3-3. Providing Disaster Information by Utilizing Earth Observation Satellite

3-3-1. Sentinel Asia

(1) Objective

ADRC continues to participate in the Sentinel Asia project. The project was launched in 2006 with an objective of establishing a disaster risk management system by making the use of satellite images in Asia. ADRC functions as the focal point to receive emergency observation request in the framework of the Sentinel Asia. Upon receiving a request, ADRC decides whether the request is appropriate and whether the emergency observation should be implemented mainly by assessing the damages and casualties. Based on its own judgement, ADRC will forward the request to eight space agencies, namely, the ISRO (India), the JAXA (Japan), the GISTDA (Thailand), the KARI (Korea), the NARL (Taiwan), the CRISP (Singapore) , the MBRSC (Dubai) and the VAST (Vietnam) participating in the Sentinel Asia Project.

In accordance with the Cooperation Agreement between the United Nations Office for Outer Space Affairs (UNOOSA) and ADRC signed on 4 June 2009 on the establishment of the ADRC UN-SPIDER Regional Support Office (RSO), the ADRC UN-SPIDER RSO has been established within the ADRC office and operated by ADRC staff members as coordinators of the ADRC UN-SPIDER RSO.

ADRC, as a UN-SPIDER RSO, should thus work towards ensuring the successful implementation of the UN-SPIDER Work Plan thereby facilitating countries in Asia to have access to and develop the capacity to use space-based information to support the whole of disaster management cycle.

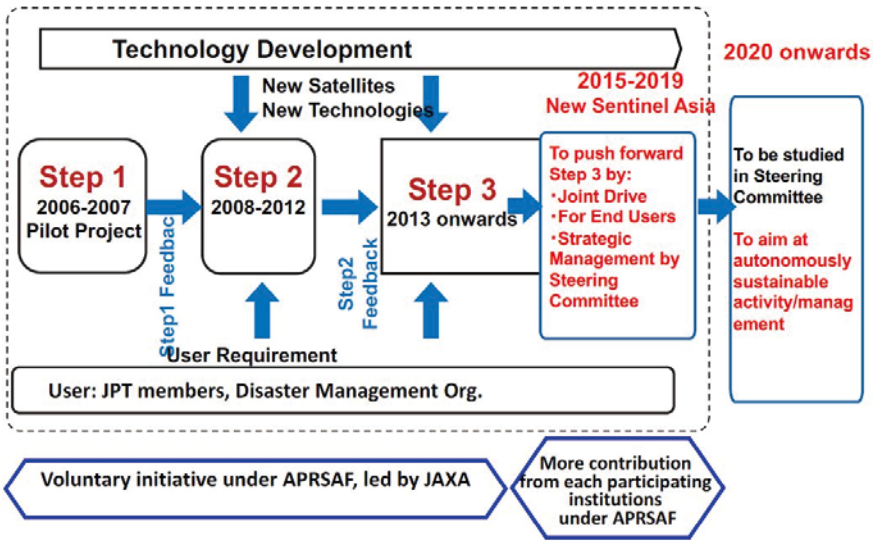

Fig. 3-3-1-1 Flow of emergency observation

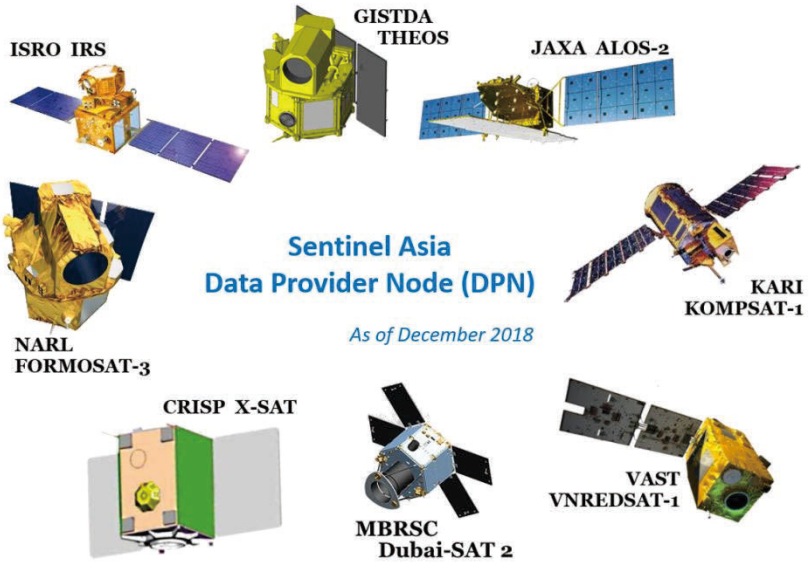

Fig. 3-3-1-2 Data Provider Nodes of Sentinel Asia

(2) Implementation of Sentinel Asia Step3 and Sentinel Asia Satiric Plan

A step-by-step approach for the implementation of Sentinel Asia was adopted as follows:

Step 1: Implementation of the backbone Sentinel Asia data dissemination system
Step 2: Expansion of the dissemination backbone with new satellite communication systems
Step 3: Establishment of a comprehensive disaster management support system

At APRSAF-19 (Asia-Pacific Regional Space Agency Forum, APRSAF) held in Kuala Lumpur in December 2012, successful completion of Sentinel Asia Step 2 was declared. Sentinel Asia Step 3 has the following concept, based on experiences in Step 2 and user requirements.

The Secretariat of Sentinel Asia and the main organization considered a Sentinel Asia Strategic Plan which is shown specific activity on Sentinel Asia for next 10 years. This Strategic Plan includes following themes and mentioned about a strengthen network between space agencies and disaster management organizations.

- Satellite Data Provisions and Systems
- Value Added Product (VAP)
- End-user Enhancement
- Step-3 Activities (Complete DRR cycle)
- Communication, Collaboration and Cooperation

(3) Emergency Observation Activities in the Past

Despite the year to year changes in the number of requests, the ratio of activated numbers

remains stable at around 80%. After a peak of 2010-2011, however, the number of requests reduced after ALOS, a laser sensor had stopped in May 2011, which might had affected the number of requests. From January to December 2019, 28 emergency observations were requested, 25 of which were undertaken, after the operation of ALOS-2, and succeeding satellite of ALOS had started from November 2014.

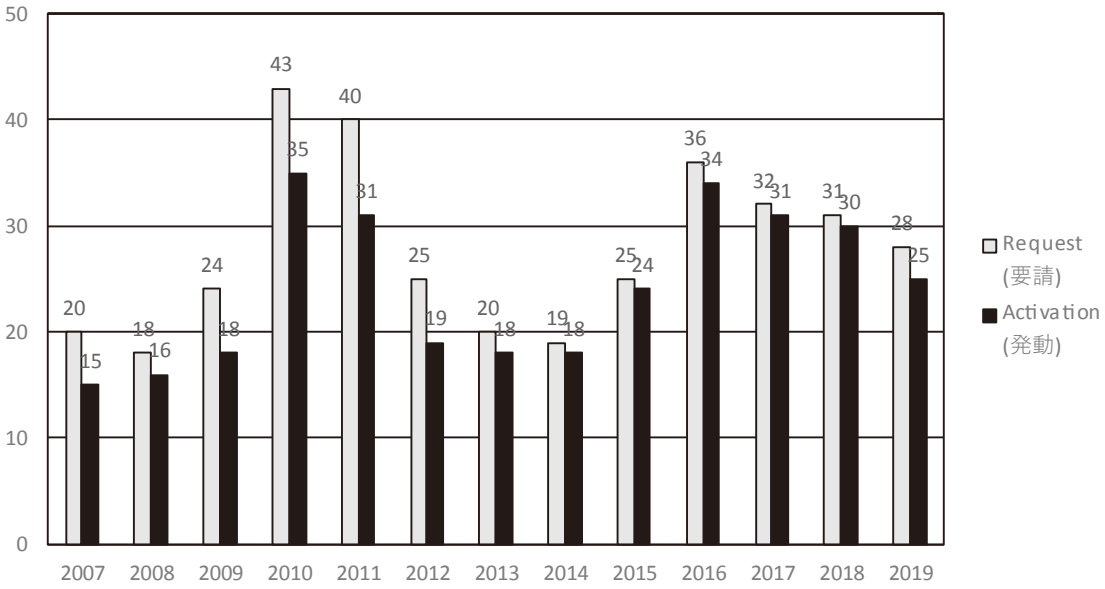

Fig. 3-3-1-3 Changes in the number of emergency observation 2007-2019

Looking at the breakdown of type of disaster from 2007 to 2019, the ratio of flood and earthquake occupies for around 65% of the total (Fig. 3-3-1-4).

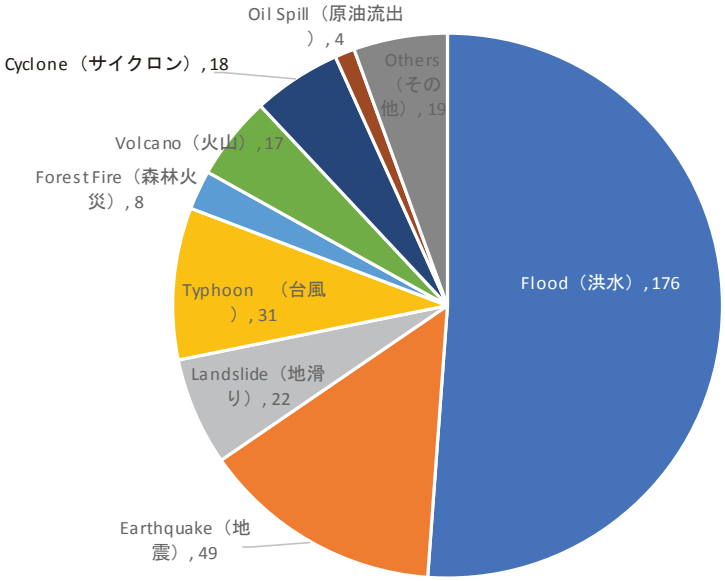

Fig. 3-3-1-4 Breakdown by type of disaster (N=344)

(4) Sentinel Asia New Website

Sentinel Asia has been provided a lot of data and information in Step 2 system. However there were latest additional data and information for emergency observation in recent year. The Secretariat of Sentinel Asia opened a new Sentinel Asia website in 2019. Also new EOR system, named OPTEMIS, was published for JPT members.

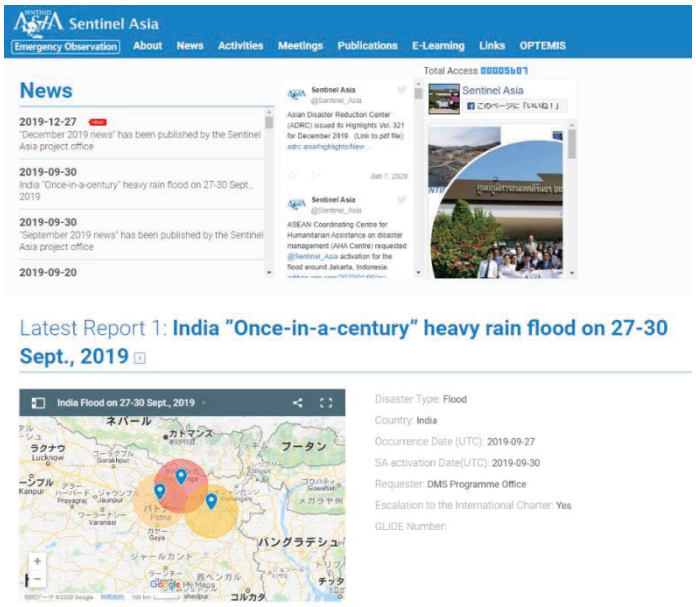

Fig. 3-3-1-5 Sentinel Asia's new website

3-3-2. Participation in the International Conference on Sentinel Asia

(1) 9th Annual UN-SPIDER Regional Support Offices Coordination Meeting

ADRC participated in the 9th Annual UN-SPIDER RSO Coordination Meeting in Vienna, Austria on 18-19 June 2019. The participants shared the latest initiatives and challenges in their regional activities including capacity building, sharing knowledge, and raising awareness. Mr. SUZUKI Koji, Executive Director of ADRC, briefly introduced the ADRC's latest initiative in building an early warning system platform using space-based technologies.

During the meeting, ADRC also noted that more DRR strategies are expected to be developed for implementing the Sendai Framework, and space-based data and information could play an important role in that regard. A lot of countries have challenges in identifying disaster risks since the data and information necessary for identifying risks are not readily available. They can overcome those challenges by introducing remote sensing data and the use of information provided by satellites.

In June 2009, ADRC and UNOOSA signed a cooperation agreement on the establishment of the ADRC UN-SPIDER RSO on the occasion of the 52nd session of the Committee on the Peaceful Uses of Outer Space (COPUOS). As for the application of space-based technologies and information in DRR, ADRC has been playing a major role in Sentinel Asia, which

facilitates space-based information application and capacity development.

ADRC believes it is necessary to harmonize the functions and activities of Sentinel Asia and UNSPIDER/RSO to achieve more effective emergency observations and improve the application of space-based information in DRR. ADRC will continue to explore opportunities for collaboration with UNOOSA and RSOs.

Fig. 3-3-2-1 Discussion at UNSPIDER RSO Coordinating Meeting

(2) The UN International Conference on Space-based Technology for Disaster Risk Reduction and 10 Years Commemoration of the UN-SPIDER Beijing Office

ADRC participated in the United Nations International Conference on Space-based Technology for Disaster Risk Reduction and 10 Years Commemoration of the UN-SPIDER Beijing Office on 11-12 September 2019 in Beijing, China.

ADRC has been playing a leading role in facilitating the application of space-based technologies and data to DRR through Sentinel Asia, and also has committed to a partnership with UNOOSA as a RSO of UN-SPIDER. At the conference, the RSOs of UN-SPIDER, including ADRC, were invited to the stage and presented with plaques. ADRC gave presentations during the sessions on “Advances in Earth Observation and Open Source Data to Support DRR” and “Networking and Engagement with the UN-SPIDER Network.” For space-based data to be more effectively used in DRR, it is critical to further discuss the data use polices of relevant agencies to ensure easy access to data.

Fig. 3-3-2-2 UN International Conference on Space-based Technologies for DRR

(3) Participation in the Seventh Joint Project Team Meeting for Sentinel Asia STEP3

ADRC participated in the Sixth Joint Project Team (JPT) Meeting for Sentinel Asia, which was organized by JAXA and the Asian Disaster Preparedness Center (ADPC) from 12 to 14 November 2019 in Bangkok, Thailand. About 50 participants including representatives of satellite agencies, disaster management organizations, and academic institutions in Japan attended the meeting. The meeting primarily covered the following topics:

Session 1: Overview
Session 2: New Membership
Session 3: Users' Session
Session 4: Training Workshop
Session 5: Strengthened link between Sentinel Asia and the Sendai Framework
Session 6: Project Management Session
Session 7: Wrap-up session

ADRC presented information on the activation of emergency observations in 2018. A training session was held which is related to a new observation system, named “OPTEMIS”, on 13 November. All of participants tried to request by using this new system. Also Mr. Suzuki, ADRC Executive Director and co-chair of the event, gave closing remarks.

Fig. 3-3-2-3 Group photo

(4) International Conferences 26th Session of the Asia-Pacific Regional Space Agency Forum (APRSAF-26)

The 26th Session of APRSAF was held from 26 to 29 November 2019 in Nagoya, Japan. It was co-organized by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and JAXA.

APRSAF was established in 1993 to enhance space activities in the Asia-Pacific region. Attended by space agencies, governments, and international organizations such as the United Nations as well as companies, universities and research institutes, this forum is the largest

space-related conference in the Asia-Pacific region. APRSAF has four Working Groups: the (1) Space Applications Working Group (SAWG), (2) Space Technology Working Group (STWG), (3) Space Environment Utilization Working Group (SEUWG), and (4) Space Education Working Group (SEWG). APRSAF participants share information about their activities and future plans for their countries and regions in each working group. APRSAF also supports international projects designed to find solutions to common issues such as disaster management and environmental protection.

The Sentinel Asia initiative is one such activity and involves the use of space-based information in the form of satellite images for disaster management. ADRC has been tasked with the responsibility of receiving emergency observation requests from ADRC member countries and JPT members. ADRC joined SAWG and reported on trends in Sentinel Asia emergency observation requests and its future action plans.

Fig. 3-3-2-4 Presentation

(5) 12th Sentinel Asia Steering Committee

On 21 and 22 January 2020, the 12th Sentinel Asia Steering Committee was held in National Remote Sensing Center (NRSC) in Indian Space Research Organization (ISRO), Hyderabad, India. JAXA and NRSC-ISRO jointly organized the meeting. ADRC Executive Director, Mr. Suzuki participated in the meeting as a co-chair of the Steering Committee.

Fig. 3-3-2-5 Group photo, Steering Committee members

It was announced that Dr. Lal Samarakoon, the other co-chair and the former director of Geoinformatics Center (GIC)-Asian Institute of Technology (AIT) would retire from the co-chair post at the end of 2020. As for the vacant co-chair post, ADRC Mr. Suzuki suggested that the co-chairs be selected from the space-community and also from the data analysis community. The Sentinel Asia secretariat would consult with the Steering Committee members on how they would select the co-chair(s), including the process of selection. They will discuss this matter on web-based meeting.

Fig. 3-3-2-6 Session discussion

The new partnership with private companies has been discussed in the last face-to-face steering committee in Sri Racha, Thailand. They clarified the challenge of the data policy in the partnership framework. If the data server of the application supported by the private company is installed in the supporting private company, it would be against the data policy of some space agencies. They argued that ESRI support to Sentinel Asia with its ArcGIS application might not be accepted.

In the Steering Committee, they argued the Sentinel Asia membership issue of KARI Korea. The Sentinel Asia Secretariat proposed to send KARI a document to ask if KARI would stay in Sentinel Asia. Co-chair, Mr. Suzuki proposed that he could informally visit KARI and jointly clarify the challenges for KARI to stay in Sentinel Asia. They agreed that a co-chair would visit Republic of Korea for the informal meeting with KARI after April 2020.

In the Special Session of this Steering Committee, which was organized by ISRO, it introduced a wide variety of its initiatives on space-based technology applications to DRR, including monitoring technologies of disaster events.