



# The Regional Network Office for Urban Safety (RNUS)

## Monthly Report (April 2024)

Report to STE/SET

Prepared by RNUS

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# 1.1 Summary

This report summarizes the activities done in RNUS office during the month of April 2024. Progress has been summarized in the following orders:

- 1) RNUS Outreach Activities
- 2) RNUS Office Procurement Update
- 3) Progress on Research Activities
  - Groundwater table measurement with low-cost device for CH4 emission mitigation in Thailand
  - Structural Health Monitoring with remote sensing techniques
  - Study on post-disaster recovery dynamics
- 4) Support in STE's Student Research
- 5) Plans

# 1.2 RNUS Outreach Activities

RNUS brochure has been revised incorporating the current research activities and it can be downloaded in the following link, Fig-1&2 provide insight of RNUS brochure, (<https://drive.google.com/file/d/14YD7WwAqQWigQuuTL5IEtL9ms-1RqXbV/view?usp=sharing>).

**MEMBERS**

**Advisor**  
Prof. Pennung Warnitchai  
Earthquake Engineering, SET, AIT

**Prof. Wataru Takeuchi**  
RS/GIS, Director of OHOW, IIS, U-Tokyo

**Coordinator**  
Dr. Khim Myat Kyaw  
Structure engineering, SET, AIT  
(Assistant professor, IIS, U-Tokyo)

**Joint coordinator**  
Dr. Chaitanya Krishna  
Structure engineering, SET, AIT

**Visiting researcher**  
Dr. Yasmin Bhattacharya  
Urban engineering, SERD, AIT  
(postdoctoral fellow, IIS, U-Tokyo)

**Secretary**  
Ms. Mettha Masuttitham

**Cooperative members**  
Prof. Kimiro Meguro  
Dean of III, Director of CIDIR, IIS, U-Tokyo

**Prof. Reiko Kuwano**  
Geotechnical engineering, IIS, U-Tokyo

**Prof. Miho Ohara**  
Disaster mitigation engineering, III, CIDIR, IIS, U-Tokyo

**Assoc. Prof. Tsukasa Mizutani**  
Real-Time Spatial Analysis, IIS, U-Tokyo

**MAP TO RNUS/AIT**

**CONTACT US**

Regional Network Office for Urban Safety (RNUS)  
School of Engineering and Technology (N201)  
Asian Institute of Technology  
58 Moo 9 Paholyothin Road, Klong Luang  
Pathumthani 12120 THAILAND

Tel: (66-2) 524-6418  
E-mail: [rnus@ait.ac.th](mailto:rnus@ait.ac.th)

<https://rnus.ait.ac.th/>

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Fig-1 RNUS brochure: front page



Fig-2 RNUS brochure: back page

### 1.3 RNUS Office Procurement Update

Workstation HP Z2 TWR G9 IDS and 27” LG Monitor (shown in Fig-3) have been procured in RNUS office, and it’s ready to run computation-intensive analysis.

The **DJI Phantom 4 Pro+V2.0** drone from Takeuchi Lab./UTokyo was brought to RNUS office for drone test flying in RID paddy field (see Fig-4 for drone device image). With its 1-inch sensor camera, this drone can be used for capturing aerial imagery.

Moreover, low-cost air pollution PM2.5 monitoring system was positioned in RNUS office as shown in Fig-5. This mobile low-cost sensor can measure the particulate matter, PM2.5 referring to fine particles with diameters that are 2.5 micrometres and smaller. This device is also brought from Takeuchi Lab./ UTokyo.



Fig-3 Workstation and monitor procured by RNUS office.



Fig-4 DJI Phantom 4 Pro+V2.0 drone from Takeuchi Lab./UTokyo.



Fig-5 Low-cost PM2.5 monitoring system.

## 1.4 Progress on Research Activities

Research on “Groundwater table measurement with low-cost device for CH<sub>4</sub> emission mitigation in Thailand” is ongoing as part of RNUS research activities. Water level sensors were already installed in RID paddy field and the data can be continuously checked via dashboard. Drone flying is scheduled for next harvesting season starting from August. It is planned to visit RID paddy field around end of May 2024 for drone test flying. Research idea and preliminary result was presented in International Symposium of Remote Sensing 2024 (ISRS2024) which was held in 24-26 April 2024 at National Chung Hsing University, Taichung, Taiwan. Paper ID is P101.

Structural Health Monitoring with remote sensing techniques is also ongoing research topic in RNUS office. Remote sensing technique called Interferometric Synthetic Aperture Radar (InSAR) can detect the millimeter-level motion of the ground and this technique was used in this research. As of now, case study with linear rail infrastructure health monitoring (Dhaka-Kasiani-Gopalganj railway in Bangladesh) was done and the research outcome was presented in ISRS2024. Paper ID is P4020. Abstracts of both papers (P101 and P4020) can be downloaded from this link (<https://drive.google.com/file/d/1RA30BuyHOTqanK6WjUXlctL9qrjiPuJq/view>). This method is found to be applicable for other types of infrastructure health monitoring such as road and bridge SHM. In continuation of this research outcome, it is intended to replicate the research idea for highway SHM in Myanmar and bridge embankment instability mapping in Ayuttaya, Thailand. Analysis is ongoing and progress will be updated in the coming months.

Research on “Post-disaster recovery dynamics” is progressing with the sub-research topic approval for New Zealand based analysis granted by StatsNZ (Statistical authority of New

Zealand). This research is currently in the preparation phase and analysis will be carried out in June-July, 2024 from New Zealand.

## **1.5 Support in STE's Student Research**

Dr.Khin is currently helping Ms. May Chue Nyeint (STE Master student) in her research on "Numerical Study to Evaluate and Use Sub-Structure Method to Retrofit a Case Study School Building in Dhaka". As Dr.Khin is out of RNUS office from 13<sup>th</sup> March 2014 to 29<sup>th</sup> April 2024, online communication is ongoing as necessary.

## **1.6 Plans**

It's planned to visit RID paddy field in last week of May for LiDAR drone test flying over paddy field.

As part of RNUS outreach activities, RNUS seminar series 2/2024 will be held in 29 or 30 May 2024, 14:00~15:00 in hybrid mode (venue in AIT-TBC). Dr. Xuan Truong Trinh, project researcher from Takeuchi Lab. will be giving presentation on current RNUS research topic "Groundwater table measurement with low-cost device for CH<sub>4</sub> emission mitigation in Thailand".