

**** November 2021 News from Sentinel Asia Project Office ****

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Topics:

1. [News] Emergency Observation of Disasters
2. [Interview] Dr. Kuang-Chong Wu, President of National Applied Research Laboratories (NARLabs), and Dr. Jong-Shinn Wu, Director General of National Space Organization (NSPO)
3. [News] Special Session on Sentinel Asia “Sentinel Asia for the ASEAN Region” under the AHA Centre Executive Programme held on 17 November 2021
4. How to Send an Emergency Observation Request
5. Using the Sentinel Asia Operation System, OPTEMIS

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1. [News] Emergency Observation of Disasters (as of 25 November 2021)

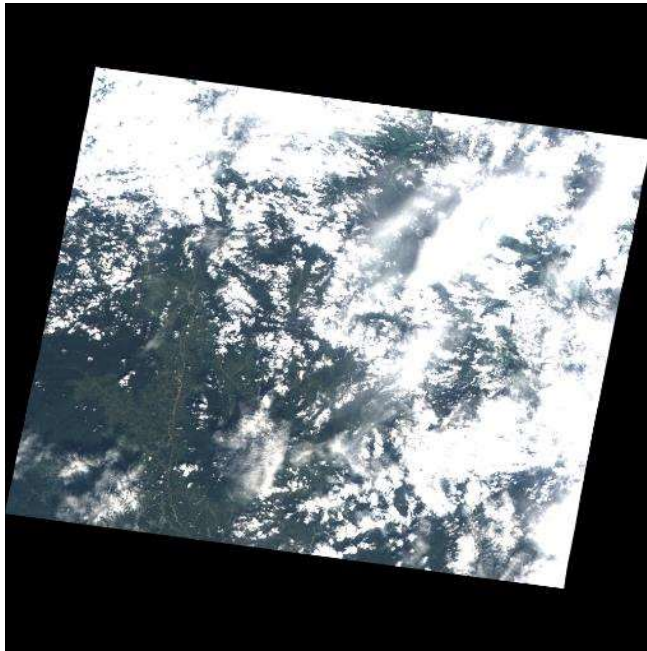
(1) Floods and Landslides in Vietnam (GLIDE Number: FL-2021-000166-VNM)

From 22 to 25 October, heavy rainfall was recorded in Vietnam, causing widespread floods. “VNExpress” reported that 11,000 houses were submerged, one person was killed and three others were missing.

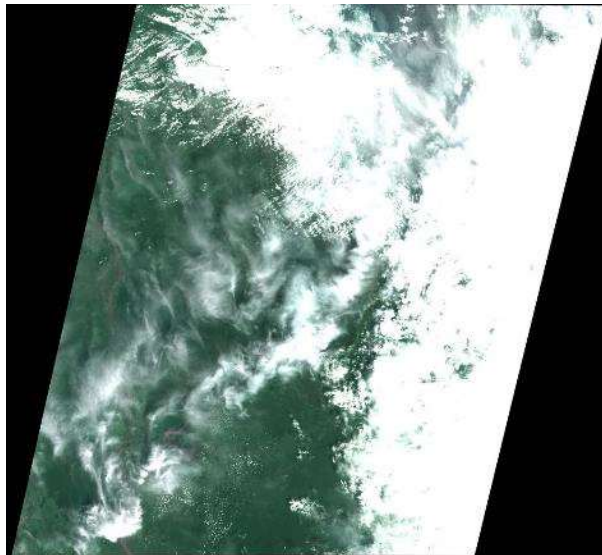
(<https://e.vnexpress.net/news/news/record-rainfall-deluges-central-vietnam-province-4376382.html>)

The Ministry of Natural Resources and Environment (MONRE) of Vietnam made an EOR to Sentinel Asia on 25 October. Among Data Provider Nodes (DPNs), the Japan Aerospace Exploration Agency (JAXA), the Indian Space Research Organization (ISRO), and the Geo-Informatics and Space Technology Development Agency (GISTDA) provided data. Among DANs, the Asian Institute of Technology (AIT) provided its VAPs. Information on the latest response by Sentinel Asia is available at the following link:

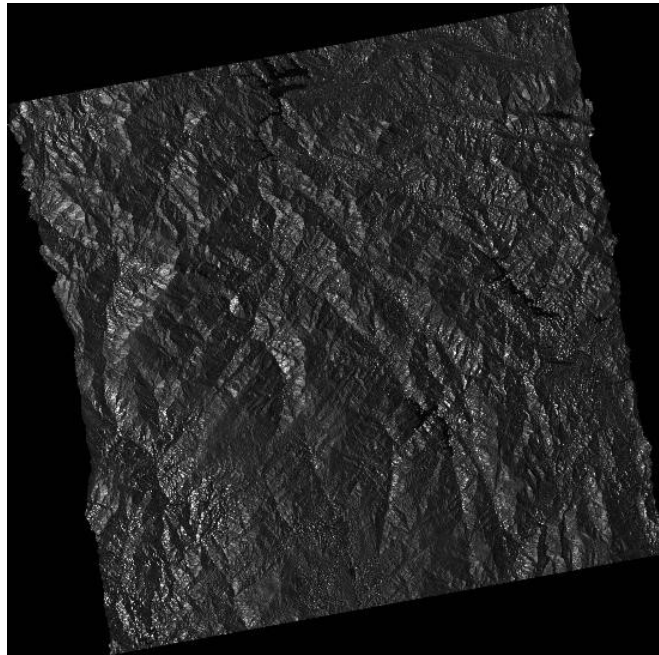
<https://sentinel-asia.org/EO/2021/article20211022VN.html>



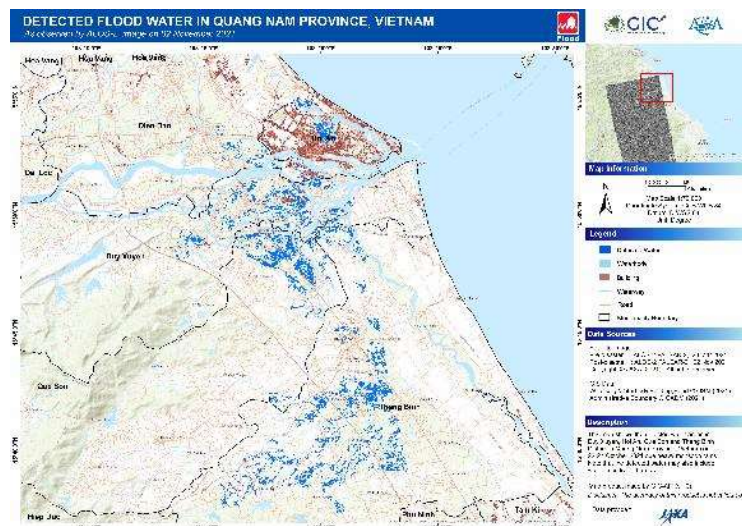
Satellite image (THEOS1) provided by GISTDA



Satellite image (Resourcesat-2) provided by ISRO



Satellite image (ALOS-2) provided by JAXA



Value-Added Product by AIT

(2) Floods and Landslides in Sri Lanka (GLIDE Number: FL-2021-000188-LKA)

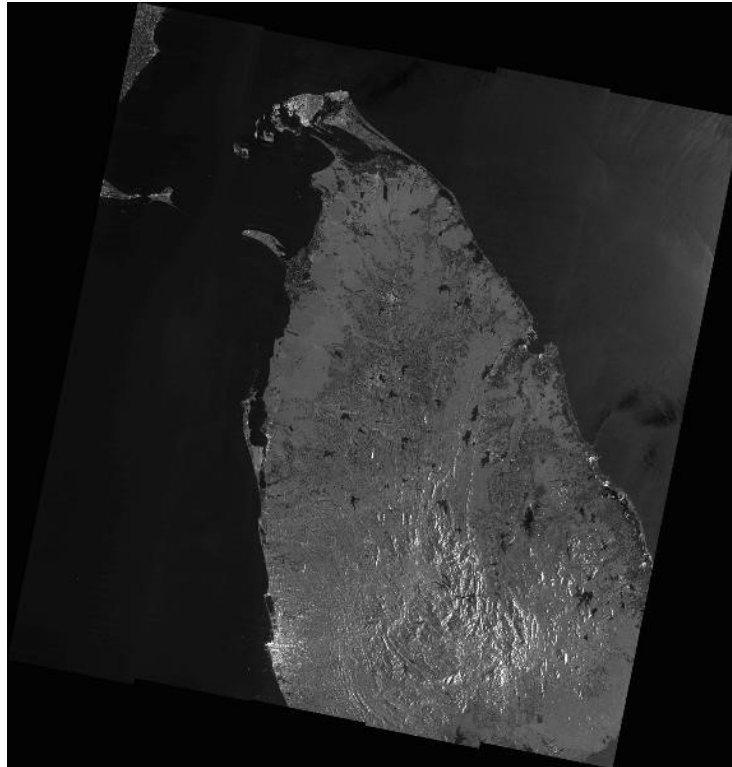
Heavy rain from the north-east monsoon in Sri Lanka caused floods and landslides. “India Today” reported that at least 26 people have been killed and over 230,000 others affected as of 12 November.

(<https://www.indiatoday.in/world/story/people-killed-affected-extreme-weather-conditions-sri-lanka-1876063-2021-11-12>)

The Disaster Management Center (DMC) of Sri Lanka made an EOR to Sentinel Asia on 15 November. This EOR was escalated to the International Disasters Charter. AIT assumed the role of Project Manager for this Charter activation. Among Data Provider Nodes (DPNs),

JAXA provided data. Among DANs, AIT provided its VAPs. Information on the latest response by Sentinel Asia is available at the following link:

<https://sentinel-asia.org/EO/2021/article20211105LK.html>



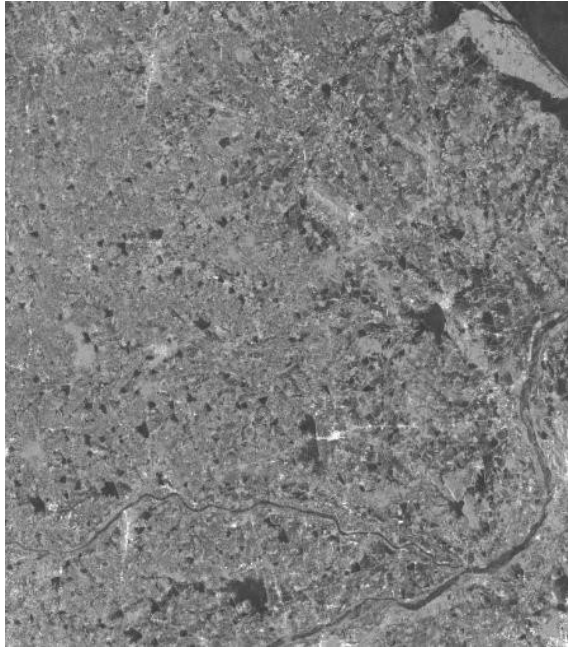
Satellite image (ALOS-2) provided by JAXA

(3) Floods in India (GLIDE Number: FL-2021-000172-IND)

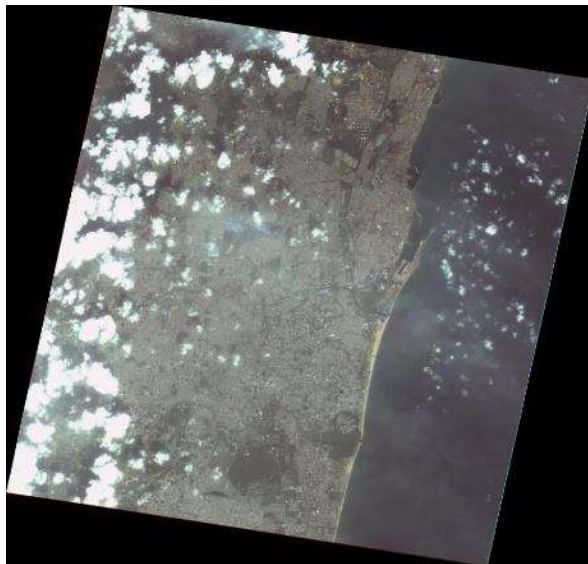
Heavy overnight rain led to flooding in several areas of southern India including the city of Chennai. CNN reported that there was more than 20 centimeters of rainfall in Chennai, the heaviest since 2015. (<https://edition.cnn.com/2021/11/07/india/chennai-india-rain-flood-intl-hnk/index.html>)

ISRO made an EOR to Sentinel Asia on 15 November. Among Data Provider Nodes (DPNs), JAXA and the National Applied Research Laboratories (NARL) provided data. Among DANs, AIT and the Mohammed Bin Rashid Space Centre (MBRSC) provided their VAPs. Information on the latest response by Sentinel Asia is available at the following link:

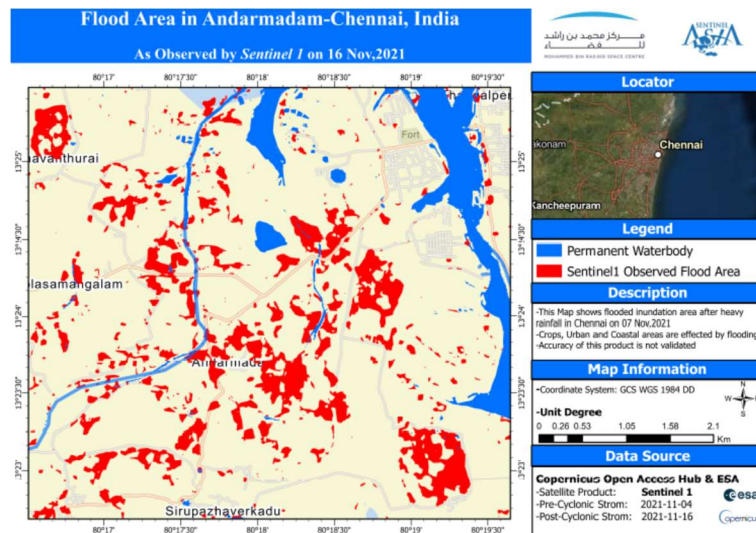
<https://sentinel-asia.org/EO/2021/article20211107IN.html>



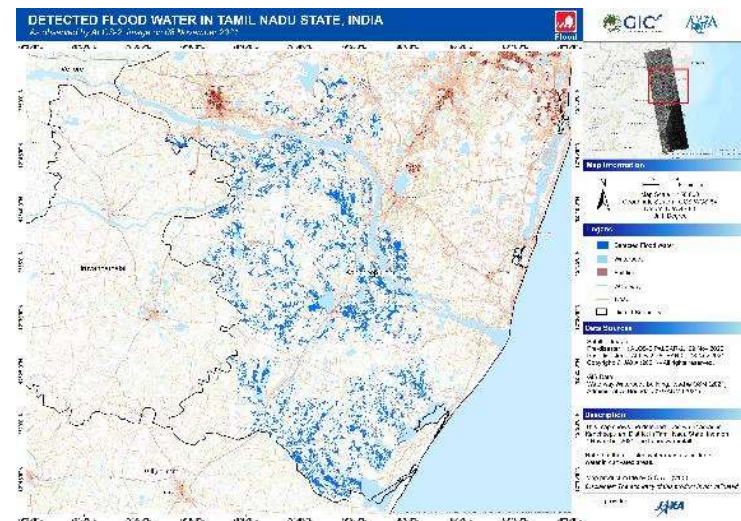
Satellite image (ALOS-2) provided by JAXA



Satellite image (Formosat-5) provided by NARL



Value-Added Product by MBRSC



Value-Added Product by AIT

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- [Interview] Dr. Kuang-Chong Wu, President of National Applied Research Laboratories (NARLabs), and Dr. Jong-Shinn Wu, Director General of National Space Organization (NSPO)

The National Applied Research Laboratories (NARLabs) of Taiwan joined Sentinel Asia (SA) in 2010. Since then, NARLabs, along with the National Space Organization (NSPO), one of the institutes under NARLabs, continues to provide its satellite data to SA. Recently, they contributed to the realization of SA operation system OPTEMIS in collaboration with Academia Sinica from Taiwan and Geo-Informatics and Space Technology Development Agency (GISTDA). They are also working with the newly developed Taiwan Data Cube (TWDC) on the further application of Earth observation data. The SA secretariat interviewed Dr. Kuang-Chong Wu, President of NARLabs, and Dr. Jong-Shinn Wu, Director General of NSPO, to ask about their connection to SA and related contributions, past and future.

Dr. Kuang-Chong Wu, President of National Applied Research Laboratories (NARLabs)



Dr. Jong-Shinn Wu, Director General of National Space Organization (NSPO)



Sentinel Asia Secretariat

NARLabs and NSPO are long-time SA members in addition to being major players in this region. Could you introduce the missions and roles of each organization to readers?

Dr. Kuang-Chong Wu, NARLabs

NARLabs, the National Applied Research Laboratories, is the largest R&D organization under Taiwan's Ministry of Science and Technology. We have four major missions: to establish R&D platforms, to support academic research, to promote frontier science and technology, and to foster high-tech manpower. There are eight research centers under the umbrella of NARLabs, including NSPO, the National Space Organization, TORI, the Taiwan Ocean Research Institute, and NCREC, the National Center for Research on Earthquake Engineering.

Taiwan has a "2030 Science and Technology Vision," which is to create an innovative, inclusive, and sustainable society. With our earth and environment technology, NARLabs is ready to support the Sendai Framework in building a disaster-resilient society. That's why NARLabs as a whole, not only NSPO, volunteered to join Sentinel Asia in 2010. In the past decade, NARLabs has also invited partners from Taiwan's Academia Sinica and National Central University to collaborate with the Sentinel Asia family. Looking back at the evolution

of Sentinel Asia, NSPO has made many contributions. NARLabs has more to offer when we expand our work from disaster response to preparedness/mitigation and the recovery phase.

Dr. Jong-Shinn Wu/NSPO

NSPO is the only national space research organization in Taiwan. We have nearly 300 employees working for national missions, most of which are satellite projects, and are very happy to cooperate with the Sentinel Asia.

Secretariat

You mentioned that NARLabs had also invited partners from the National Central University to join Sentinel Asia. Does NARLabs collaborate with universities and other institutes under NARLabs for SA activities?

NARLabs

Universities are not under NARLabs, but all of our centers work very closely with them. Also, there are other institutes for ocean research, earthquake engineering, and supercomputing that we work with. They are not SA members, but our data are on the Open Data Cube, which we cooperate on. We will continue to find future opportunities to engage in discussions with such institutes and bring them into our framework of cooperation when needed.

Secretariat

The Sentinel Asia Secretariat appreciates Team Taiwan for its long-time support to SA as a DPN and a DAN. Could you highlight some of your contributions to past EORs?

Dr. Jong-Shinn Wu/NSPO

The most significant effort, I think, is that related to the Great East Japan Earthquake and tsunami in 2011. In that tragic disaster, NSPO worked very closely with JAXA to schedule joint observation by FORMOSAT-2 and ALOS-2 of the disaster for a one-month period. The first image captured by FORMOSAT-2 after the tsunami struck was shown on the front page of the SA website.

In 2010 and 2021, NSPO has contributed to Sentinel Asia activities as a Data Provider Node. NSPO as a DPN has successfully responded to various Emergency Observation Requests (EORs) pertaining to 23 countries and 173 major disaster relief activities with FORMOSAT-2 and FORMOSAT-5 satellite datasets comprising before and after events.

Secretariat

The Secretariat also appreciates your support to the Sentinel Asia Step 3 system. We think it is a significant achievement in SA Step 3 activities that this system is operated under multinational cooperation, combined with OPTEMIS provided by GISTDA. What role did you have in the

OPTEMIS operation?

Dr. Jong-Shinn Wu/NSPO

The Sentinel Asia Step 3 system was developed by the SA Step 3 technical team, which consists of Japan Aerospace Exploration Agency (JAXA) of Japan, GISTDA of Thailand, NARLabs, and Academia Sinica Grid-computing Centre (ASGC) of Taiwan. The Step 3 system is a cloud-based system that aims to improve the data efficiency and security of the previous generation SA system. In this system, the GISTDA-provided OPTEMIS is used as the operational interface and the system is hosted on NARLabs/ASGC using cloud infrastructure. The tech team was organized in April 2019, and resulting system development activities were conducted at three different sites and through monthly Web meetings and a face-to-face meeting in June 2019 in Taipei. Finally, the SA Step 3 system was released online and announced operational in October 2019 as planned. The new system provides up-to-date functionalities from an ICT technical point of view for Sentinel Asia disaster relief and mitigation activities. The more important achievement is the mechanism of multinational cooperation and the process of distributed implementation, which can serve as a success story for future cooperation.

Secretariat

Indeed, this is a success story. Sentinel Asia has evolved stepwise from the pilot project phase into the current operational phase, “Step 3,” and in this phase, Sentinel Asia aims at “joint implementation,” whereby each member of JPT-3 is recommended to share its resources in order to achieve more effective and sustainable operation. This contribution by NSPO and Academia Sinica perfectly matches this ideal.

Could you tell us how this cooperation started?

Dr. Jong-Shinn Wu/NSPO

After 10 years of working closely with Sentinel Asia as a core DPN, we thought we could contribute further by providing Taiwan’s famous ICT and cloud services. In January 2019, NSPO represented NARLabs and signed an agreement with SA Step 3 Joint Project Team to provide cloud service for the SA Step 3 system. The selected cloud service provider ASGC in Taiwan is a long-term partner of NSPO, and helps to bring FORMOSAT data from Svalbard receiving station back to Taiwan. They are both technically capable and familiar with the FORMOSAT operational environment, which can be integrated into the system development team efficiently. The later successful experience of implementing the Step 3 system on time demonstrates this. The Step 3 system has been operational now for more than two years, with an availability of 99.9%. NSPO, NARLabs, and ASGC will provide further necessary assistance to fulfill SA’s future operational needs in order to contribute to regional disaster humanitarian relief.

Secretariat

Recently, you started operation of Taiwan Data Cube. Could you introduce this system, and how do you evaluate its benefit to the Sentinel Asia Community?

Dr. Jong-Shinn Wu/NSPO

Currently Taiwan Data Cube (TWDC) has been established in NSPO to manage and operate analysis-ready data acquired by FORMOSAT series satellites and other open-source, remote-sensing satellites. The features of TWDC are:

- Provision of analysis-ready data for FORMOSAT-2 and FORMOSAT-5 and other open satellite data;
- High-performance cloud computing environment maintained by National Center for High-performance Computing;
- Development and execution of data analysis in a cloud computing environment;
- Provision of public and private cubes, with authorized users able to access data of various cubes.

It is not free for all use cases. For large commercial users, we charge only management cost because it is mostly built with open sources.

For the latter question, we evaluate its benefit by two major points:

- Taiwan Data Cube applications are showcased to highlight the value of Earth Observation for SDGs. They properly connect data and users.
- Value-added products can be easily made available to the stakeholders in the form of open data cubes, in the public domain.

Secretariat

Could you tell us about past and future contributions of the FORMOSAT satellite series, related to disaster monitoring and early recovery, to the SA community?

Dr. Jong-Shinn Wu/NSPO

First, one of the characteristics of the FORMOSAT satellite series is its short repeat cycle orbit. This means that the imagery data are especially suited for regular monitoring of rapidly changing situations, such as in effective response in the aftermath of a disaster. We follow emergency management planning guides to process the EOR in the response stage to support the SA community for disaster management. In the past 10 years, FORMOSAT satellites have supported time series observations to help disaster agencies in the Asia-Pacific region assess the extent of damage, facilitating early recovery. The data have been applied in various types of EOR during the early phases of crises. Examples include object-based image classification using change detection to obtain damage assessment data and detection of flooding areas from multispectral data.

Second, Formosat-2 and Formosat-5 data can be used in satellite image artificial intelligence correction research; the training data sets can be applied in AI applications such as compiling maps and rice field detection programs.

Finally, in the future remote sensing program, we are considering Formosat-8, for which there are plans to develop six remote sensing satellites, constructing a constellation, for global coverage and multiple local revisits. It will be able to acquire data more frequently, with high spatial coverage. Furthermore, it is also expected to achieve not only more abundant spectral information but also higher spatial resolution. We believe that this program can contribute further benefits to overall disaster assessment for the SA community.

To be more specific, and for your information, Formosat-8 will have 1-meter resolution for panchromatic and 2-meter resolution for multi-spectral, with 12-kilometer swath. It was originally planned to be launched in 2023, but now it will be in 2024 due to the COVID-19 pandemic. Formosat-8 consists of six satellites, A to F, and the constellation enables us to shorten the revisit time, which is three times per day for the Taiwan area. We are now planning the orbit but some of them will observe in morning and others will do so in afternoon, which will contribute to disaster monitoring.

Secretariat

Could you tell us what you expect from Sentinel Asia and about your future plans to support it?

Dr. Kuang-Chong Wu/NARLabs

Recently I have seen that Sentinel Asia is proactively working on several strategic plans in the Step 3 phase. The efforts are aimed at several important issues such as improving efficiency and building private–public partnerships. Among the goals set in the SDGs’ agenda, “Leave no one behind” is the first thing that I expect from Sentinel Asia. We in the Asia-Pacific region, including Taiwan, are constantly facing various threats from natural hazards, so I am very glad we joined Sentinel Asia. During the past decade, we provided assistance to others who needed it, and conversely, we received assistance when we needed it through the Sentinel Asia community. I hope that we did not leave any one behind, especially those who do not own technology and do not have resources to reach out for help. The second is that I’d like to see Sentinel Asia in the global picture. The community could establish mechanisms to exchange experiences with other regional/global communities so that they can learn from each other.

About future plans to support it, earlier this year, Taiwan passed the "Space Development Act." Since then, the Ministry of Science and Technology has focused on completing related regulations including those for “Establishing the National Space Center as an Executive Legal Entity," in order to lay a long-lasting foundation for Taiwan's space development. Then,

sometime in the next year, NARLabs and NSPO will become separate entities. As I had mentioned earlier, in addition to NSPO’s capabilities, NARLabs has more to offer in Step 3, especially when Sentinel Asia expands research from disaster response to the preparedness, mitigation, and recovery phases. Among these capabilities, the most important one is the establishment of a regional Open Data Cube. We have proposed this platform to the Steering Committee for a decision. If it is adopted as an infrastructure, I believe the interoperability will significantly improve the operational efficiency. In addition, we recently encouraged NCREE to join Sentinel Asia. NCREE and National Taiwan University are combining AI and satellite remote-sensing data to conduct landslide susceptibility analysis. Moreover, TORI has developed an Ocean Bottom Seismometer Observation system. In a joint research project with the Japan Agency for Marine-Earth Science and Technology (JAMSTEC), the observation data provided better understanding of the science of tectonic evolution and the dynamics of multi-subduction zones. Building on the success of what we have achieved together in the past decade, we will, with all our efforts, support and safeguard our homeland with all partners in the Sentinel Asia community.

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3. [News] Special Session on Sentinel Asia “Sentinel Asia for the ASEAN Region” under the AHA Centre Executive Programme held on 17 November 2021

“The AHA Centre Executive Programme (ACE Programme)” is an over 4-month training course conducted by the ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) with a view to developing future leaders of national disaster management offices (NDMOs) in ASEAN countries. Started in 2014, this year marks the 7th batch of the programme. As its vision states, many of the alumni of previous batches of ACE Programme have been already representing and leading their NDMOs.

Prof. Mizan Bisri of Kobe University (JPT member organization based in Japan) had been appointed by the AHA Centre to facilitate to liaise with Japanese-base resources for the programme and organized the “Japan Disaster Risk Reduction (DRR) Online Course” from 15 to 18 November 2021, as part of the ACE Programme. As part of the Japan DRR Online Course, an invitation was extended to the Sentinel Asia Secretariat for organizing a dedicated joint session composed of speakers from Japan-based Sentinel Asia JPT member organizations.

The joint session was held on 17 November 2021, with the title “Sentinel Asia: Space-based disaster risk management support for the benefit of the Asia-Pacific region ~Sentinel Asia for the ASEAN Region~”. More than 30 future young leaders from 24 NDMOs (as well as AHA Centre staff members) attended the session. Experts from the Asian Disaster Reduction Center (ADRC), the University of Tokyo, and the JAXA/Sentinel Asia Secretariat gave lectures and hands-on training courses. The thematic topics of the training courses include “How to make Emergency

Observation Requests (EORs) to Sentinel Asia”; “How to utilize Web-GIS system for obtaining tangible damage information”; and “Extraction of building footprints from satellite data.” At the end of the session, information on many other training opportunities by JPT members including those who were not at the session was also introduced, and participants whose organizations are not yet JPT members were strongly encouraged to make applications for membership.

The organizing team is convinced that, as the outcome of the session, participants have become familiar with the significance and benefits (including ones to be upgraded in the future) of Sentinel Asia and how they can enjoy such benefits. Through this joint session with the AHA Centre and Kobe University, the partnership between NDMOs of ASEAN member states and Sentinel Asia has been further strengthened.



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4. How to send an Emergency Observation Request

JPT member organizations are entitled to send an Emergency Observation Request (EOR) for disasters in the Asia-Pacific region. Please refer to https://sentinel-asia.org/e-learning/Emergency_Observation_Request.html.

EOR Order Desk:

Asian Disaster Reduction Center (ADRC)

HP: <http://www.adrc.asia/>

E-mail: sarequest@adrc.asia

