and consultancy system**
76. **OASIS: Online Aerial image-based Surface Information System**
77. **UAV based Smart Spraying system for Agriculture**
78. **Generation and visualization of neural radiance field-based digital twin for autonomous vision-based SHM**
79. **Artificial intelligence enabled portable slit lamp-smart phone device for ophthalmological examination**
80. **Medication Management System**
81. **Wireless Real-Time Passenger Counting System**
82. **iHealth: IoT-Enabled Ancillary Support for Rural Health-Center**
83. **SARVAKSH Strategic, AI-Reinforced, Vectorized, Adaptive, Kinetic and Secure Haven**
84. **Development of a Cyber-Physical System for Road and Infrastructure Monitoring and Maintenance**
85. **Development of a Low-Cost Digital Instrumentation System for Angular Position Measurement of a Rotating Shaft using Tunnelling Magneto-Resistance Angle Sensor**
86. **Development of 3D holography based digital twin technology for an induction motor for predictive maintenance**
87. **E-Nose:Design and Development of an Electronic nose for Aroma analysis and Evaluation in Ayurveda**
88. **TrisEase: Physiotherapy solution for Trismus**
89. **Designing remote PPG based Heart estimation system for face mask videos**

- 90. AI based virtual assistant to support primary education for rural students in regional language**
- 91. AI-guided portable system for adulteration and dilution detection in Basmati rice**
- 92. Agri-Genomics Data Management Platform**
- 93. Development of multiwalled carbon nanotube voltage sensor using copper oxide nanofluids**
- 94. Design of FBG Assisted AI Based Plantar Pressure Measuring Device For Clinical Applications**
- 95. Design and Development of Wireless Flexible Electronics Nasal-WiFlen Mask for Respiratory Breathing Assessments**
- 96. Continuous closed CSF Glucose Monitoring using CGM sensor in patients with External ventricular drainage for early detection of CSF Infection**
- 97. Capacity Building in Cyber Physical Systems**
- 98. Quality of life in cancer in Indian context: Development of digital interface for Indian Context.**
