MINUTES OF THE MEETING OF MEMBERS OF HUB GOVERNING BOARD OF NMICPS TECHNOLOGY INNOVATION HUB ON AUTONOMOUS NAVIGATION (TIHAN) FOUNDATION HELD ON TUESDAY 22ND OCTOBER 2024 AT ADMIN BLOCK, BOARD ROOM, IIT HYDERABAD, KANDI CAMPUS, SANGAREDDY, TELANGANA, INDIA - 502284 AT 11.00 A.M.

Time of commencement of the Meeting: 11.00 A.M.
Time of conclusion of the Meeting: 12.00 P.M.

1.   **ATTENDANCE:**

Sr. No.	Name	Designation	Mode of Attendance Physical/Electronic mode
Members:			
1.	Prof. B S Murty	Chairman	Physically
2.	Prof. P Rajalakshmi	Project Director	Physically
3.	Mr. S. K. Marwaha	Member, Ministry of Electronics & Information Technology	Physically
4.	Ms. Rajni Kushawa	Division DST, Govt. of India	Through VC from New Delhi
5.	Ms. Tanushree Sharma	Division DST, Govt. of India	Through VC from New Delhi
6.	Mr. C S Sharma	Member, Quality Council of India	Through VC from New Delhi
7.	Dr. Kumar N. Sivarajan	Industry Member	Through VC from Bengaluru
8.	Mr. Samir Kumar	Industry Member	Through VC from Bengaluru
9.	Prof. G. Narahari Sastry	Academic Member	Physically
10.	Dr. Aravind Kumar Rengan	Academic Member	Physically
11.	Prof. Bheemarjuna Reddy Tamma	Academic Member	Physically
12.	Mr. Vivek	DST, Govt. of India	Through VC from Delhi
Executive Team & Invitee:			
13.	Mrs. Lopa Mishra Jana	TiHAN - Hub Executive Officer	Physically
14.	Dr. Syam Narayanan	TiHAN – Technical Officer	Physically
15.	CA Saurabh Dashottar	Auditors	Physically
16.	CS Jayata Agarwal	Practising Company Secretary	Through VC from Jaipur

2.   **ELECTION OF THE CHAIRMAN:**
As per article 27 of Articles of Association of the company, the Director of IIT Hyderabad (Host Institute) is deemed to be the chairman of NMICPS TiHAN Foundation, and as per Mission communications, Chairman of Host Institute will be Chairman of the HGB. Thus, **Prof. B. S. Murty** was elected as the chairman of the meeting and occupied the chair.

3. **QUORUM:**

   At 11.00 a.m., the Chairman welcomed the Members present physically and through video conferencing. Thereafter, the Chairman announced that the requisite quorum was present and called the Meeting to order. The Chairman extended a warm and hearty welcome to all members at the Hub Governing Board Company Meeting (HGB).

4. **LEAVE OF ABSENCE:**

   Leave of absence was granted to Dr. Ekta Kapoor, Dr. Reji Mathai, Dr. Gopichand Katragadda, Mr. Krishna Bodanapu, Shri. Rohit Kumar, for not attending the meeting due to unavoidable circumstances and had requested the same.

5. **CONFIRMATION OF MINUTES OF THE MEETING OF MEMBERS OF HGB HELD ON 30TH JULY 2024:**

   Minutes of the Hub Governing Board meeting held on 30th July 2024 duly initialed by the Chairman placed before the Board and approved. Prof. P Rajalakshmi explained the activities and decisions taken in the previous meeting to all the members.

6. **EXTENSION OF NATIONAL MISSION ON INTER DISCIPLINARY CYBER PHYSICAL SYSTEM:**

   Prof. P Rajalakshmi informed the members of the Government of India has extended the Scheme, National Mission on Inter Disciplinary Cyber Physical System (NMICPS) until December 2027. The said scheme was accorded in December 2018 for a duration of 5 years, i.e. until December 2023. The approval is conveyed for the extension of the NM-ICPS by 4 years i.e. from January 2024 till December 2027 for continuing the mission activities in their present scale-up without any additional financial implication.

7. **TiHAN VISION & MISSION, ACTIVITIES, RESEARCH AREAS:**

   Prof. P Rajalakshmi informed the members of the HUB regarding the primary focus, vision and mission of TiHAN.

   The vision of this hub is to become a global destination for next-generation smart mobility technologies that utilize reliable and efficient autonomous navigation and data acquisition systems. The mission of this hub is to accelerate the adoption of autonomous navigation and next-generation smart mobility technologies for use in intelligent transportation and other sectors, not only in India but also in a global context.

   She further informed the HGB Members about the research areas of TiHAN. The R&D focuses on addressing the challenges in realizing the adoption of autonomous vehicles and navigation systems (UAVs, ROVs, etc.) in real-time use cases. The hub aims at translational technology research and development along with commercialization in the areas of autonomous navigation and data acquisition systems. The broad application sectors of the hub include Autonomous Transportation Systems, Agriculture, Infrastructure, Surveillance, and Environmental.

   The solutions are embedded with sensors, in-house developed actuators, control systems, mapping, and AI algorithms, which enable autonomous driving navigation in different scenarios like highway merging, autonomous parking, Adaptive Cruise Control (ACC), pedestrian detection, and negotiation of obstacles.

The hub TiHAN-IIT Hyderabad has developed several futuristic autonomous multimodal transportation solutions like ground, aerial, surface and underwater vehicles & also a first of its kind testbed for R&D of autonomous navigation technologies.

Such technologies can help mitigate risks, ensure safety, increase efficiency, accessibility, and reduce environmental impact, paving the way for evolution of safe & convenient automated transportation in the country.

8. **TIHAN- THIRD PARTY EVALUATION BY DST:**
The review process conducted DST was two parts: a virtual meeting followed by a physical review. The Virtual Meeting was held on September 27, 2024 (10 AM to 12 PM) and Physical Review was conducted on 30th September & October 01, 2024. The members of the Third-Party Evaluation (TPE) Committee were Prof. Rajat Moona, Director IIT Gandhinagar, Shri. Ananth Krishnan, Former CTO of TCS, and Ms. Rajani Kushwaha, JA(Tech), FFT Division, DST.

Third-Party Evaluation committee had an online Interaction with few Expert Members of TiHAN – Mr. Samir Kumar (HGB), Prof. Huzur Saran (Expert), Prof. Bheermarjuna Reddy (HGB), Prof. Srikant Saripalli (Texas A&M, Chair Professor), Prof. Kamesh (UNT, Chair Professor), Mr. Alok Mukerjee (Ex-DRDO, Expert), Dr. B M Baveja (PMC).

She further informed the members that technologies developed at TiHAN were demonstrated, and startups, R&D collaborators, faculty fellows, HGB members, Expert Committee Chair professors and RnD staffs, M.Tech, Ph.D. students, PDFs, TOs, HOO, and HEO interacted with the TPE committee.

TPE provided suggestions and feedback for improvement and appreciated the achievements of TiHAN. TiHAN concept note for TTRP (Technology Translational Research Park), which was submitted to DST was shared with TPE committee.

9. **TIHAN TARGETS & ACCOMPLISHMENTS SO FAR:**
Prof. P Rajalakshmi explained that the Research and Technology nurture the R&D portfolio of the hub and promote commercially viable translational research. She explained the increase in CPS Research Base Hub projects - 88 collaborative R&D projects. Periodic project reviews have been done through an expert project review committee. She informed the board about the:

Technology Development: No of Technologies (IP, Licensing, Patent Etc.) – 49 (includes copyrights, patents, Software IPs- and Trademark), Technology Products - 72, Publications, PR and other Intellectual activities - 353, Increase in CPS Research Base – 90.

Entrepreneurship Development: Technology Business Incubator (TBI) - 1, Start-ups & Spin-off companies – 36, GCC - Grand Challenges & Competitions- 8, Promotion and Acceleration of Young and Aspiring technology entrepreneurs (PRAYAS)- 3, CPS-Entrepreneur in Residence (EIR)- 28, Dedicated Innovation Accelerator (DIAL)- 3, CPS-Seed Support System (CPS-SSS)-2, Job Creation – 747.

Human Resource Development: Graduate Fellowships – 372, Post Graduate Fellowships – 136, Doctoral Fellowships – 71, Faculty Fellowships – 19, Chair Professors – 5, Skill Development - 8092, Postdoctoral Fellowships – 24.

International Collaborations: International Collaborations - 28.

She further informed the members about the **Transfer of Technology (ToT) and Commercialization:** TiHAN Supported project to CSIR-Central Scientific Instruments Organization in collaboration with TiHAN IIT Hyderabad has successfully transferred its cutting-edge Software Framework for UAV-based Object Detection & Localization technology to L&T Ltd, Mumbai.

Also, TiHAN supported the project to C-DAC have initiated a collaborative effort to transfer technology (ToT) for the development of C-V2X hardware, including On-Board Units (OBU) and Road-Side Units (RSU). This partnership aims to accelerate the deployment of vehicular communication platforms, enhancing connected and autonomous vehicle infrastructure to Zerosum, Metro Infrasys, & LTTS as potential partners.

Prof. Rajalakshmi informed that the autonomous Navigation Technologies for the Electric Buggy / Cart / Campus Shuttle – Published on the website of the company and discussion with NRDC is going on. And Discussion with Zen Micro Systems, ROOTS, Honeywell is also under pipeline.

10. **FUND STATUS:**
Prof. Rajalakshmi presented the funds received from DST and utilization of the same to date. So far TiHAN-IITH has received Rs. 107.43 crores from DST and also spent Rs. 103.51 Crores. TiHAN has requested to DST for the next tranche of Grant of 27.57 crores for smooth functioning of the Hub. Re-appropriation of Recurring & Non-Recurring Budget for different heads sought was also approved to ensure optimal use of resources and the timely completion of key objectives without compromising the overall budget framework. Following
is the re-appropriation proposed

BUDGET REAPPROPRIATION				
Sr. No	Budget Head	Sanction (In Rs.)	Reappropriation (In Rs.)	Difference (In Rs.)
Non-Recurring				
1	Equipment	27.50	26.05	- 1.45
2	Capital Expenditure	17.05	18.50	+ 1.45
	Total	**44.55**	**44.55**	**0**
Recurring				
3	Manpower	38.6	21.00	- 17.60
4	Travel	3.45	2.80	- 0.65
5	Technology Development	24.53	47.53	+ 23.00
6	Skill Development	3.16	1.16	- 2.00

7	Innovation and Entrepreneurship and Startup Ecosystem	14.79	14.46	- 0.33
8	International Collaboration	5.92	3.50	- 2.42
	Total	**90.45**	**90.45**	**0**
	Total (non-recurring + Recurring)	**135**	**135**	**0**

11. ACTIVITIES:

a) **Third Year Review of Suzuki Motor Corporation Funded Project:**
Prof. P Rajalakshmi further informed the board that TiHAN successfully completed the project funded by Suzuki Motor Corporation, Japan on ADAS for Point-to-Point Navigation systems for Autonomous car adaptable for Indian Scenarios on 26th August 2024.
The final review and demonstration took place in the presence of the Chief Guests, Sri D. Sridhar Babu, IT Minister of Telangana, Mr. Kurachi Nobunari, GM Suzuki Motors along with our esteemed guests and collaborators.

b) **Prof. P Rajalakshmi informed the board about TiHAN's Contribution to Vijayawada Flood Relief Efforts:**
Flood Net Development: TiHAN has developed FloodNet, an advanced model for water detection that leverages semantic segmentation technology. This innovative system is designed to significantly improve flood monitoring and response efforts, providing timely and accurate data to support effective disasters. **Detection of Mosquitos Breeding Hotspots:** Drone Deployment by Qopters Pvt. Ltd.: In collaboration with this initiative, TiHAN startup Qopters Pvt. Ltd. deployed drones in Vijayawada to assist with rescue operations amid the recent floods. These drones play a crucial role in enhancing response efforts, enabling rapid assessment of affected areas, and delivering critical support to those impacted by the disaster. **Detection of Garbage Vulnerable Points was also demonstrated.**

c) **TiHAN Participation in IMC**
TiHAN participated in IMC, Prof. P Rajalakshmi was a speaker at Cyber Physical System (CPS) Summit session during IMC 2024 and was moderated by Dr. Ekta Kapoor.

d) **Fusion Forge Lab of TIHAN at TIP Building IITH:**
She also informed that TiHAN at IIT Hyderabad inaugurated the "Fusion Forge" Lab for Autonomous Drones and Unmanned Ground Vehicles (UGVs). It was inaugurated by IIT-H Director Prof. B. S. Murty on 26th September 2024. This center aims to develop right skills and empower innovators in Autonomous Navigation, Artificial Intelligence, and Drone Technology.
The training facility is equipped with workstations, autonomous drone development kits, and training resources for UGV autonomous navigation, providing a comprehensive environment for skill development and hands-on learning.

TECHNICAL ACTIVITIES:

Edge Computing and Multi-RAT for Autonomous Navigation: Architecture of Edge based Autonomous Navigation deployment in ACS (Real-Time Experimentation) Multifunction Control Hardware for Drive-by-Wire System, APP Interface for Multi-modal Transportation: CAN-based Drive-by-Wire System, Drive-by-Wire in Commercial Vehicles, V2I for Green Corridor.

R&D Collaborations Initiated:

TIHAN Signed an MoU with National Small Industries Corporation Technical Service Centre Hyderabad.

Showcasing Innovation:

TiHAN demonstrated its personalized air vehicle and heavy payload cargo drones to Prof. Abhay Karandikar, Secretary of the Department of Science and Technology on 8th September 2024.

TiHAN Showcase Autonomous navigation tech at the Global AI Summit 2024 on5th&6thSeptember2024, Telangana. Honored to connect with Telangana CM Shri. Revanth Reddy and IT Minister.

OUTREACH ACTIVITIES:

Participation of TiHAN in **IMC 2024** event will be held at Pragati Maidan, Bharat Mandapam, Delhi, from the 15th to the 18th of October 2024. Dr. Chandra Sekhar Pemmasani, Minister of State for Rural Development and Communications, Government of India, Mr. Suresh Kumar, Infrastructure and Investment, Secretary to Government of Andhra Pradesh, and Mr. Dinesh Kumar, MD of AP DRONES Department have appreciated the efforts of TiHAN during Vijayawada Floods and emphasized on future collaborative work in IMC 2024 Event.

TiHAN Presented a technical session on **ADAS** on 19th September 2024 at the **GARC** facility in Chennai.

As part of the Software Defined Vehicle Summit India 2024, the panel discussion on "Regulatory Landscape and Policy Framework for Software-Defined Vehicles in India," organized in association with TiHAN IIT Hyderabad, will take place on 25th September 2024 at Bangalore.

Prof. P Rajalakshmi also informed about the Skill Development Workshop on Drones in Agriculture in Telugu, Skill Development Workshop on Drones in Agriculture, etc.

TiHAN proposal accepted for CES 2025:

TiHAN proposal got accepted and will be showcasing in CES 2025JAN 7-10, 2025 LAS VEGAS, NV.

TiHAN RECOGNITIONS:

- NMICPS Technology Innovation Hub on Autonomous Navigation Foundation, Hyderabad, Telangana -recognized as Scientific & Industrial Research Organization (SIRO) by the Department of Scientific and Industrial Research (DSIR) from April 2023 to March 2026.

- NMICPS Technology Innovation Hub on Autonomous Navigation Foundation, has achieved ISO 9001:2015 certification for Quality Management System.
- Applied for TiHAN's Foreign Contribution Regulation Act (FCRA)Account – Document Verification Done by Ministry of Home Affairs (MHA Officials).
- TiHAN is in the Process of the National Accreditation Board for Testing and Calibration Laboratories (NABL) for UAV Propulsion Test Centres – Calibration certificates received, final application in process

12. SUGGESTIONS FROM THE MEMBERS, DISCUSSION, AND ACTION PLAN:

Mr. Sameer Kumar recommended to have brainstorming session to discuss the ideas about the next generation mobility solutions and self-sustainability of the hub.

Mr. Kumar N Sivarajan suggested to generate funds for the autonomous drones and look for investment to scale this technology on global level. He further mentioned that TiHAN could be world leaders in this technology.

VOTE OF THANKS:

Prof. Rajalakshmi announced the summary of the discussion, recommendations, and decisions taken in the meeting. Before the conclusion of the Meeting, CS Jayata Agarwal, Company Secretary, made the call after the meeting and ensured the presence of a quorum throughout the meeting.

With the agenda item being transacted, Jayata thanked the members for making it convenient to attend the meeting and thanked them for their active participation.

Thereafter, the members declared the meeting as concluded.

Signatures:

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Prof. B. S. Murty   **Prof. Rajalakshmi**
Chairman of HGB   **Project Director/Member Secretary**