NATIONAL MISSION
ON INTERDISCIPLINARY CYBER-PHYSICAL SYSTEMS

QUARTERLY BULLETIN

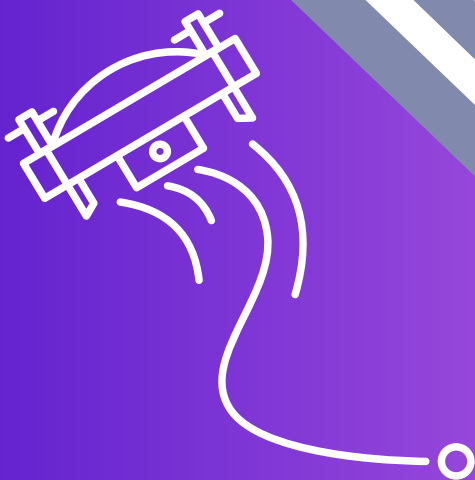**APRIL 2025**

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विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY
सत्यमेव जयते

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

About

National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)

The Union Cabinet approved the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) in December 2018 at a total outlay of Rs. 3660 Crores for a period of five years which was further extended for four years is implemented by the Department of Science and Technology (DST).

Under the NM-ICPS, 25 Technology Innovation Hubs (TIHs) have been established in reputed institutes across the country. Each hub is a Section-8 Company, an independent entity within the Host Institute and has been assigned a Technology Vertical in the areas of advanced technologies such as Artificial Intelligence and Machine Learning: Technologies for Internet of Things & Internet of Everything; Data Banks & Data Services, Data Analysis; Robotics & Autonomous Systems; Cyber Security and Cyber Security for Physical Infrastructure; Quantum technologies etc.

The Mission aims at development of technology platforms to carry out R&D, translational research, product development, incubating & supporting start-ups as well as commercialization. The Mission is being implemented with all the TIHs undertaking activities under the four major categories i.e.,

1. Technology Development

2. Entrepreneurship Development

3. Human Resource Development

4. International Collaborations

Objectives of the Mission:

1. Technology Development, translational research and commercialization in Cyber-Physical.

2. Adoption of CPS technologies to address India specific National / Regional issues.

3. Produce Next Generation skilled manpower.

4. Catalyze Translational Research.

5. Accelerate entrepreneurship and start-up ecosystem development in CPS technologies.

6. Give impetus to advanced research in CPS technologies and higher education in Science.

7. Bring India at par with other advanced countries and derive several direct and indirect benefits.

NM-ICPS is a comprehensive mission that brings together Academia, Industry, Government and International Organizations. The mission has created an ecosystem that fosters entrepreneurship, develops next generation skilled manpower, catalyses translational research and promotes the commercialization of CPS technologies. NM-ICPS is an ambitious initiative that has the potential to transform key sectors of the Indian economy like healthcare, transportation, education, infrastructure & defence make them more efficient, safe, and sustainable to place India at par with other advanced countries.

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IIT Palakkad Technology IHub Foundation
EDUCATE . INNOVATE . IMPACT   Driving automation for energy and safety

IIT Palakkad Technology IHUB Foundation (IPTIF)

Hub Overview

IIT Palakkad Technology IHUB Foundation (IPTIF) works on Intelligent Collaborative Systems (ICS) & aims to create a strong foundation and a seamless ecosystem for Cyber-Physical Systems, attracting available nationwide potential and harnessing expertise to foster research innovation, technology, and product development. IPTIF is dedicated to enabling a vibrant innovation ecosystem by providing a reliable platform for developing technologies on ICS, with special focus on energy and safety domains, by innovators, entrepreneurs and startups to engage in activities that create value for the local, national, and international ecosystem.

Project & Startup Updates:

The TIH supported the development of an Edge AI-based ADAS for Autonomous Vehicles, featuring a unified framework with perception, localization, path planning, and motion control modules. Integrated with ZED SDK and YOLOv8, it enables real-time detection of vehicles, pedestrians, and traffic lights for safe autonomous navigation. Optimized for Jetson Orin Nano with TensorRT, it ensures low latency and fast response, enhancing road safety and smart mobility.
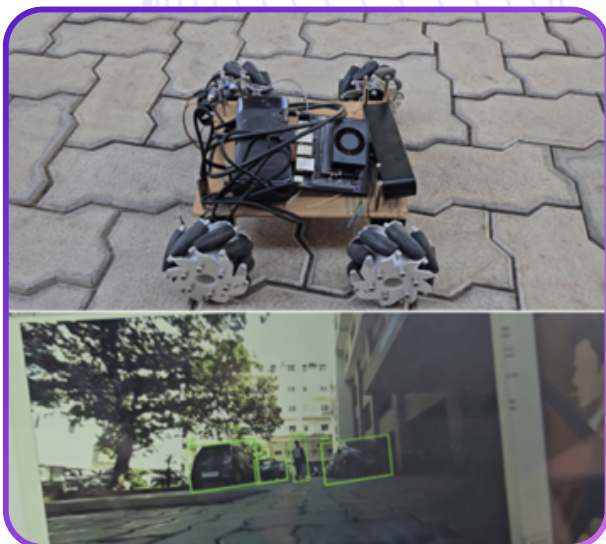
TIH supported startup Savtoa Software Technologies Pvt Ltd has developed SAV 1001, a 1.5m dual-hull Autonomous Surface Vessel (ASV) designed for high-precision hydrographic surveying. Equipped with RTK GPS, sonar, and SAVI Survey Software, it enables autonomous mission execution, real-time data acquisition, and sub-centimeter accuracy. Its twin-thruster propulsion and durable FRP hull support reliable, automated surveys, as demonstrated in a successful deployment at Chittikara Quarry. With advanced mapping, swarm coordination, and efficient data collection, SAV 1001 is a scalable, cost-effective solution for inland water surveys, coastal monitoring and environmental research.

Collaborations:

IPTIF, successfully conducted an advanced-level short-term online course on PV Integration to Grid: Modelling, Analysis, and Control from 18th to 22nd February 2025. Led by Prof. Bikash Pal (FIEEE) from Imperial College London, the course offered global perspectives and practical insights into PV-grid integration. It was attended by 57 participants worldwide, including industry experts, faculty, students, and researchers.

Skill Development:

IPTIF successfully concluded a three-day workshop on Data Analytics for Strategic Impact led by Mr. Lomin Joy, Senior Project Engineer, IIT Palakkad, at PMA SAFI HR Institute, Malappuram, Kerala. Over 50 students took part in this and it provided participants with certificates upon successful completion.

Bio-CPS

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BITS Pilani

BITS BioCyTiH Foundation

Hub Overview

BITS BioCyTiH Foundation is a Section-8 Company of BITS Pilani that aims to foster Research, Innovation, Skill Development & Training in Bio-CPS through mentoring and nurturing startups and entrepreneurs, and industry academia collaborations to undertake cutting edge research and provide affordable solutions in the areas of healthcare, agriculture, water and environment.

Project Updates:

A key project currently underway is the development of Tooth-Colored Alumina Dental Braces. The project has successfully created eco-friendly alumina feedstock and optimized micro ceramic injection molding (μ-CIM) parameters. It has also attracted industrial collaboration with S&S Advance Ceramics Pvt Ltd for commercialization, with two patents in preparation.
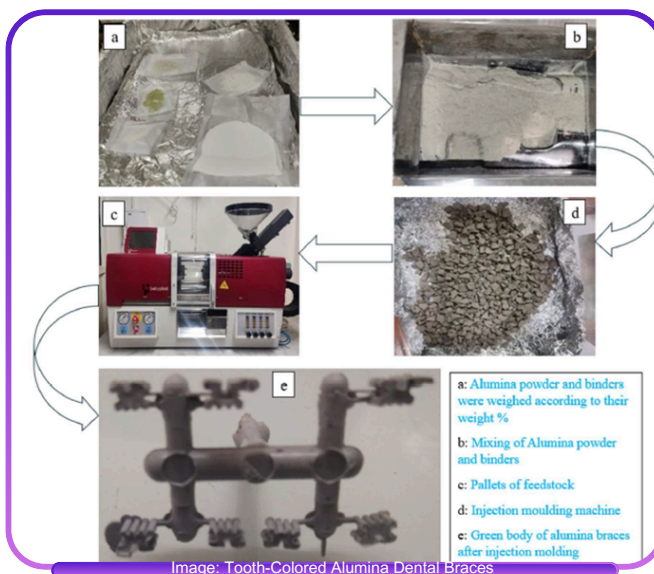

a: Alumina powder and binders were weighed according to their weight %
b: Mixing of Alumina powder and binders
c: Pallets of feedstock
d: Injection moulding machine
e: Green body of alumina braces after injection molding

Image: Tooth-Colored Alumina Dental Braces

Image: Training programs to enhance skills

Skill Development & Deployments:

The TIH conducts various workshops and training programs to enhance skills and foster innovation across emerging technologies. As part of this initiative, and in collaboration with Cellink, the TIH organized a 3D Bioprinting Workshop on March 18, 2025, at BITS Pilani, Hyderabad Campus. This workshop provided participants with in-depth, hands-on training in bioprinting applications, particularly focused on tissue engineering and drug development. Experts from academia and industry shared insights into the latest advancements in bioprinting technologies, offering participants a comprehensive understanding of its real-world applications. The event also served as a platform to encourage interdisciplinary collaboration and promote research in biomedical innovation.

Women's Contribution in Research & Innovation:

The TIH actively supports women in science and technology, with 22 women researchers across faculty, postdoctoral, PhD, and master's levels are contributing to various projects. These researchers play a key role in advancing innovations in healthcare, diagnostics, and sustainable technologies.
The foundation has also incubated eight women-led startups, showcasing the entrepreneurial potential of women in STEM.

Intelligent Collaborative Systems

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IIITB COMET Foundation

Hub Overview

IIITB COMET Foundation is set up to spearhead innovations in the next generation of communication systems, indigenously develop technologies to power 5G communication address the critical demand of seamlessly connecting people, businesses & industries, and lay the foundations for 6G networks. IIITB COMET Foundation initially is focusing on the verticals of 5G infrastructure as well as 5G applications such as Industrial IoT, eHealth, education, automotive V2X, AI/ML and AR/VR.

Project Updates:

The TIH funded projects successfully tested three variants of Reconfigurable Intelligent Surfaces (RIS) tiles, all designed and fabricated from scratch. These tiles were evaluated in a standards-compliant testbed, marking a significant step toward advancing RIS technology.

Image: Variants of Reconfigurable Intelligent Surfaces (RIS) tiles

Skill Development:

On March 17, 2025, TIH in technical collaboration with TSDSI and with support from Bharat 6G Alliance conducted a workshop on RIS technology. With over 25 speakers from across the country, the workshop was attended by more than 100 participants. The speakers and participants were from academia, government organizations, and the industry.

The TIH initiated a certificate course on Future Wireless Communication (FWC) in February 2025 at the IIITB campus, through the IIITB COMET Foundation. The course is structured into three modules over an 8-month duration, covering key areas such as digital embedded systems design and 5G standards, aimed at building skilled talent for next-generation wireless technologies.

Image: Course on Future Wireless Communication (FWC)

Image: workshop

Collaborations:

Collaborations: The TIH is expanding collaboration opportunities with industry partners. Tejas Networks is in the process of signing a master research agreement to develop and commercialize RIS technology, while Niral Networks has signed an MoU for joint development of future wireless communication technologies.

Women's Contribution in Research & Innovation:

The TIH has onboarded Stonesoup, a completely women-led startup, as part of the COMET 5G Springboard event, where it will receive both technical and business support. Additionally, during the RIS workshop held on March 17, 2025, three women researchers—Smriti Kumar, Shubhika Mishra, and Anjana, all Ph.D. scholars—actively contributed by presenting the COMET RIS testbed at IIIT Bangalore, showcasing the impactful involvement of women in cutting-edge technology development.

Advanced Communication Systems

IHUB NTIHAC Foundation (C3iHub)

Hub Overview

C3iHub (Cybersecurity and Cybersecurity for Cyber-Physical Systems Innovation Hub) addresses cybersecurity issues of the Cyber-Physical Systems and devises technologies to protect. C3iHub focuses on verticals: critical infrastructure-security, UAV-security, tamper-proof data storage and cybercrime prevention, and associated horizontal layers: hardware security, network security, firmware security, etc.

Project Updates:

Recent advancements include Phase II of Security Audit and SOC installation at major ports under IPA, the rollout of blockchain-based SSI employee ID cards for entry-exit management at IIT Kanpur, and cybersecurity training programs for MoP, NIC, HQCC Lucknow, and MHA's Cyber Commandos. Additionally, a hackathon attracted over 7,000 participants in solution and start-up tracks, showcasing innovation in cybersecurity.
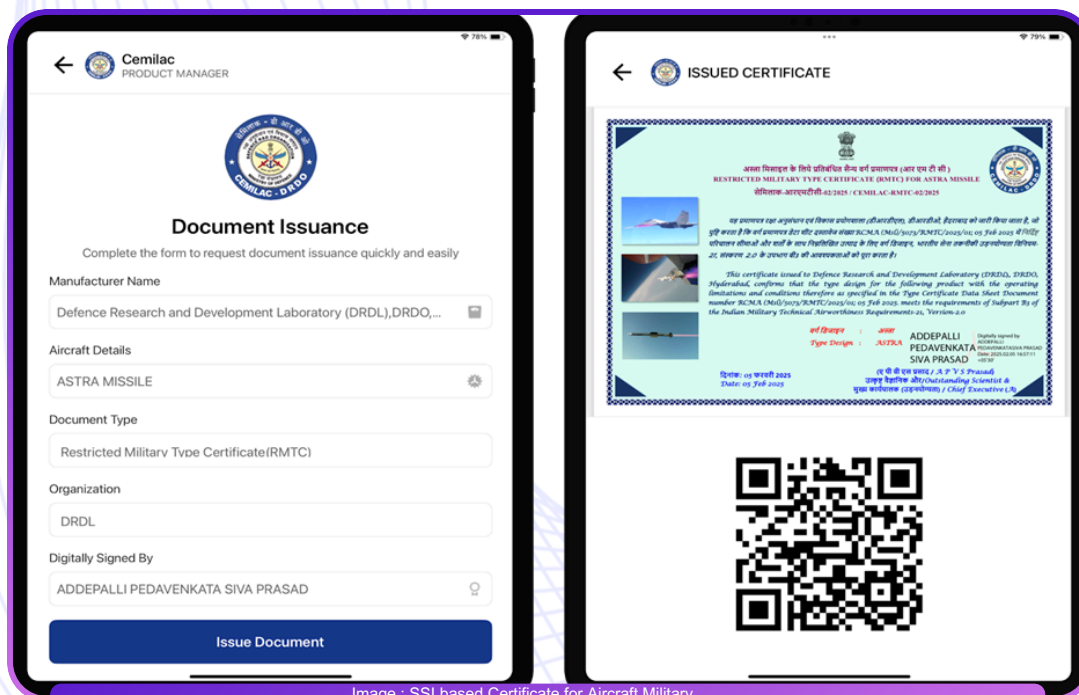
Image : SSI based Certificate for Aircraft Military

Skill Development:

HackIITK 2025, a flagship global cybersecurity hackathon organized by IIT Kanpur's C3iHub, witnessed over 7,000 participants tackling real-world challenges in IT Security, Web3 Security, AI/ML Security, and more across Solution and Startup Tracks. Supported by industry giants like BEL, AWS, and Siemens, the event showcased cutting-edge innovations, including blockchain-based SSI systems for IIT Kanpur's campus and military aircraft certification. The hackathon concluded with significant prizes worth ₹30 lakhs and highlighted India's growing prominence in cybersecurity innovation.

Women's Contribution in Research & Innovation:

The TIH supports a diverse group of women in engineering and research. It includes 30 women engineers and research engineers, 11 projects led by women principal investigators under Spoke and Spike initiatives, and 38 women as research scholars, undergraduates, and interns. Additionally, it supports three start-ups founded by women, promoting innovation and entrepreneurship.

Cyber Security and Cyber Security for Physical Infrastructure

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IIT Madras

IITM Pravartak Technologies Foundation

Hub Overview

IITM Pravartak Technologies Foundation is the Technology Innovation Hub (TIH) of IIT Madras. IITM Pravartak focuses on new knowledge in SNACS through extensive and application-oriented research and gladly prepares young India for the next generation of world-class technologies. IITM Pravartak contributes to the areas of national priority such as health care, agriculture, education, infrastructure and upskilling, including targeted training for economically weaker sections

Startup Updates:

DataCorp Engineering Innovations Private Limited, incubated by IITM Pravartak Technologies Foundation, has developed innovative solutions in Agriculture, Robotics, and Enterprise Software to empower small-scale farmers. The startup has specialized in creating semi- and fully autonomous farm equipment, starting with compact de-weeding tools, and has planned to expand into machines for seeding, planting, fertilizing, and harvesting. It has enhanced

farm productivity, reduced labor intensity, and optimized resource use through cost-effective, high-performance agricultural technologies.

Skill Development:

The Advanced Master's Program in Aviation Safety Management (ASM), jointly offered by IITM Pravartak Technologies Foundation and École Nationale de l'Aviation Civile (ENAC) with Airbus support, has provided aviation professionals with specialized training to become proficient Aviation Safety Managers. This 24-month hybrid program, comprising 12 modules and a 6-month dissertation, has combined in-person workshops and online sessions to deliver a flexible learning experience. Participants have gained expertise in Safety Management Systems (SMS), Risk Assessment, Regulatory Compliance, State Safety Programs, and Stakeholder Engagement, while ENAC's global perspective has enhanced industry relevance. Graduates have acquired practical skills to manage aviation safety risks effectively, ensuring compliance and fostering safer aviation operations worldwide

Sensors, Networking, Actuators & Control Systems (SNACS)

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Divyasampark IHUB Roorkee for Devices Materials & Technology Foundation

Hub Overview

iHUB DivyaSampark at IIT Roorkee is a Technology Innovation Hub that aims to enable innovative ecosystem in CPS and becoming the source for the next generation of digital technologies, products and services by promoting translational research, enhancing core competencies, capacity building, training to provide solutions for national strategic sectors and becoming a key contributor to 'Digital India' and 'AatmaNirbhar Bharat'. The Hub is working as a networked platform, acting as a cushion between different stakeholders like researchers, industry, startups, policymakers, investors (Angel, VC, PE) and opening doors for global partnerships to push the boundaries of innovation.

Startup Updates:

Behave Neu, a start-up supported by the TIH has revolutionized learning by integrating neuroscience, technology, and gamification to enhance focus, memory, and creativity in young minds. Through advanced Brain-Computer Interface (BCI) games, it has made learning both engaging and impactful. Behave Neu has pitched for Shark Tank USA Season 17 at CES.
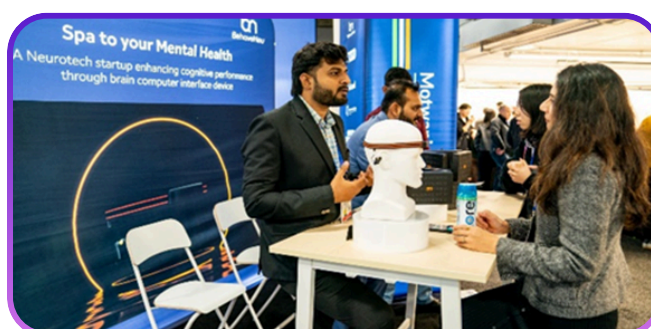
Skill Development:

The Spoke Hub "iHUB Shivalik" has established the Center of Business Incubation & Innovation (CBII) at Shivalik College of Engineering, Dehradun. This event has been graced by Hon'ble Shri Ram Nath Kovind Ji, Former President of India, and Shri Dhan Singh Rawat Ji, Education Minister of Uttarakhand. This state-of-the-art lab has driven groundbreaking innovation and research, featuring a Laser Cutting Zone for precision-driven prototyping, a PCB Printing Zone for advancing fabrication, a 3D Printing Zone, and much more. It has marked a major leap towards deep-tech innovation, entrepreneurship, and technological excellence

Collaborations:

DTOWN Robotics Private Limited has been committed to revolutionizing the future with robotics, drones, and technology. Its 'Mauli Robot,' developed in collaboration with the Uttarakhand Police Drone Team, has taken center stage by bringing a futuristic twist to the National Games Medal Ceremony.

Device Technology and Materials

IIT Ropar Technology & Innovation Foundation

Hub Overview

The goal of iHub - AWaDH is development of technologies to support environmentally sustainable and profitable agriculture, quality food for all, and the preservation of biodiversity. It aims at providing technological solutions to he Agricultural & Water related issues through deployment of CPS in Food Processing, Rural Development, Fisheries, Textiles, Electronics, Fertilizer, Atomic Energy etc.

Startup Updates:

The TIH organized the PRAGATI Summit 2025, marking a major milestone in promoting entrepreneurship, deep-tech innovation, and ecosystem development. The summit enabled over ₹2.6 Cr in grants, ₹60L through the Ideathon, and ₹1.3 Cr for Sanitation and Water Action for Conserving Humanity (SWACH) startups. Key launches included the GENESIS Startup Grant, DRONAGIRI GIA, and a Small Farmholding Survey Report. Strengthening CPS collaborations, the quarter also laid the groundwork for upcoming initiatives such as the WISE Fund (₹2 Cr+) for women-led startups, a ₹1 Cr AI-powered Water Lab, nationwide SPRINT editions, and the PRAGATI Accelerator, further propelling impactful innovation.

TIH-supported startup Animeta is revolutionizing affordable, antibiotic-free animal healthcare through an AI-powered disease diagnosis chatbot, accessible via mobile apps and WhatsApp. With backing from IIT Ropar and AWaDH, it has reached 2 lakh+ farmers across Tamil Nadu, Maharashtra, Punjab, and Uttar Pradesh, saving over ₹100 crore in veterinary costs. In partnership with Nestlé, Lactalis India, and NDDB's Milk Producer Companies, and with support from Social Alpha and Benzai10, Animeta is improving milk quality, farmer livelihoods, and has earned the Bharat Agripreneur Award 2024.

Deployment:

NanoAqua Nanobubble Generator, developed at AWaDH by Dr. Neelkanth Nirmalkar (IIT Ropar–TIF AWaDH), is India's first sustainable, chemical-free water treatment solution, now at TRL-9. This innovative system enhances oxygenation, reduces organic sediment, and improves water quality across lakes, ponds, aquaculture, and industrial sites. Deployed across 10+ locations, it includes pilot installations in Rang Sagar Lake (Udaipur) and Phool Kalan (Punjab), with successful self-financed implementations in seven additional locations.

The TIH deployed AWaDH CPS Labs at two academic institutions and one industry institute. These include IIIT Una, Himachal Pradesh, IILM University, Noida, Uttar Pradesh, and their first industry collaboration with CICU (Chamber of Industrial & Commercial Undertakings), Ludhiana, Punjab. Additionally, the TIH established their first AWaDH Tinkering Lab at Tula's School, Dehradun.

Women's Contribution in Research & Innovation:

Women at AWaDH are making significant contributions across technology development, entrepreneurship, and research, driving deep-tech innovations in CPS, agriculture, and water technology. In technology development, 5 women researchers are actively involved in impactful projects. A total of 53 women entrepreneurs have been supported to scale their startups, while 56 women researchers have benefited from fellowships to advance their work. Through mentorship, training, and research opportunities, iHub - AWaDH is empowering women to lead cutting-edge innovations and transformative solutions in deep-tech sectors.

Technologies for Agriculture & Water

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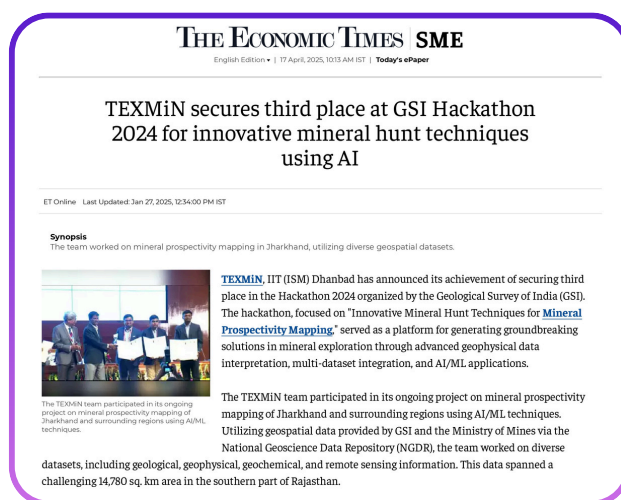# Technology Innovation in Exploration & Mining Foundation (TEXMiN)

Hub Overview

Technology Innovation in Exploration & Mining (TEXMiN), the Mining Technology Innovation Hub has been set by GoI at IIT (ISM) Dhanbad, under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS), to undertake Technology Development, Capacity Building, and promote Innovation & spur Start up-eco-system in the mining sector to achieve 3S Mining (Safe, Smart, and Sustainable Mining leading to Mining 4.0).

Project Updates:

TEXMiN began 2025 with a major win, securing 3rd place at the GSI Hackathon 2024, organised by the Geological Survey of India. Centered on "Innovative Mineral Hunt Techniques," the event focused on using AI/ML, geophysical data, and multi-dataset integration for mineral prospectivity mapping. TEXMiN's solution, based on its ongoing work in Jharkhand, analysed geospatial data over 14,780 sq. km in southern Rajasthan. The award was announced on January 19, 2025, during the 64th CGPB meeting, with top officials from the Ministry of Mines and GSI present. Shri V. L. Kantha Rao presented the award, praising TEXMiN's innovation in Mining 4.0 under the leadership of Prof. Partha Pratim Mandal.

THE ECONOMIC TIMES | SME
English Edition • | 17 April, 2025, 10:13 AM IST | **Today's ePaper**

TEXMiN secures third place at GSI Hackathon 2024 for innovative mineral hunt techniques using AI

ET Online   Last Updated: Jan 27, 2025, 12:34:00 PM IST

Synopsis
The team worked on mineral prospectivity mapping in Jharkhand, utilizing diverse geospatial datasets.

TEXMiN, IIT (ISM) Dhanbad has announced its achievement of securing third place in the Hackathon 2024 organized by the Geological Survey of India (GSI). The hackathon, focused on "Innovative Mineral Hunt Techniques for Mineral Prospectivity Mapping," served as a platform for generating groundbreaking solutions in mineral exploration through advanced geophysical data interpretation, multi-dataset integration, and AI/ML applications.

The TEXMiN team participated in its ongoing project on mineral prospectivity mapping of Jharkhand and surrounding regions using AI/ML techniques. Utilizing geospatial data provided by GSI and the Ministry of Mines via the National Geoscience Data Repository (NGDR), the team worked on diverse datasets, including geological, geophysical, geochemical, and remote sensing information. This data spanned a challenging 14,780 sq. km area in the southern part of Rajasthan.

Collaborations:

TEXMiN was honored to participate in the UK-India High-Level Intergovernmental Policy Roundtable on Critical Minerals—a key forum shaping the future of mineral exploration and sustainability. The discussion covered India's National Critical Mineral Mission, policy gaps, and strategies for resilient, collaborative supply chains. We thank all stakeholders for their insights, which will further empower TEXMiN's mission to fast-track the adoption of Mining 4.0.

TEXMiN, in collaboration with IIT(ISM) Dhanbad, successfully organized the Industry-Institute Interaction 2025 (III-2025) Workshop, focusing on smart mining, CPS, critical minerals, and sustainable energy. As key outcomes, TEXMiN received a work order from MOIL, signed an MoU with Deepak Fertilisers, and partnered with BIT Sindri, IIEST Shibpur, NIT Rourkela, and VNIT Nagpur to establish Mining CPS CoEs.

Women's Contribution in Research & Innovation:

Women have played a significant role in contributing to the growth and innovation of the TIH. The hub currently engages 17 women researchers in various capacities, including Project Investigators, Associates, Assistants, and Fellows across undergraduate, postgraduate, and doctoral levels. Notably, three women serve as PIs or Co-PIs leading critical research initiatives. Additionally, four women employees and consultants support core operational and strategic functions at TEXMiN.

Technologies for Mining

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IIIT- H Data I- Hub Foundation

Hub Overview

IIIT- H Data I- Hub Foundation (iHub-Data) is dedicated to enhancing national research and deploying solution in data banks, data services, data analytics. The Hub aims at putting together large-scale datasets as well as developing solutions based on such datasets through applied research. The research is primarily focused towards creating the highest global academic standards for the betterment of society

Project Update:

The TIH launched India-data.org in January 2025. It is an integrated ecosystem designed to enhance dataset sharing and model publication in artificial intelligence and machine learning (AI/ML). Built entirely on open-source technologies, the platform brings together a dataset repository, analytical tools, and an AI/ML challenge platform to support robust research and development. With 1.6 petabytes of storage and a 96 GPU cluster, it offers the infrastructure needed to handle large datasets and complex computations. By enabling seamless access to India-specific datasets and fostering collaboration among researchers, policymakers, and industry leaders, India-data.org drives translational impact across sectors.

Collaboration:

The TIH signed Memorandums of Understanding (MoUs) with several prominent organizations, including Tekyz Tech India Private Limited, GeoVista, HDFC Parivartan, Fiacre Telematics, SRK Engineering College, Sparsh Communications, and Navier Missions Pvt Ltd, marking a significant step towards fostering collaboration and innovation in the field of data and technology.

Skill Development:

The TIH organized the 13th Workshop on Excitement of Research on March 9, 2025, offering students an opportunity to engage with IIITH's vibrant research ecosystem through keynote talks by distinguished faculty, interactive research presentations, and discussions on the role of research in industry.

The TIH also hosted the Symposium on Improving Driving Behavior in India, bringing together experts from the industry, public sector, INAI, and IHub-Data. Chief Guest Shri Joel Davis, IPS (Joint Commissioner of Police, Cyberabad), emphasized how real-time monitoring and technology-driven strategies are being used to ease traffic congestion and enhance driving behavior.

Data Banks & Data Services, Data Analysis

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IIT Bhilai

IIT Bhilai Innovation And Technology Foundation

Hub Overview

IIT Bhilai Innovation and Technology Foundation (IBITF) operates in Fintech arena focusing on identifying impactful solutions leveraging emerging technologies like Blockchain, IoT, AI/ML, and e-payments, with a primary emphasis on applying these technologies to the Agriculture and MediTech sectors.

Project Updates:

BhoomiCold is a pioneering digital solution developed by Bhoomicam Pvt. Ltd. to transform how cold storage warehouses in India manage perishable agricultural produce, such as potatoes, onions, and seasonal vegetables. This SaaS-based platform is built to streamline end-to-end operations from farmer onboarding to inventory tracking, ensuring efficiency, transparency, and financial inclusivity. A key feature of BhoomiCold is its WhatsApp-based farmer communication system, which include:

- Shares real-time space availability before storage season begins.
- Sends entry confirmations, payment receipts, and loan linkage alerts directly to farmers in vernacular languages, supporting financial literacy and timely decision-making.

Deployments:

Bhoomicam Cold storage management software is successfully installed at Kannuaj Uttar Pradesh Cold storage Unit. By empowering over 2000 farmers (pilot site: Shri Devaki Namdan Tripathi Cold Storage, Kannauj, UP) and supporting agribusinesses and lending institutions, BhoomiCold is building a scalable, tech-enabled backbone for India's cold chain infrastructure.

Collaborations:

Industries Conclave - Vision Viksit Bharat 2047 brought together key stakeholders from the government, industry, and academia to discuss the future of industrial and technological growth in Chhattisgarh, aligning with the national vision for Viksit Bharat 2047. The event featured four panel discussions, centering on Chhattisgarh @2047 – Building a Future-Ready Industrial Ecosystem. Special emphasis was given on "HealthTech, AgriTech & FinTech for the Last Mile",

The event was graced by Hon'ble Chief Minister of Chhattisgarh, Shri Vishnu Deo Sai, who performed the ceremonial lamp lighting and addressed the audience. In his speech, he reaffirmed the state's commitment to fostering industrial and technological advancements, highlighting the pivotal role of IIT Bhilai in driving innovation and strengthening Chhattisgarh's position as an industrial powerhouse

Women's Contribution in Research & Innovation:

TIH at IIT Bhilai continues to promote inclusive excellence by ensuring active participation of women in deep-tech research, innovation, and leadership roles. As of now, 39 women researchers at UG, PG, PhD, and post-doctoral levels are engaged in translational projects supported through fellowships. In addition, 31 women faculty members and researchers are serving as principal investigators or co-investigators in funded research initiatives. These contributions have led to the incubation of five women-led startups, with successful technologies developed in areas such as blockchain applications, mobile health for remote areas, smart workforce management, and indigenous language processing—demonstrating the growing impact of women in science and technology leadership.
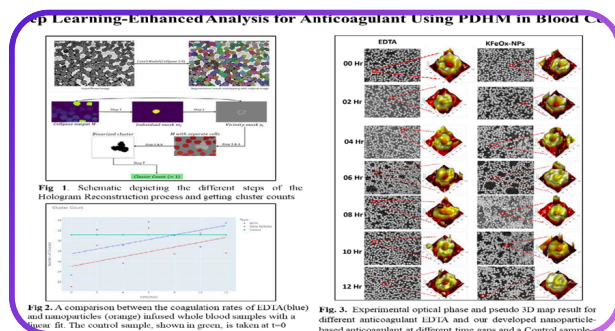
I-DAPT-Hub Foundation

Hub Overview

I-DAPT Hub Foundation at IIT (BHU), Varanasi was set up to address the emerging needs of the country in the area of Interdisciplinary Data Analytics and Predictive Technologies (I-DAPT). I-DAPT Hub Foundation aims to use the interdisciplinary nature of data analytics and predictive technology to achieve the mission of modernization of socio-technical systems and existing services with disruptive innovations and inventions of novel products, processes and technologies. I-DAPT Hub Foundation at IIT (BHU) is presently working on five thrust areas i.e. Telecommunications, Power, Road Transport and Highways, Defence Research and Development, and Health and Family Welfare.

Project & Startup Updates:

TIH has developed a novel Learning Assisted Phase Sensor to address limitations of traditional optical sensors in imaging biological samples. This Quantitative Phase Imaging (QPI) device provides label-free, 3D structural and biochemical insights into live cells, essential for diagnosing diseases like sickle cell anemia. Integrating random phase encoding and machine learning, the sensor enables rapid, automated opto-biological classification. The

Fig 1. Schematic depicting the different steps of the Hologram Reconstruction process and getting cluster counts

Fig 2. A comparison between the coagulation rates of EDTA(blue) and nanoparticles (orange) infused whole blood samples with a linear fit. The control sample, shown in green, is taken at t=0

Fig. 3. Experimental optical phase and pseudo 3D map result for different anticoagulant EDTA and our developed nanoparticle-based anticoagulant at different time gaps and a Control sample

indigenous phase sensor based on digital holography eliminates the need for vibration isolation, enhancing field usability. The project was honored with the Fumio Okano Award at the 3D Imaging Conference (SPIE DCS 2024, USA) for its excellence in live cell imaging. Future goals include automating disease diagnosis for transparent biological samples, including diabetic cells.

Startup supported by TIH, M/s Hibilter IT System Pvt. Ltd. launched the HAOW (AI on Wheels) platform, an industry-agnostic AI system that provides data-driven insights across sectors such as agriculture, defense, telecom, and energy. Powered by generative AI, HAOW automates root cause analysis, identifies process gaps, and delivers actionable operational insights, resulting in cost reduction and enhanced efficiency.

Skill Development:

IPR Awareness Workshop

TIH, in collaboration with Dean R&D and the IPR Cell, organized an IPR Awareness Workshop on 17th March 2025. Sponsored by I-DAPT Hub Foundation, the workshop focused on IP protection, commercialization, prior art search techniques, and global IP protection mechanisms. Dr. Shweta Sharma addressed 350+ participants, including faculty, researchers, and students, on strategies for effective IP management and technology transfer. Attendees gained valuable insights into IPR filing procedures and innovation protection.

Women's Contribution in Research & Innovation:

TIH continues to empower women researchers and technologists through inclusive programs. Under HRD initiatives, 4 workshops/Short Term Courses (STCs) /guest lectures were conducted, benefiting 500+ participants. Topics ranged from emerging technologies to sustainable innovation. The Chanakya Fellowship supported 15 scholars (UG, PG, PhD, Post-Doc), of which 5 were women, all engaged in AI/ML-based research projects, driving inclusive innovation and leadership in tech.

Data Analytics & Predictive Technologies

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

TIH Foundation for IoT and IoE

Hub Overview

The goal of the TIH is to create a self-sustaining IoT and IoE entrepreneurship ecosystem, increase Technology Readiness Levels (TRLs) in IoT R&D to build and commercialize reliable IoT products. Technology developments are currently aligned with the needs of the industry and has also developed a uniquely structured four-level IoT course.

Project & Startup Updates:

Agri IoT products (Sambhav, Samadhan, iSarathi) deployed at ICAR farms in Pune reduced water usage by 18%, advancing precision farming, with ongoing testing at ICAR Onion & Garlic Research. Talks with partners aim to scale access. Industrial IoT demonstrated successful oil pipeline leak detection via drones and achieved a 15% efficiency improvement in business process automation using AI. Digital Darwin won "Healthcare Heroes 2025" for its AI-powered tele-rehab aiding athletes and patients. Ayati Devices secured ₹1 crore funding on Shark Tank for Vibrasense, a diabetic screening device. NEMA AI showcased services globally and advanced diagnostics in India. Clickzy joined MEITY's "LEap Ahead 2" cohort for mentorship and funding. Smowcode exhibited innovations at major tech events. Neoperk Technologies received a ₹20L grant and progressed in IndiaAI Innovation Challenge. BharatGen developed bilingual generative AI models and showcased domain-specific applications while conducting workshops to foster AI capacity building.

Skill Development:

ATMAN 2.0 at IIT Bombay showcased Agritech innovations with 20+ projects, selecting seven for funding. TIH launched a mentorship program with 34 applications. BharatGen developed a bilingual LLM (2.9B parameters) and showcased AI solutions. TIH continued progress in Agri and Industrial IoT projects. The initiative also facilitated expert interactions and technical sessions to guide innovators. Plans are underway to expand support for pilot deployments and field validation.

Image : ATMAN 2.0 at IIT Bombay

Women's Contribution in Research & Innovation:

Women are making significant contributions across various projects. In Ph.D. research, Dr. Ashwini Gajarushi is notable, while Ishita Prem, Dimple Bhuta, and Susmita Banerjee hold Master's degrees. Tabassum Shaikh is pursuing her Master's. Ashlesha and Swapnali are involved in IoT technology transfer. Nidhi, founder of NEMA AI, is developing EEG screening solutions for healthcare and education. BharatGen's generative AI is driven by a tech lead, S. Durga, and several female Ph.D. and M.Tech students, including Isha Pandey, Janhavi Rajput, Priya Mishra, Jahanvi Purohit, Smita Gautam, and Amruta Mahendra Parulekar.

Technologies for Internet of Things (IoT) & Internet of Everything (IoE)

I- Hub Foundation for Cobotics (IHFC)

Hub Overview

The vision of the IHFC is to focus on the research and development of novel technology in the areas of robot analysis, design and control, communication, computer architectures, machine learning, artificial intelligence & the design of embedded systems and power topologies. The IHFC aims at serving various sectors like medical robotics, agriculture, disaster management, defence, industry.

Project Updates:

The TIH has developed a TRL 5 assistive robotics device for home-based ankle rehabilitation, combining calf stimulation and foot-drop correction to enable dorsiflexion and plantar flexion, addressing muscle stiffness.

It has prioritized affordability and accessibility to combat India's physiotherapist shortage and high import costs. The TIH is also developing a basic prototype of a prosthetic hand. This project has focused on developing an affordable AI-driven prosthetic hand using sonomyography and advanced algorithms, aiming for a cost-effective device with a user-centric design. The design emphasises ease of use, adaptability to individual users, and minimal maintenance.

Startup Updates:

Alphoenix Design, a start-up supported by the TIH, has been developing high-efficiency BLDC motors for drones, robotics, and appliances. IVF Precisions has been enhancing fertility treatments with advanced solutions like Vitri Kr™. Femacare has been transforming women's health with minimally invasive solutions. HyBionics Pvt Ltd has been revolutionizing prosthetic care with 3D printed smart prosthetic sockets. The READY Program has been supporting innovative products in cobotics.

Centre of Excellence: IHFC has established eight Co-Innovation Centres (CiC) and sponsored initiatives like the Medical Cobotics Centre (MCC) to advance deep-tech innovation, healthcare robotics, and training in India. It has empowered underprivileged individuals through drone technology workshops funded by IRCON, supported aspiring SC/ST faculty through TLS workshops, and fostered team-based innovation. MCC, inaugurated at IIIT Delhi, offers state-of-the-art medical simulation and training facilities, bridging healthcare and engineering for research, product development, and startups.

Skill Development:

The Kendriya Vidyalaya Sangathan (KVS) has led a 5-day training program on Robotics & IoT for Trained Graduate Teachers (TGT) Work Education under the PM SHRI scheme in collaboration with IHFC and IIT Delhi's TIH. The R.I.S.E. Uttarakhand 10-Day Teacher Training Program, jointly organized by IHFC, IIT Delhi, and Cograd with the Department of School Education, Uttarakhand, has enhanced the skills of secondary and primary school teachers by providing hands-on training in AI ,Coding, and Robotics. A total of 768 teachers from all 13 districts of Uttarakhand have participated in this program.

International Collaborations:

TIH has initiated international collaboration with Odense Robotics - Denmark. A kick-off meeting was held on March 21, 2025, and has planned a visit to IHFC in June while conducting regular weekly meetings to foster synergy.

Cobotics

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

Technology
Innovation Hub
IITG TIDF

Technology Innovation and Development Foundation

Hub Overview

Technology Innovation and Development Foundation at IIT Guwahati is dedicated to advancing Technologies for Underwater Exploration. Projects range from developing underwater robots for tracking, surveillance, and monitoring to applications in defense research, earth science, health research, renewable energy, tourism, shipping, and skill development. The hub focuses on creating cost-effective solutions through research & development. Cyber-Physical Systems take center stage, integrating underwater computer vision, communication technologies, artificial intelligence, IoT, and diverse robotic systems for groundbreaking advancements in underwater technology.

Project & Startup Updates:

Honey Loop Technologies has successfully developed and operationalized its first fully functional prototype, marking a significant milestone in green water transport by integrating the innovative Vortex Energy Engine, which enhances efficiency and sustainability. TIH, IIT Guwahati, has showcased the Bamboo Composite Kayak at Advantage Assam, highlighting its commitment to sustainable innovations in the water transport sector

Collaboration:

TIH and TIC-IITG have successfully collaborated on the Aquatech Innovation Hackathon, fostering technological advancements in water-based solutions. Additionally, TIH has initiated a strategic collaboration with the Indian Army to facilitate training programs and technology exchange in Electric Vehicles (EVs), aiming to enhance technical expertise and innovation in EV technology for defense applications.

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SPOT!

Image: Honey Loop Technologies Achieves Milestone in Green Water Transport

Women's Contribution in Research & Innovation:

TIH, IIT Guwahati, has recognized the remarkable contributions of women researchers, including faculty, postdoctoral fellows, PhD, and master's students, who have driven innovation across various domains. Women-led initiatives at the hub have achieved milestones in technology transfers, startups, and advancements in underwater exploration, aquatech, and sustainable solutions.

Technologies for Underwater Exploration

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

DEPARTMENT OF SCIENCE & TECHNOLOGY

NMICPS Technology Innovation Hub on Autonomous Navigation Foundation

Hub Overview

TiHAN, a Section 8 company at IIT Hyderabad under the NM-ICPS scheme of the Department of Science & Technology focuses on Autonomous Navigation Technologies that play a critical role in enabling vehicles and robots to navigate safely and efficiently in a wide range of environments, from urban streets and highways to offroad terrain and indoor facilities.

Project Updates:

The HANUman project, focusing on Heavy Payload/High Altitude Navigation of Unmanned Aerial Vehicles, has developed the Chakravyuha drone. This drone has been designed to lift heavy payloads, making it particularly suitable for operations in elevated terrains. It has been equipped with advanced autonomous navigation systems, including Map and GNSS-based navigation, along with real-time obstacle avoidance capabilities for precise route planning and positional accuracy. The Chakravyuha drone has been integrated with these features to enhance its operational efficiency in challenging environments.

Skill Development:

TiHAN-IIT Hyderabad, in collaboration with IIT Hyderabad, has successfully conducted a certificate course on "Advanced Drone Innovations (ADI): Design, Technology, Perception & Business Strategies" for 103 participants, while the Gandhi Institute of Engineering and Technology (GIET) University, Gunupur, in partnership with TiHAN-IITH, has organized a one-week skill development workshop on "Secure Automation in Robotics through Machine Learning" for 105 students, both aimed at advancing knowledge and skills in emerging technologies.

Deployments:

TiHAN IIT Hyderabad, in collaboration with the Real Time Governance Society (RTGS) of the Andhra Pradesh Government, has demonstrated its Autonomous Campus Shuttle (ACS) at the AP Secretariat for three weeks and expressed interest in deploying it at IT Hills (SEZ) in Visakhapatnam, marking a milestone in smart mobility innovation by integrating autonomous vehicle technology to enhance transportation efficiency and safety while reducing congestion and environmental impact, and promoting technology awareness through a signed MoU for further deployments

Collaborations:

TiHAN IIT Hyderabad has signed several MoUs to advance various technological initiatives. It has partnered with Avianco to revolutionize urban air mobility solutions, with Sona Comstar, combining expertise in autonomous navigation and EV technology, and with Droisys to develop autonomous drone applications for the CPG/FMCG industry. Furthermore, TiHAN has joined forces with IRMA ISEED Foundation and the World Cooperation Economic Forum to drive a digital revolution in cooperative agriculture. Lastly, it has signed an MoU with ITS India to advance intelligent mobility, connected vehicles, and autonomous navigation.

Women's Contribution in Research & Innovation:

AeroAgro AI, led by Dr. Sushmita Dandeliya at IIIT Nagpur, has focused on creating autonomous drone networks for precision farming and crop health insights. Ms. Prabha Kaparapu has led a research project titled "Autonomous AI Vision Model" under PredictML AiDataTech Private Limited. Researchers in the Hub included 1 Research Consultant, 1 Senior Research Assistant Fellow, and 5 Interns.

Autonomous Navigation and Data Acquisition Systems

IITI DRISHTI CPS Foundation

Hub Overview

IITI DRISHTI CPS Foundation, created as a one-stop shop for CPS solutions with a specific focus on system simulation, modelling and visualisation. The hub has created an ecosystem which works as a focal point for the convergence of the efforts of academia, industry and government agencies for technology development and commercialization.

Project Updates:

The TIH-supported startup Edith Robotics Solutions Private Ltd is developing an advanced isolation bed for healthcare facilities aimed at enhancing patient safety and preventing the spread of airborne infections. The technology features a transparent body with complete air-flow regulation, filtration, and sterilization systems to create a highly sterile ICU environment. Additionally, the isolation bed is digitally replicated through a Digital Twin integrated with Cyber-Physical System (CPS) inputs, enabling enhanced monitoring and control. Currently at TRL 6, the product is undergoing a pilot run for deployment in hospital ICU settings.

Image: Advanced isolation bed for healthcare facilities

Collaborations:

In collaboration with the Cambridge University Institute for Manufacturing (IfM) and Mahindra Institute of Quality (MIQ), TIH organized a workshop on the ShoeString Digital Manufacturing system in Nashik. The workshop catered to Tier-1 suppliers of Mahindra & Mahindra from Nashik, Pune, and NCR. Startups, OEMs & MSMEs gained hands-on knowledge about using low-cost, low-risk digitization technologies to address key challenges in production quality, inventory management, and other manufacturing issues.

Women's Contribution in Research & Innovation:

TIH has supported 17 women-led startups and 14 women researchers working on cutting-edge technologies across various domains. Startups include innovations such as AI-powered defect detection systems, satellite data-based agriculture advisory, portable blood testing devices, and blockchain-powered health platforms. Notable projects range from smart isolation beds and GIS-based crop residue tracking to personalized dermatology and real-time factory Digital Twin solutions. On the research front, contributions span AI-driven autonomous vehicle systems, secure key generation, wearable mental health tech, agri-robotics, and predictive diagnostics in oncology, highlighting significant strides in AI, healthcare, agritech, and education by women innovators and researchers.

System Simulation, Modeling & Visualization

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

DEPARTMENT OF SCIENCE & TECHNOLOGY

ARTPARK
AI & Robotics Technology Park, I-Hub @ IISc

I-Hub for Robotics and Autonomous Systems Innovation Foundation (ARTPARK)

Hub Overview

I-HUB for Robotics and Autonomous Innovation Systems Foundation(ARTPARK-IISc - AI & Robotics Technology ark) is a unique non-profit (section-8) organization promoted by the Indian Institute of Science (IISc) to foster innovations in AI & Robotics by bringing together the best of the startup, industry, research, and government ecosystem. It is funded by the Department of Science & Technology (DST), Govt. of India, under the National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS) and the Govt. of Karnataka. ARTPARK @ IISc is driving advances in robotics, autonomous systems and AI through translational R&D in areas of Intelligent Healthcare, Automation for Logistics and Skilling for the AI age.

Project Updates:

The TIH is supporting Project Pakketa, a unified cold chain interface (UCI) designed to simplify access to cold-chain services by integrating warehouse and logistics availability, ease of booking, transparency in temperature monitoring, and fintech solutions. It aims to address the challenge of fragmented platforms in the cold-chain domain. Pakketa seeks to build a digital public good infrastructure for demand-supply management in cold-chain logistics in India. The project is expected to benefit a wide range of stakeholders, including farmers, food processors, and pharmaceutical companies. By enabling better coordination and real-time visibility, Pakketa will help reduce wastage, lower costs, and improve efficiency across the cold-chain ecosystem.
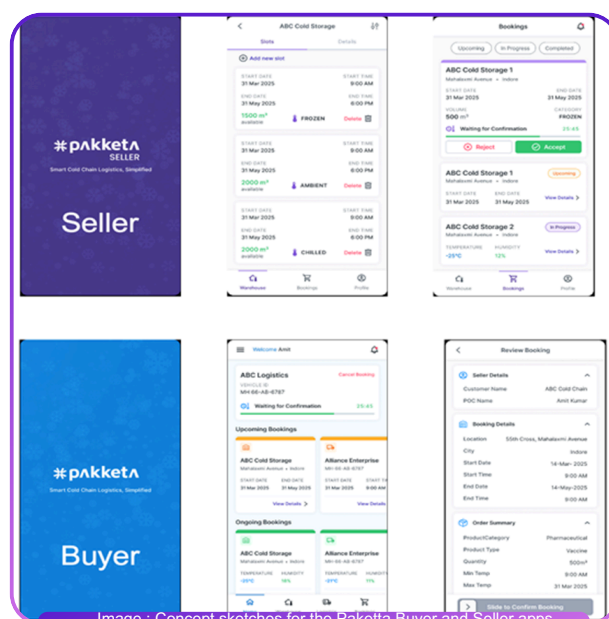

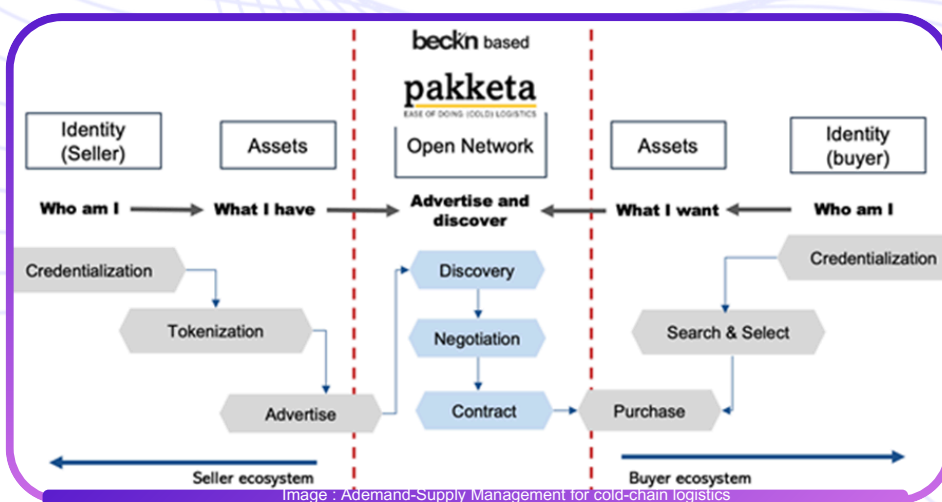Image : Concept sketches for the Paketta Buyer and Seller apps

Image : Astrome's team

Image : Ademand-Supply Management for cold-chain logistics

Startup Updates:

Astrome Technology has secured $10 million in funding to drive innovation in wireless connectivity and expand into the satellite communication space.

Robotics & Autonomous Systems

I-Hub Quantum Technology Foundation

Hub Overview

I-HUB Quantum Technology Foundation is a section-8 company hosted by IISER Pune and funded by the Department of Science and Technology, Government of India under the National Mission on Interdisciplinary Cyber-Physical Systems. I-HUB QTF promotes development of Quantum Technologies through four verticals: Quantum Information & Metrology; Quantum Communications; Quantum Materials & Devices; and Enabling Technologies; and via these aims to harness the quantum phenomena to develop advanced computing systems as well as for more immediate applications in precision sensors, navigation devices for GPS, geological mapping, atomic clocks, encrypted communication and novel materials. Beyond technology development, the Hub facilitates technology translation, incubation and human resource development.

Project Updates:

A recent patent application titled "Confined-dewetting method for synthesis of metal nanoparticles" has been filed under the support of TIH at I-HUB QTF. The application, filed under Patent Application No. 202421034366, showcases innovative work in the synthesis of metal nanoparticles through a confined-dewetting approach.

Skill Development:

I-HUB QTF actively advanced its skill development initiatives through a range of impactful activities. An Introductory Workshop on Quantum Computing was successfully conducted at Fergusson College on 31st January 2025, aiming to provide students from diverse academic backgrounds with foundational knowledge in Quantum Computing and to ignite their curiosity in the field. The sessions were led by professors from IISER Pune. Additionally, I-HUB QTF hosted faculty members from Vivekanand Education Society's Institute of Technology (VESIT) as part of their Faculty Development Program (FDP), which included an overview of I-HUB QTF's initiatives and lab tours. Furthermore, five Quantum Seminars were conducted, offering valuable insights from experts across academia and industry. In recognition of academic excellence and to promote undergraduate research, I-HUB QTF awarded a total of 14 Chanakya Undergraduate Fellowships, including 9 awarded to female students.

Women's Contribution in Research & Innovation:

At I-HUB QTF, women have made significant contributions across various roles in research and innovation. A total of 11 women have served as Researchers, Project Investigators, Co-Principal Investigators, Project Leaders, and research staff. This includes 1 Project Investigator, 4 involved in the Spike Project, 1 Project Scientist, 1 Faculty Fellow, 1 Project Assistant, and 3 Senior Research Fellows. In addition to their research roles, women have also demonstrated leadership in entrepreneurship. Out of the 14 startups incubated by I-HUB QTF, 3 are led by women founders or co-founders, reflecting their active participation in both scientific and entrepreneurial endeavors.

Quantum Technologies

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

TIH
iHub Drishti

iHub Drishti Foundation

Hub Overview

The TIH on Computer Vision and Augmented and Virtual Reality (CV and ARVR), named as iHub Drishti Foundation focuses on the core research areas of Seeing and Sensing, Dependability, Real-time Computer Vision Systems, and Data Collection, Curation, and Annotation. iHub Drishti has identified the following application areas for developing technologies: Computer Vision for Autonomous Systems; Computer Vision for Better Living: Healthcare and Biosphere; Imaging for Document Analysis; CV and VR for Industry 4.0; Dependable AR-VR for X (including games).

Project & Startup Updates:

Computer Vision-Based Monitoring of Fishes in Marine Cage Farming: This project develops a computer vision-based underwater monitoring system to track fish growth, health, and behavior in marine cages. It uses techniques like domain adversarial learning for image enhancement and a U-net segmentation model for fish detection. Key features include a synthetic underwater dataset and an unsupervised spatially curated perceptual loss model. The project enhances operational efficiency and safety in cage farming, contributing to cost-effective fish production.

Computer Vision for Plant Phenomics and Smart Agriculture: This project applies computer vision to identify and quantify traits in rice and wheat plants under stress conditions using various imaging sensors. It aims to detect plant architecture, biomass, and stress responses through high-resolution, near-infrared, and hyperspectral cameras.

Image : Imaging in Field Environment @IARI Delhi

	Activities	Status
1	Standardization of image acquisition (land based systems)	Completed
2	Field image collection from Mariculture installations	Data is being generated on a monthly basis
3	Image acquisition from mariculture cage installations	Data is being generated on a monthly basis
4	Video clean-up, enhancements, de-hazing	Standardized
5	Acquisition of conventional/ analogue data on the count, individual size (length and weight) and biomass of the stock	Data is being generated on a monthly basis
6	Development of algorithms, and programs for size, count and biomass estimation	Related algorithms for count and size estimation are in place.

View of the indoor imaging setup

Offshore cage with fish

Image : Indoor and Offshore Marine Cage Farming Setup

The project is at TRL 3 and focuses on developing multi-modal imaging models for plant phenotyping, supporting sustainable food production for a growing population.

Women's Contribution in Research & Innovation:

At TIH, women have made significant contributions across various roles in research and innovation. A total of 9 projects are supported by women Principal Investigators from premier institutions across India. These accomplished professionals include faculty members and researchers from leading IITs, a technological university, and a national medical institute. Their expertise spans a wide range of fields such as artificial intelligence, cybersecurity, medical informatics, cardiology, and robotics. In addition to leading cutting-edge research, some of these women are actively involved in startup ecosystems, playing a pivotal role in bridging academic research with real-world innovation.

Computer Vision, Augmented and Virtual Reality (AR&VR)

iHub Anubhuti-
IIITD Foundation

iHub Anubhuti - IIITD Foundation

Hub Overview

iHub Anubhuti-IIITD Foundation aims at building a tripartite collaboration between industries, academia and government agencies by developing data-driven Cognitive Computing and Social Sensing solutions, mainly in the verticals - Healthcare, Education and Law Enforcement & Security.

Project & Startup Updates:

TIH has made strides in healthcare innovation through collaborations with AIIMS Delhi, Medanta Medicity, Amrita Institute of Research, and the Indian Spinal Injuries Centre. A key highlight is the progress on the AIIMS Delhi collaborative project, MIND LAMP (now Emersive), which enhances mental health care using a React-based dashboard and mobile app for real-time monitoring and personalized interventions. Additionally, a new project on Digital Stethoscope with AIIMS Pulmonology Department is underway, aimed at improving respiratory disease diagnosis through AI.

TIH supported, four new startups were incubated this quarter, focusing on AI, ML, and IoT innovations in diagnostics, healthcare efficiency, and infant care. Briota Technologies is enhancing NCD management at the community level, Gunsutra is revolutionizing field diagnostics with an AI-integrated RT-PCR machine, One2X is boosting healthcare communication analysis across 250+ languages, and Arivation Fashion Tech (Arista Vault) is advancing infant care with a smart AI-powered feeding bottle. These innovations significantly contribute to rural diagnostics, streamlined hospital workflows, and better infant health monitoring.

Skill Development:
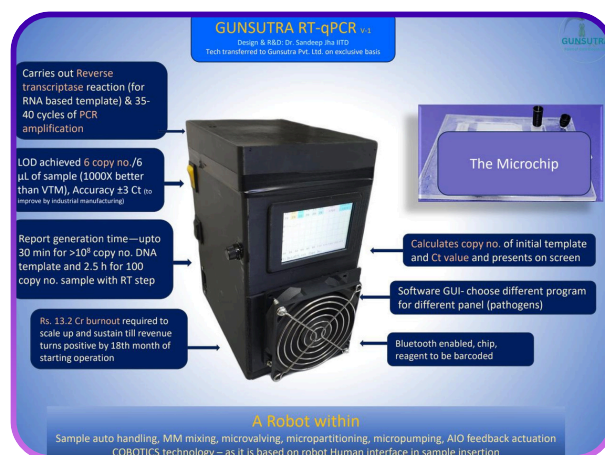
Image: NASSCOM Changemaker event

TIH sponsored the NASSCOM Changemakers' Confluence on 11th February 2025, a dedicated platform to support women-led tech startups through insightful sessions, networking, and skill-building workshops. Highlights included a session by Dr. Ekta Kapoor on the future of women in tech and Go-To-Market insights from TIH CEO Mr. Vinay Mehta, reinforcing TIH's commitment to inclusive innovation and women leadership in technology.

Women's Contribution in Research & Innovation:

One of the founders of a TIH-supported startup, Purvi Roy, founder of Arivation Fashion Tech Pvt. Ltd. (Arista Vault), exemplifies women's leadership in startup and is revolutionizing infant care through AI, ML, and IoT. By developing the AI-powered Smart Baby Feeding Bottle, they enhance child nutrition and are breaking barriers in health-tech, the women-led team inspires future innovators, creates opportunities, and drives transformative change. Their leadership fosters inclusivity, mentorship, and technological advancement, inspiring more women to drive change in healthcare.

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**NATIONAL MISSION ON
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IIT Tirupati

IIT Tirupati
Navavishkār
I-Hub Foundation

IIT Tirupati Navavishkar I-Hub Foundation

Hub Overview

The IIT Tirupati Navavishkar Hub Foundation (IITTNiF) is set up to host Technology Innovation Hub (TIH) focusing on cutting-edge technology in Positioning and Precision Technology (PPT) which includes Positioning, Navigation, Timing, GIS, Remote Sensing and other non-invasive technologies.

Startup Updates:

Operation Dronagiri Startup Challenge – Results Announcement- Operation Dronagiri was launched on November 13, 2024, under the National Geospatial Policy 2022 by the Department of Science and Technology (DST), Government of India. The TIH is driving geospatial innovation through the successful execution of the Operation Dronagiri Startup Challenge. Results were announced on 17th March 2025 during DST's visit, selecting 25 startups (19 growth-stage, 6 mature-stage) for funding in agriculture, transportation, and skilling sectors.

Image: Startup Challenges results announcement of Operation Dronagiri

Skill Development:

Synthetic Aperture Radar (SAR) Workshop: TIH has organized a hands-on SAR Workshop on 17th March 2025 to build industry capacity in Synthetic Aperture Radar (SAR) data processing using ENVI and ArcGIS. The workshop empowered 15 professionals with practical skills in geospatial analytics.

Project Update:

TIH has established the LiDAR Translational R&D Lab, inaugurated by DST Secretary, focusing on indoor navigation systems (Navavishkar) and high-resolution LiDAR AOM technologies, in collaboration with IISc Bangalore and IIT Madras.

Image: LiDAR Lab Inaugurated by Secretary DST and Mission Director, NMICPS,DST

Collaborations:

TIH has inaugurated multiple Centres of Excellence to boost research and industry collaboration, including the GDI Federated Node, PNT Lab with Safran, Geospatial Innovation Centre with ESRI, and the Geo-Spatial Intelligence & Applications Lab. TIH has launched the Digital Twin Academia Network Program, enabling real-time digital mapping of academic campuses. Institutions like IIT Tirupati and GGU are participating in creating campus-level digital twins for research and planning. These initiatives aim to foster innovation, enhance academic infrastructure management, and promote data-driven decision-making. TIH is also exploring partnerships to scale the program across more educational and research institutions.

Image: Various Centres inaugurated at TIH by DST Secretary

Positioning and Precision Technologies

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DEPARTMENT OF SCIENCE & TECHNOLOGY

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

IIT Patna Vishlesan I-Hub Foundation

Hub Overview

The multidisciplinary Vishlesan I-Hub Foundation at IIT Patna under Technology Incubation Hub (TIH) in the technology vertical - "Speech, Video & Text Analytics" targets to leverage Research and Engineering capabilities of Sustainable Development Goals and achieve the mandate of National Mission on Interdisciplinary Cyber Physical Systems. The Vishlesan I-Hub at IIT Patna also encourages to leverage other related areas for technology development, innovation, professional education, entrepreneurship, brand building, technology commercialization, and product management for the dissemination and deployment of intellectual property, and for public outreach.

Project & Startup Updates:

1. **COIL-D Language Database Initiative:** IIT Patna Vishlesan I-Hub Foundation has signed an MoU under the MeitY-sponsored project "COIL-D – Centre of Indian Language Data", with TIH as a key implementation partner. As part of the collaboration, TIH will undertake services like database creation for Indian languages, platform development, and deployment. This initiative aims to accelerate indigenous language technology development and strengthen India's digital ecosystem.
2. **Handheld Alert Device for Farmers and Public Safety:** In response to increasing casualties from lightning and floods, TIH has developed a handheld alert device (e.g., wristband or armband) for farmers and the public. The device provides real-time alerts using visual indicators, voice messages, and vibrations, based on meteorological data from IMD. This innovation enhances disaster preparedness and could be a life-saving tool in vulnerable regions.

Skill Development & Deployments:

Industry-Driven PG Certificate Program in Advanced AI & ML: IIT Patna Vishlesan I-Hub Foundation, in collaboration with Masai School, has launched a Postgraduate Certificate Program focused on Advanced Artificial Intelligence and Machine Learning. The program is tailored to meet industry demands, equipping learners with hands-on experience and domain-relevant skills for future-ready careers.

MASAI School and IIT Patna Vishlesan i-Hub Foundation

MASAI-TIH IIT Patna Joint Courses

Foundation for Data Science and Machine Learning
- Expert faculty panel from IIT and Industry mentors.
- Strong foundation course covering Python, statistics, probability & linear algebra
- Bilingual teaching (Hindi & English) for better accessibility & engagement.

Visit: **https://m.masaischool.com/iit-patna/ds-ml**

Image: Industry-Driven Certificate Program in Advanced AI & ML

Women's Contribution in Research & Innovation:

IIT Patna Vishlesan I-Hub Foundation is proud to foster a strong presence of women in key roles. As of March 2025, 2 faculty fellows, 1 PhD scholar, 22 M.Tech students, and 4 women in leadership roles in startups, innovation, and technology transfer are actively contributing to the hub's initiatives—demonstrating a significant and growing women-led impact in AI and technology development. The hub regularly hosts workshops, mentorship sessions, and networking events to empower women in STEM. These efforts aim to build an inclusive innovation ecosystem and inspire the next generation of women technologists.

Speech, Video & Text Analytics

IIT Mandi iHub and HCi Foundation

Hub Overview

iHub and HCI Foundation is a Technology Innovation Hub (TIH) established by IIT Mandi as part of the National Mission on Interdisciplinary Cyber-Physical Systems (NMICPS) scheme of Department of Science and Technology, Govt. of India.The Hub is focused on Human-Computer Interaction with a vision to nurture research in the area, enable technology translation for industry, and build scale in skill development.

Project Update:

A non-invasive glucometer has been developed by the TIH using IoT and machine learning, featuring a VOC-Analyzer that detects diabetes through breath samples. A dataset of 652 samples from diabetic and non-diabetic patients has been created, and clinical validation has shown 98.7% accuracy. The device has been granted a patent titled

"SYSTEM & METHOD FOR DETECTING DIABETES FROM BREATH SAMPLE OF AN INDIVIDUAL."
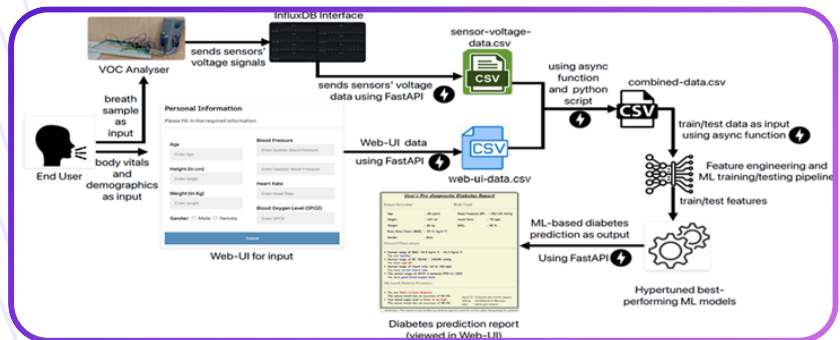
Startup Update:

256 Bits Studio Private Limited has been developing cyber security software for games in B2B and B2C markets, integrating AI and quantum processing with CSML, VARUNA, and PCGML to manage assets like images and 3D models. They have been automating processes to eliminate errors in complex data structures. With 8 lakh test users, the company has been aiming to convert 25,000 into paid users.

Skill Development:

In the last quarter of 2025, The TIH have enrolled 126 students across Solar Technology, Drone Application Training, and AI/Machine Learning Engineering, with 20 completing certification and 31 placed in companies. Through the DST-sponsored SC Project, the TIH have enrolled about 1,884 participants in various courses, such as IoT and 3D Printing, with 1,830 certified.

Collaborations:

The Himachal Pradesh High Court has implemented an AI-enabled hybrid Video Conferencing and Live Streaming solution with Computer Vision integration. This system includes facial recognition, real-time transcription, automated documentation, and AI-driven security, supported by professional audio-visual equipment and secure servers. It positions the court as a leader in AI-powered judicial transformation in India.

Human-Computer Interaction

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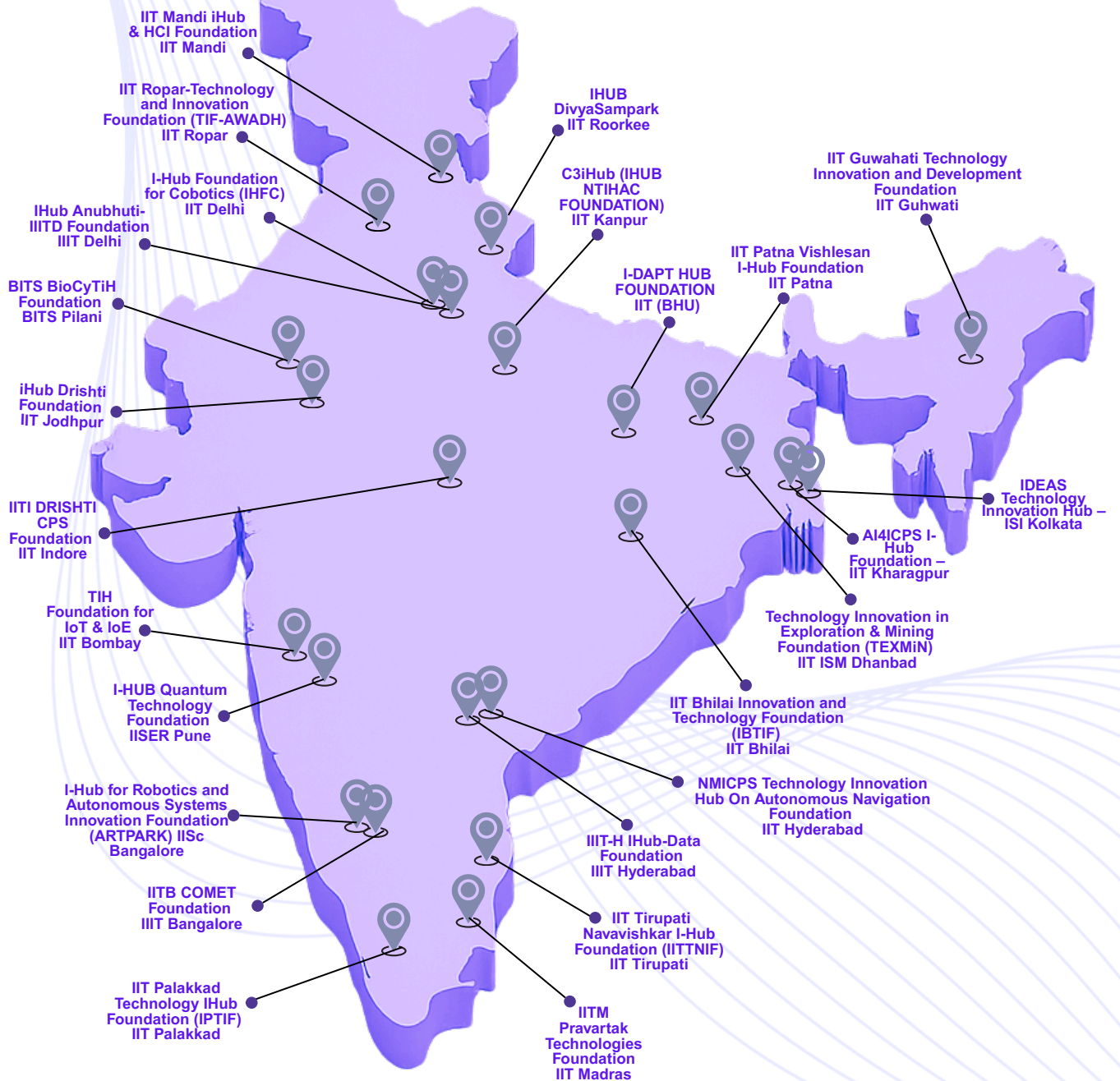**Technology Innovation Hubs (TIHs)
established under NM-ICPS**

Special Support

**Technology Innovation in Exploration & Mining
Foundation (TEXMiN),
IIT (ISM) Dhanbad**

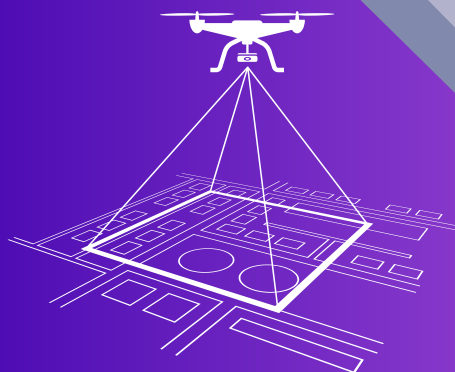Technology Innovation Hubs (TIHs) Across the Country

National Mission On Interdisciplinary Cyber-Physical Systems

Department of Science and Technology
Ministry of Science and Technology
Government of India