

## **NMICPS Technology Innovation Hub on Autonomous Navigation Foundation**

**Registered office:** C/o Indian Institute of Technology Hyderabad, IIT Hyderabad Kandi(V) Sangareddy,  
Kandi, Medak-502285

CIN: U73200TG2020NPL140558

**MINUTES OF THE MEETING OF MEMBERS OF HUB GOVERNING BOARD OF NMICPS TECHNOLOGY INNOVATION HUB ON AUTONOMOUS NAVIGATION (TiHAN) FOUNDATION HELD ON FRIDAY 24<sup>TH</sup> DECEMBER 2021 AT BOARD ROOM, ACADEMIC BLOCK-A, INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD, KANDI CAMPUS, SANGAREDDY 502285 AT 10.00 AM.**

Time of commencement of the Meeting: 10.00 AM

Time of conclusion of the Meeting: 11.30 AM

### **1. ATTENDANCE**

<b>Sr. No.</b>	<b>Name</b>	<b>Designation</b>	<b>Mode of Attendance Physical/Electronic mode</b>
<b>Directors:</b>			
1.	Prof. B. S. Murty	Chairman	Physically
2.	Dr. Rajalakshmi Pachamuthu	Member	Physically
3.	Dr. K R Murali Mohan	Mission Director	Physically
4.	Dr. Bheemarjuna Reddy Tamma	Member	Physically
5.	Mr. Samir Kumar	Member	Through VC from Bengaluru
6.	Mr. Kumar N. Sivarajan	Member	Through VC from Bengaluru
7.	Dr. Gopichand Katragadda	Member	Through VC from Bengaluru
<b>Invitees:</b>			
8.	Mr. Mahesh Balaiah Aswathiya	Chief Executive Officer	Physically
9.	CA Saurabh Dashottar	Internal Auditor	Physically
10.	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 TiHAN Foundations 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 10.00 A.M, the Chairman (Prof. B. S. Murty) 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 the members present at the Meeting of Hub Governing Board (HGB) of the Company.

**4. LEAVE OF ABSENCE:**

Leave of absence was granted to Mr. Krishna Bodanapu, Prof. Suryakumar and Prof. Kiran Kumar Kuchi for not attending the meeting, due to unavoidable circumstances and had requested for the same.

**5. CONFIRMATION OF MINUTES OF THE FIRST MEETING OF MEMBERS OF HGB HELD ON 18<sup>TH</sup> JUNE 2021:**

Minutes of the meeting of the Hub Governing Board held on 18<sup>th</sup> June 2021 duly initialed by the Chairman were placed before the Board and Board approved the same.

**6. OPENING REMARKS BY CHAIRMAN:**

Prof. B. S. Murty- the Chairman delivered his speech highlighting that the TiHAN at IIT Hyderabad is the source for fundamental knowledge and technologies in the technology vertical of Autonomous Navigation and Data Acquisition Systems (UAVs, ROVs, etc.), Performance Highlights of the Company and Future Strategy of the Company etc.

The Chairman further informed that TiHAN has been moving very fast and testbed is also getting ready. TiHAN is also planning for inauguration ceremony of Testbed. He further informed the board about that number of Industries like Suzuki, Mahindra coming forward to collaborate & support TiHAN activities.

The Chairman concluded his speech by placing on record his sincere thanks to the Department of Science and Technology (DST) under National Mission on Interdisciplinary Cyber Physical Systems (NM-ICPS) for sanctioning, the prestigious Technology Innovation Hub (TIH) on Autonomous Navigation and Data Acquisition Systems (UAVs, RoVs, etc.) to IIT Hyderabad (IITH). He also thanked Industry persons for their constant support.

**7. REMARKS BY MISSION DIRECTOR, DST:**

Dr. K R Murali Mohan has appreciated the efforts taken by Prof. Murty and Prof. Rajalakshmi and entire team to take the TiHAN at higher levels. He further mentioned about the constant co-operation of DST.

**8. LAUNCH OF TIHAN LOGO, SKILL DEVELOPMENT KITS:**

We are proud to announce the launch of the new logo as part of the ongoing evolution of our brand. The new logo was launched by Dr. K R Murali Mohan, Mission Director, DST NMICPS. TiHAN Logo has been designed considering innovation, autonomous navigation across different modes and the colours symbolises energy, dedication, new generation & technology. .

Dr. K R Murali Mohan also launched the Skill Development Kits.

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UGV & UAV kits have been conceived and developed under the skill development activities by team headed by Prof G V V Sharma, Electrical Engineering Department IIT Hyderabad. TiHAN has entered into an agreement with Optimuslogic Sytems Pvt Ltd to ensure commercial availability of UGV & UAV kits which will benefit utilization by target institutes, industry and student enthusiasts.

### **9. REVIEW ON THE ACTIVITIES OF THE HUB SINCE THE SECOND BOARD MEETING:**

Prof. Rajalakshmi- Project Director/Member Secretary informed the board about the activities carried out by TiHAN in last six months. She reiterated the Objective of the Hub for safe sustainable smart next generation mobility. She further explained that TiHAN at IIT Hyderabad importantly focuses on the research, design, and development of autonomous navigation and data acquisition systems for UAVs, ROVs, etc. With a synergistic industry and academic collaborations, the hub aims at realizing the utilization of autonomous navigation and data acquisition systems with a aim towards translational research and development considering the commercialization aspects in the area of Autonomous and Intelligent Navigation Systems for Ground, Aerial, and Water Surface Vehicles; Applications of Autonomous Navigation Technologies in Agriculture, Infrastructure Monitoring (Power Line, Constructions, Pipelines, Railway Tracks, etc.), Surveillance (Maritime, Airtime, Terrestrial), and Environmental Monitoring (Air, Water, Industrial Pollutants, etc.).

She has also informed about the activities taken by the TiHAN in Research and technology development, Industry Collaboration, Innovation, Entrepreneurship Start-up Ecosystem, International Collaborations, Human Resource and skill Development and Intelligent testbed.

Prof. Rajalakshmi has also updated status on progress & presented a video to members about a first of its kind state-of-the-art Testbed for Autonomous Navigation (Aerial/Terrestrial) being developed at TiHAN IIT Hyderabad. The Facilities includes Proving Grounds, Test tracks, Mechanical integration facilities like Hangers, Ground control stations, Anti drone detection systems, State of the art Simulation tools (SIL, MIL, HIL, VIL), Test tracks/circuits, Road Infra – Smart Poles, Intersections, Environment Emulators like Rainfall Simulators, V2X Communications, Drone Runways & Landing area, Control Test centers. Prof. Rajalakshmi also updated the status of Hanger facility for UGV and UAV testing including control room facility and different kind of road scenario for testing UGV's. TiHAN has also registered copyright on Testbed as it is one of its kind in India.

She also informed about the TiHAN accomplishments on R&D projects at Hub level and by actively collaborating with other Institutions as well as R&D Labs.

### **10. HUB TARGETS AND ACCOMPLISHMENTS SO FAR AND PLANS FOR BUSINESS DEVELOPMENT AND REVENUE GENERATION MODELS:**

Prof. Rajalakshmi explained the usage and development of Unmanned Aerial Vehicles (UAVs) in the fields of agriculture, health care, and military, etc. Based on the weight, UAVs are classified as Nano, Micro, Small, Medium, and Large Aerial Vehicles. More precisely, Nano, Micro, and small UAVs are widely used for the defence applications such as Intelligence, Surveillance, and Reconnaissance. Micro Aerial Vehicles (MAVs), which come under a weight less than or equal to 2kg, are preferable for Surveillance applications. Due to the lightweight and flapping effect, the autonomous flight of MAVs is a major challenge in robotics. An autonomous Flapping MAV is developed which includes autonomous operations like take-off, cruising, landing, and loitering mode.

She further explained about the TiHAN activities related to ground vehicles like E-Rikshaw, Passenger Car, Micro-Van and utilisation of LIDAR as well as other sensors mounted on these vehicles for autonomous navigation deployment providing video demos of accomplishments carried out till date.

She further mentioned the board about end-to-end connectivity multi model transportation solutions for Indian Scenario going forward. Energy efficient autonomous navigation enabled different modes of electric vehicles i.e. ebikes to be integrated as navigation system.

Prof Rajalakshmi intimated about the new recruits in TiHAN team, Mr. Saravana Bavan as Hub Operations Officer (HOO) and introduced Mr Mahesh as CEO of TiHAN who was present in the meeting. TiHAN has started identifying chair professors through nominations. Faculty fellowships have been offered as part of Human Resource Development. She has also informed about various Workshops, Trainings, Symposiums and Call for proposals for workshop (Guidelines Techqip, ATAL) as part of Skill Development Activities

TiHAN under the Entrepreneurship Development has identified and funded start-ups, PRAYAS (Promotion & Acceleration of Young and Aspiring technology entrepreneurs) & CPS-EIR (Entrepreneur in Residence) in collaboration with iTIC Foundation, IIT Hyderabad (Technology Business Incubator). TiHAN has been constantly interacting with the start-ups & nurturing in various formats to encourage Innovation & Technology development in Startup ecosystem.

TiHAN has been interacting with many industry partners like Suzuki, Maruti, Altran, ANRA, Infineon, Continental, Honeywell, Dassault Systemes, ZF, Cyient, etc. and discussing modalities to forge long term collaboration. Highlights of Smart E-bike development with autonomous navigation & video demonstration was highly appreciated by Board Members

She has further informed about the futuristic research in pipeline i.e. micro and nano category drones, Next Generation Hybrid Mobility ground and aerial vehicle like flying cars, pods as part of Integrated Urban Air Mobility. A video on the Floor visit to the testbed was also showcased for the Board members which included the posters from the RnD team of TiHAN – M.tech students, Phd students, Post Docs, Faculty Fellows, Start-ups and prototypes being developed as part of the Rnd activities.

## **11. BUDGET DISCUSSION:**

Dr. Rajalakshmi presented the fund utilisation till date and sought approval to seek 2<sup>nd</sup> year funds from DST-NMICPS. Mission Director Dr K R Murali Mohan assured to do the needful on recommendation of Mission Governing Board (MGB) scheduled to meet soon.

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

The Chairman invited all the Industry Representatives for their Opinions and Suggestion. Following points were discussed & suggested by the Board members

- Safety of users to be taken care in handling of Skill development kits especially UAV
- TATKAL scheme to be utilized for PATENT filing
- Industry Sponsorships for topup scholarships for PhD & other research scholars to be explored
- The Targets & accomplishments of TiHAN to be made available on website as per NMICPS website & guidelines
- Encourage utilization of global platform to showcase technology developments & prototypes.
- Members offered to connect with relevant industry members & partners to further accelerate TiHAN objectives.

The Chairman responded to the queries of Members and thanked them for their participation.

## **13. ANY OTHER MATTER WITH THE PERMISSION OF THE CHAIR:**

Prof. Rajalakshmi has informed the board about the two new designations with respect to Key Managerial Personals created in the company. He introduced Mr. Mahesh Balaiah Aswathaiya appointed as Chief Executive Officer (CEO) and Mr. Saravana Bavan appointed as Hub Operation Officer of the Company.

## **VOTE OF THANKS:**

Chairman announced the summary of the discussion, recommendations and decisions taken in the meeting. Before the conclusion of the Meeting, Chairman made the roll call at the conclusion of the meeting and ensured presence of quorum throughout the meeting.

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

Thereafter, the chairman declared the meeting as concluded.

Date:  
Place: IITH



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**Prof. B. S. Murty**  
**Chairman**