

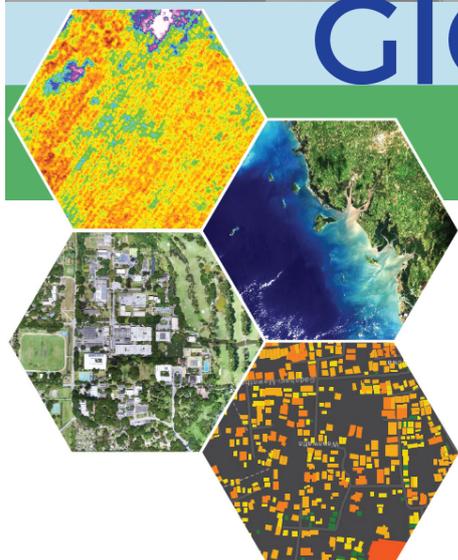


Professor Shunji Murai welcomes guests to the GIC 20th Anniversary Open House



GEOINFORMATICS CENTER

July 2019 NEWSLETTER



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GIC Celebrates its 20 Year Anniversary

The GeoInformatics Center reached a milestone in 2019 with its 20th anniversary. To celebrate the occasion GIC hosted an open house on Thursday May 30, 2019.

GIC Founder Professor Shunji Murai and GIC Director Dr. Manzul Hazarika were present to welcome guests and kick off the event with an opening ceremony.

During the open house guests had a number of opportunities to learn about the diversity of projects GIC conducts around Asia and the Pacific. A poster session featuring GIC's research varied in topics from machine learning for building footprint extraction to using remote sensing data to estimate crop yield. A drone display room

showcased GIC's recently developed RTK capable hexacopter as well as drone-related projects. Interactive stations allowed guests to explore GIC's web portals and newly developed disaster early warning system.

The highlight of the open house was a presentation by Professor Shunji Murai on his latest research involving earthquake prediction. His approach involves analyzing the atmospheric anomalies that happen before an earthquake which in turn affect GNSS signals. The method was used with success in 2018 to predict Japan's Hokkaido earthquake two days in advance.

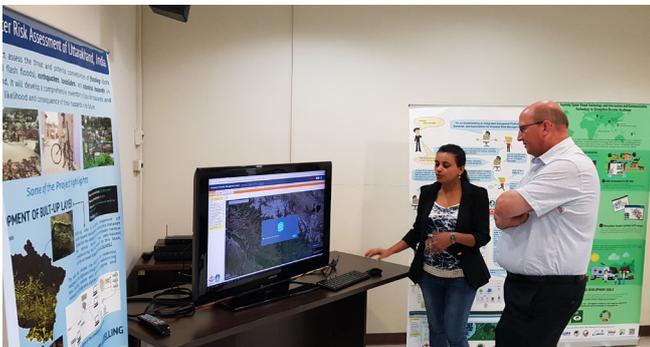
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GIC Celebrates its 20 Year Anniversary (cont.)



Guests at GIC Open House Poster session

The GeoInformatics Center has been a part of AIT since 1999. Professor Shunji Murai founded the center to address the needs of the region in terms of short-term training courses in geoinformatics. A merger with the Asian Center for Research on Remote Sensing in 2004 added research and consultancy to GIC's repertoire. The GeoInformatics Center as we know it today has trained more than 3,000 people from the region, and has undertaken a number of projects in countries including Bangladesh, Cambodia, Indonesia, Lao PDR, Nepal, the Philippines, Sri Lanka, Thailand and Vietnam.



Demonstration of the Decision Support System created for Uttarakhand State in India. The DSS was created to provide information flow to the right groups during a disaster.



Exploring GIC's project activity around Asia and the Pacific

Bhutan RNR Census Study Tour at AIT

Four officials from the Bhutan Department of Agriculture and Forests participated in a study tour at the Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific (FAO-RAP) and AIT's GeoInformatics Center from June 10 - 14, 2019.

The Department of Agriculture and Forests carried out a nationwide census of renewable natural resources in March 2019. To assist the department, FAO-RAP arranged a study tour for department representatives at AIT. The study tour provided the representatives an opportunity to work closely with FAO statisticians on determining the best way to present census data for a forthcoming publication. GIC staff were on hand to give a background on applications of geoinformatics to disaster and agricultural statistics, as well as to give an introduction on how to best visualize census data in a GIS to produce maps for their report.

2019's RNR census was the first in Bhutan to feature the Computer-Assisted Personal Interviewing (CAPI) software. CAPI can be accessed via smart device and makes it possible to improve the efficiency of face-to-face interviews, reduces the need for data cleaning, and provides a means for supervisors to monitor enumerator performance during the agricultural census.

The study tour was made possible through a collaboration between the Food and Agriculture Organization of the United Nations Regional and the GeoInformatics Center.



To learn more about the FAO-RAP and their latest projects please visit their website at: <http://www.fao.org/asiapacific/en/>

Workshop in Tajikistan for Multi-hazard Risk Assessment

Disaster experts from the Asian Institute of Technology and the University of Twente (UT), the Netherlands, conducted a two week workshop to share the methodology and risk profile generation with local authorities in Dushanbe, Tajikistan from April 29 – May 9, 2019.

The objective of the workshop was to ensure the sustainability of the project outcomes by transferring knowledge to local authorities so that they can replicate the same methodology as necessary in future disaster scenarios. Key themes during the first week of the workshop included obtaining spatial data for risk assessment, hazard analysis, and risk assessment.

The workshop was held in Dushanbe, Tajikistan at the UNDP Office and the Atlas Hotel. Nearly 30 professionals took part in the workshop from Tajikistan government bodies and non-government organizations including the Center for Research of Glaciers, Institute of Geology, Earthquake Engineering and Seismology (IGEES), Department of Geology, Agency on Hydrometeorology, Design and Research Institute FAZO, Environmental Protection Committee, Aga Khan Agency for Habitat, and the Committee of Emergency Situation and Civil Defense.

Participants were then grouped according to their respective areas of specialization during the second week to create risk profiles for each hazard along with guidance from AIT and ITC experts. Several software, models and indices like PCRaster, OpenLISEM and SPI modelling were used in the process of hazard profile generation along with open source GIS software platforms.



Field visit to gather information about historical disasters in the area

Elements at risk mapping and proper categorization of settlements plays an important role in the risk assessment result. Therefore, to familiarize with the existing local conditions of different types of settlements in Tajikistan, a field trip was organized on May 4 – 5, 2019 from Dushanbe to Khujand covering the entire Soughd region. The total journey was about 700km through several major and minor human settlements. Settlements visited included Dushanbe (highest population), Khujand (second highest population), Istravashan (third highest population), Buragen, Shakhristan, Pashchi, Dashtikhon, Kurkat, and Daliyoni Poyon.

Villager interviews provided an opportunity to gain greater insight into local knowledge regarding disaster history, main livelihood, number of families living and the variety of housing material types present. Furthermore, the journey was recorded using Ricoh Theta 360 degree cam to populate more attributes of elements at risk within OpenStreetMap. The data is available to view on the Mapillary online platform: (<https://www.mapillary.com/app/?lat=20&lng=0&z=1.5>)



Multi Hazard Risk Assessment Workshop participants and facilitators at Dushanbe, Tajikistan

The workshop is part of a United Nations Development Program (UNDP) project to increase disaster preparedness in Tajikistan. The goal of the project is “to assess the vulnerability of communities and infrastructure to natural hazards, determine their degree of exposure to future hazardous events and develop risk reduction recommendations (profiles) to be integrated into development planning processes in all districts across Tajikistan”.

Urban Flood Field Lab in Chiang Mai

GIC staff participated in the Understanding Risk Field Lab which took place at the International Sustainable Development Studies Institute in Chiang Mai, Thailand from June 3 – 28, 2019. The theme of the field lab was urban flooding in Chiang Mai, which was handled in a multi-faceted approach.

GIC staff were on hand during the first week of the month-long field lab to lend their expertise in drone data acquisition. Initially they selected a suitable area of interest in regards to flooding with consideration to the no-fly zone and delivered technical sessions on drone image acquisition theory. In the field the team performed missions to capture imagery over the 2km² area of interest with a DJI Phantom 4 multirotor and performed a GNSS survey of ground control points including logging via smart device. Finally, the team returned to the lab to process the drone imagery to

create deliverables including orthomosaic and digital surface model. The deliverables were to be used during further sessions of the field lab to model flooding in Chiang Mai.

Themes for the field lab included AI and Machine Learning for Flood Impact, Nature-based Solutions to Mitigate Flood Risk, Sensing and the 'Internet of Things', Community Mapping with OpenStreetMap, Risk Communication & Visualising Oral Histories of Flooding, Art & Science for Flood Risk, and User-centred Design for Disaster Risk Financing.

Understanding Risk is a nonprofit organization that is addressing disaster risk assessment through community involvement. The community is vast, consisting of over 9,000 professionals in the geospatial and disaster prevention community from across the globe. To learn more please visit <https://understandrisk.org>



UAV data processing session at the International Sustainable Development Studies Institute



Performing a GNSS survey of ground control points (left). Their locations were included in image processing to improve deliverable geometry (right)

On the Air with Radio Thailand

Radio Thailand recently interviewed Dr. Manzul Hazarika, Director of the GeoInformatics Center, regarding the benefits of remote sensing for precision agriculture. During the interview, Dr. Hazarika describes a recent project GIC conducted with FAO using unmanned aerial vehicles (UAV) and satellite imagery to estimate pre-harvest rice yield in Thailand's Ang Thong province.

The original broadcast was aired on April 23, 2019 on Radio Thailand's FM88 MHz station; the broadcast can be accessed by visiting GIC's

website by clicking [here](#). The audion file is in an audio player near the bottom of the page.

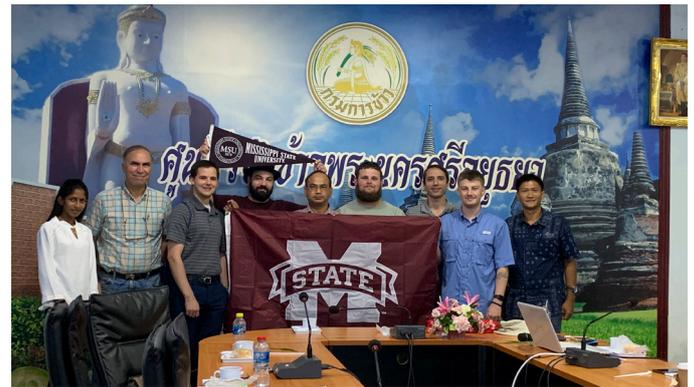
Radio Thailand was established in 1930 and continues to be a leading news source over the airwaves in Thailand. For more information on Radio Thailand, please visit nbt.prd.go.th



Students from Mississippi State University visit AIT-GIC

A group of students from Mississippi State University's Bagley School of Engineering participated in a study abroad program at AIT's Geoinformatics Center from May 31 – June 23, 2019.

The three-week program focused on the global perspective of resource planning. GIC staff delivered lectures in a wide range of geoinformatics applications including drought modelling, flood mapping, and crop monitoring. Practical sessions accompanied the lectures, including sessions on agricultural mapping with MODIS imagery and best practices for producing cartographic deliverables.



Mississippi study abroad group visit to the Ayuthaya Rice Research Center

The group also participated in a drone training course at the Geoinformatics Center during the second week of the program. GIC staff led sessions on aerial image acquisition theory, basic drone maneuvers, flight planning, and image processing.

While the students came from a variety of engineering backgrounds, they found the study abroad experience a valuable addition to their university education. Geoinformatics lessons in combination with cultural stops through Thailand made for a unique learning experience, providing perspectives into a new culture and field of study.



Dr. Manzul presenting GIC's disaster early warning endeavors

Beyond the classroom the group made a field visit to the Ayuthaya Rice Research Center. Mr. Kritkamol Paothong, Head Agricultural Research Specialist, gave a welcome from the Center and reviewed the latest innovative technology being used for rice cultivation. Center Director Mr. Pisit Pornmanarot also joined to explain about Pathum Thani's floating rice paddies and to present Thailand's record-holding longest rice plant.



Mississippi State University students visit Wat Phra Kaew in Bangkok



Discussing central Thailand rice practices with the director of the Ayuthaya Rice Research Center

Dr. Ganesh Bora, an alumnus of the School of Environment, Resources, and Development at AIT, led the study abroad trip. After graduating with a masters degree from the Faculty of Agricultural Systems and Engineering, Dr. Bora went on to complete his terminal degree at Kansas State University in the United States. Currently he serves as faculty at Mississippi State University in Starkville, Mississippi, USA.

GIC Publishes UAV Development Research in Coordinates Magazine

GIC's research towards creating a long-range mapping drone was published in the June 2019 issue of Coordinates magazine (Volume 15, Issue 6).

The article, titled Building a low cost long range mapping drone, focuses on a fixed wing drone that was developed at GIC in 2018. The drone features a 2m wingspan and a maximum endurance of 50 minutes on a single 5200mAh lithium polymer battery. Visible spectrum imagery is captured with a consumer grade Sony RX 100 M3 camera with a 20.1 MP CMOS sensor.

During flight, progress is monitored on a ground control station as well as with live video. A nose-mounted video camera provides a first-person perspective from the drone during flight for navigation and safety purposes. The video is viewed through a pair of monitor goggles that link to the live video feed.

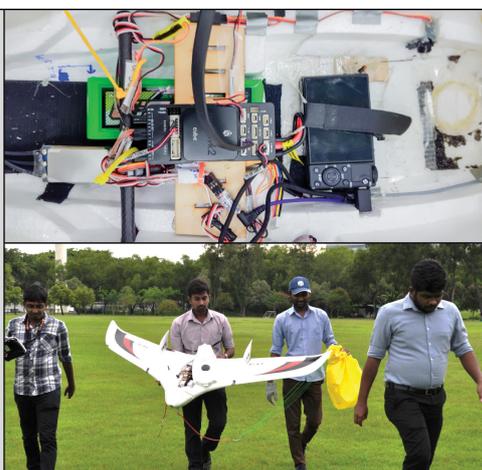
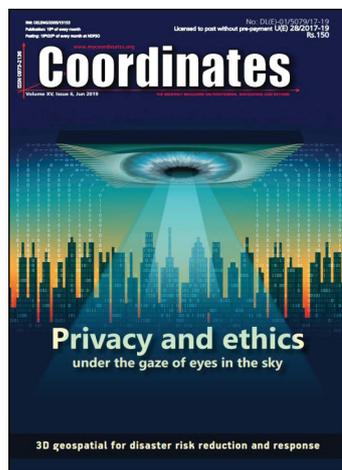
One of the caveats to operating a fixed wing drone is designating an appropriate landing area. Fixed wing drones typically require a

substantial area free of obstructions to perform a belly landing. Depending on the positioning error associated with a particular drone's landing characteristics, the area could be as large as a 9 meter radius around the chosen landing point. This project was able to reduce the area needed for landing by incorporating

In all, the drone featured in the article was assembled and configured at GIC for less than \$2000 USD with parts sourced from the internet. This represents a significant cost savings over other fixed wing survey capable drones on offer from major manufacturers like Sensefly which may cost five times as much for similar output.

The magazine article can be accessed [here](#) through the Coordinates website.

Coordinates is an Indian magazine delivering monthly content on the latest geospatial technology and applications. More information on Coordinates can be found by accessing their website at <https://mycoordinates.org/>



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