



Sentinel Asia

# Report of the Steering Committee and APRSAF29

9th Joint Project Team Meeting  
November 5, 2024

Deputy Executive Secretariat  
Goro Takei



# 1. Concept of Sentinel Asia Strategic Plan

“Challenges for Disaster Risk Reduction by a Collaboration between Space and Disaster Management Agencies”  
Not only the Disaster Response but all Disaster Risk Reduction Cycles.

## MITIGATION

- Hazard Map
- Early Warning
- Success Story
- Pre-disaster monitoring

## RECOVERY

- Mid/Long-term monitoring
- Recovery Planning



## PREPADNESS

- Training
- Capacity Building
- Standard Operation Procedure (SOP)

## RESPONSE

- Emergency Observation
- Data Analysis
- Damage Assessment

## 2. Steering Committee Members

The Steering Committee(SC) is the advisory committee for strategic management of Sentinel Asia(SA).

The purpose of SC is to discuss and define the management strategy of SA for its sustainability and affordability on the use of space technology and applications to contribute to substantial disaster risk and damage reduction in Asia-Pacific region.

There are 14 organizations as Steering Committee Members (ADPC and PhilSA newly joined the SC) GISTDA and AIT are current Co-Chairs



## 2. Steering Committee Members

**14** organizations **GISTDA and AIT** being current Co-Chairs

Organization of Steering Committee	
Asian Disaster Reduction Center	ADRC
Asian Disaster Preparedness Center	ADPC
Asian Institute of Technology	AIT
Center for Remote Imaging, Sensing and Processing	CRISP
Geo-Informatics and Space Technology Development Agency	GISTDA
Indian Space Research Organization	ISRO
International Water Management Institute	IWMI
Japan Aerospace Exploration Agency	JAXA
Mohammad Bin Rashid Space Centre	MBRSC
Philippine Institute of Volcanology and Seismology	Phivolcs
Philippine Space Agency	PhilSA
Taiwan Space Agency	TASA
Vietnam Academy of Science and Technology – Space Technology Institute	VAST-STI
Yamaguchi University	YU

### 3. Dates of SC Meetings

Year	Date	Meeting Type	Host
2023	1/19	Web Meeting	
	3/13	Web Meeting	
	6/20	Web Meeting	
	9/25	Web Meeting	
2024	1/30-31	SC Face to Face	Hosted by TASA
	3/25	Web Meeting	
	7/1	Web Meeting	
	10/24	Web Meeting	
	12/12-13	SC Face to Face	Hosted by IWMI

# 4.1 Steering Committee Face to Face Meeting in January 30-31, 2024 hosted by TASA



## 4.2 Major Discussion Themes in Steering Committee Face to Face Meeting January 2024

Some of the major themes discussed in the meeting.

	Lead Agencies	Topics
1	Phivolcs	Earthquake Induced Landslide Inventory and Assessment
2	JAXA	Landslide Detection Analysis Support Enhancement
3	ISRO	ISRO's Contribution to Sentinel Asia
4	TASA	QGIS disaster analysis module assisting Bangladesh Water Development Board
5	ADRC JAXA	Discussion for Capacity Building
6	GISTDA ADRC JAXA	Collaboration with Other Organizations UNITAR/UNOSAT UNESCAP UNDRR(APMCDRR)
7	ALL	Support for Mitigation Phase and Recovery Phase
8	JAXA	Strategic Plan Update

## 4.3 PHIVOLCS work on Landslide detection

PHIVOLCS presented their work on Semi-Automated Landslide Inventory Methodology

- Collection and Pre-processing of High-Res Satellite Imagery
- Object-based Image Analysis –Segmentation and Classification

Preliminary results using AI were presented.

### Semi-automated Landslide Inventory

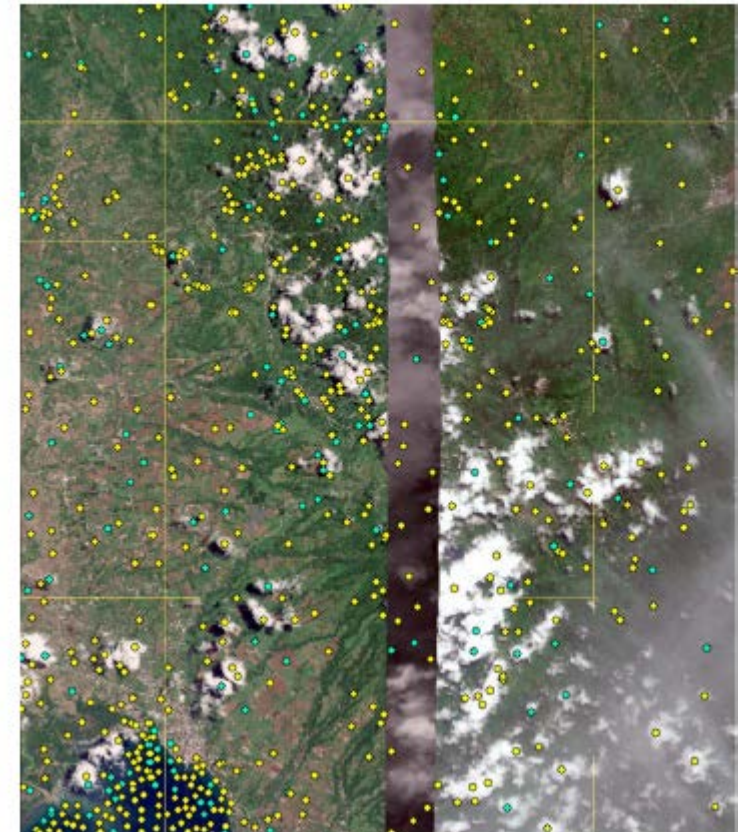


Manually Delineated Landslide Inventory



Semi-automated Landslide Inventory using Object-based Image Analysis

### Preliminary Results: Sample Data Points





# 4.4 Strengthening Capacity Building Activities for JPT

- TASA created Handbook for utilization of their Semi-Automated VAP creator: Emergent VAP (EVAP) module based on QGIS.
- Shared at Sentinel Asia Homepage: <https://sentinel-asia.org/e-learning/TechnicalMaterials.html>

<b>Chapter 1 ~ Chapter 3</b>	<b>Chapter 4 Methodology</b>	<b>Chapter 5 EVAP</b>
<ul style="list-style-type: none"> <li>• Introduction</li> <li>• Software and data preparation</li> </ul>	<ul style="list-style-type: none"> <li>• Spectral index</li> <li>• Gaussian statistics</li> </ul>	<ul style="list-style-type: none"> <li>• Processing Procedure of EVAP</li> </ul>

## "Guide to Using Emergent Value-Added Products (EVAP) Module with QGIS for Disaster Response" by Taiwan Space Agency



[read more >](#)

In accordance with Sentinel Asia's strategic plan to empower local agencies with local data and Value-Added Products (VAPs) for addressing local needs, the Taiwan Space Agency (TASA) has developed a manual to facilitate the application of the EVAP module. This manual provides step-by-step instructions on how to utilize the EVAP module within QGIS to swiftly and easily identify disaster-affected areas.

# 4.4 Strengthening Capacity Building Activities for JPT

- TASA shared their technology with Bangladesh Water Development Board (BWDB)
- BWDB is utilizing it for flood hazards.

## Case studies (1/4)


1

Flash Flood in Bangladesh


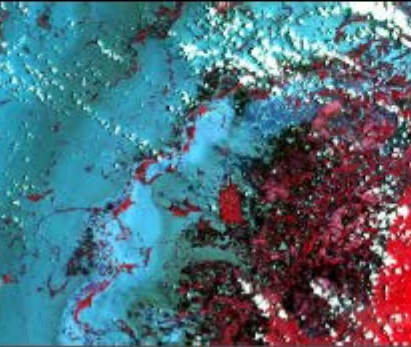

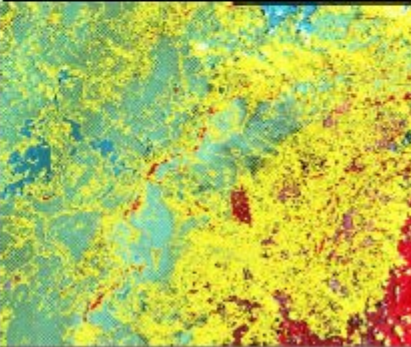
At least 25 people have died and millions have been left stranded. The Sylhet region is among the worst affected in Bangladesh, with much of the area without electricity and internet access.

2022-06-18  
**Flood in Bangladesh on 18 June, 2022**


Emergency Obs. Request Information



Disaster Type: Flood  
 Country: Bangladesh  
 Occurrence Date (UTC): 18 June, 2022  
 Observation Date (UTC): 24 June, 2022  
 Requester: Asian Disaster Reduction Center (ADRC)  
 Available for the International Charter 'No  
 2022 Number: FL-2022-00217-000'

Prior FORMOSAT-5 2022/04/21
Post FORMOSAT-5 2022/07/10
Change Image
Affected Area



## 4.5 Capacity Building

Through feedbacks from EOR, Visits to various organizations, and feedbacks after JPTM, SC acknowledged the high interest toward the support of capacity building for DAN and JPT members (especially Disaster Management Organizations)

- GLOF Training at Bhutan (AIT and JAXA) (August 2024)
- Project Manager Training for International Disaster Charter Escalation at CAIAG (JAXA) (September 2024)

Coming Up:

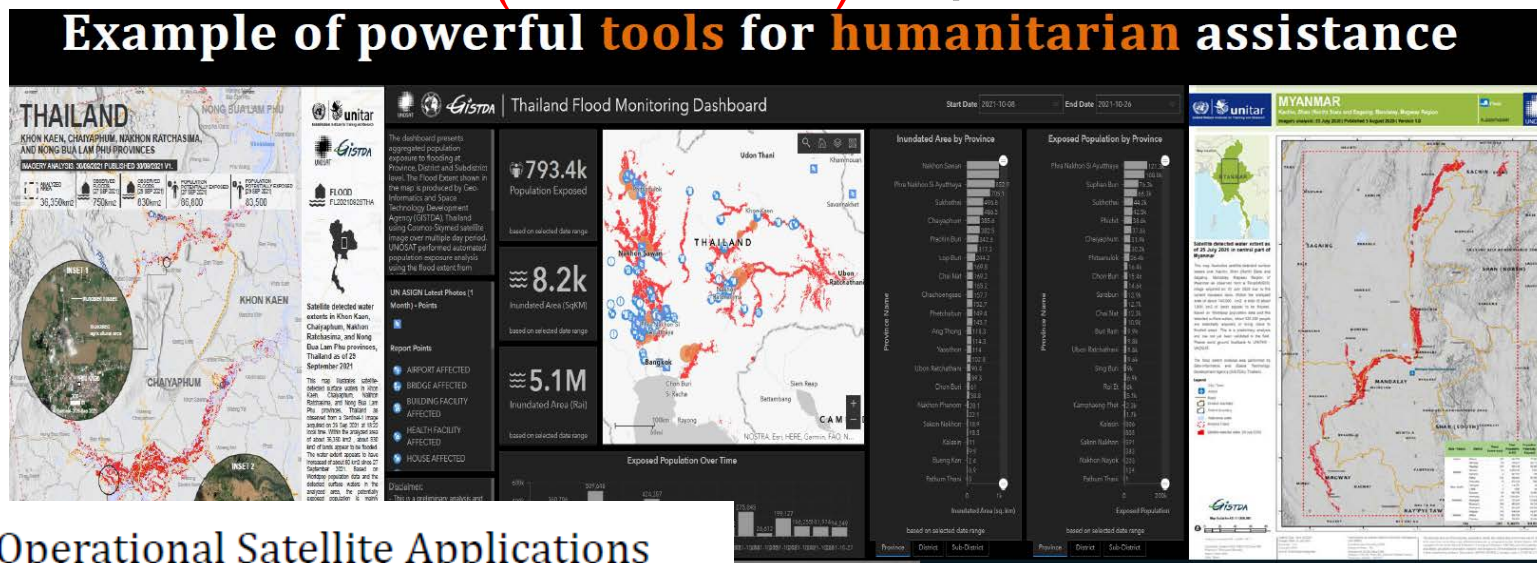
- Trainings at JPTM 2024 (Joint Project Team of SA) (November 2024)
- SAR Training at Türkiye (Yamaguchi University) (January 2025)
- Future plans are also under consideration by AIT, ISRO, IWMI, JAXA, and TASA
- **Please consult Sentinel Asia SC members for training requests.**

# 4.6 Collaboration with Other Organizations

SC is working on strengthening collaborations with other organizations.

- **GISTDA** presented their collaboration with **UNITAR/UNOSAT and UNESCAP**
- **ADRC** presented their collaboration with **UNDRR (APMCDRR)** (Shown in Recent Activities of Sentinel Asia)

- **JAXA**, being the board member of **International Disaster Charter**, works as the representative of Sentinel Asia
- More discussions are on-going.



**Example of powerful tools for humanitarian assistance**

## ❖ MOU between UNITAR/UNOSAT and GISTDA on Operational Satellite Applications

(signed in 2019 & 2023)

- Promoting **knowledge sharing** and **implementing capacity development** activities
- Cooperating on **research and innovation** in support of the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction
- Outreach and awareness raising on benefits of geo-spatial information technologies
- Collaborating in **“UNOSAT Rapid Mapping Partners Initiative”**

## 4.7 Update of Strategic Plan

The progress of actions written in the **Strategic Plan is reviewed and updated.**

<https://sentinel-asia.org/e-learning/Documents.html>

Sentinel Asia Systems such as OPTEMIS, SFTP, Web-GIS and Mobile Apps are completed.

Ongoing actions that are under development:

- Standard operation procedure for VAPs
- Create common understanding of for quality of VAPs (including Satellite Observation Scenario and development of Urban Flood Mapping methods)
- Provision of VAPs using University Network
- Collecting feedbacks and requests from users of Disaster Risk Reduction operation through questionnaires after EOR, JPTM, etc.
- Assist local agencies with easy and open source tools for promoting and facilitating better usage of VAPs at local level.
- Establishing Standard Operation Procedure to expedite EOR
- Aligning the activities of Sentinel Asia to Sendai Framework

## 4.7 Update of Strategic Plan

### Updates of the Strategic Plan:

- “DPN meeting” will be removed from the action plan since many DPNs participate in SC meetings and discuss matters regarding data provision.
- “Development of Data Policy for R&D” purpose will be removed, since there is no request for data utilization for R&D purposes, currently. DPN will consider when new request arises.
- “Working Groups” may be terminated, since there is no action taken for last several years if there is no objection from the JPT members.

# 5.1 Sentinel Asia Session in APRSAF29

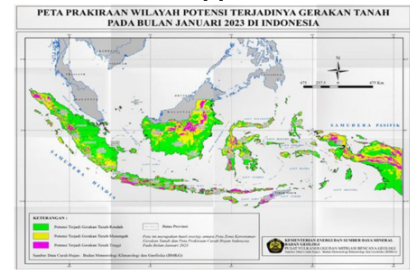
- In February 2006, **Sentinel Asia was established** and started its activities in accordance **with the recommendation at APRSAF-12** in October 2005
- The secretariat and co-chairs reports our activities to APRSAF every year.
- Mr. Goro Takei of **JAXA gave Sentinel Asia Report** on Emergency Observation Requests of major disasters and major topics of JTPM 2023 in **Sentinel Asia Session in Space Application Workshop in APRSAF29 in Indonesia**



## 6.2 Indonesia Session

Special Session “Accelerating Satellite-based Data and Information for Disaster Risk Management in Indonesia”

Dr. Udrekh and Mr. Putra of National Disaster Management Authority (BNPB) introduced the application of satellite data for Indonesian Disaster Risk Reduction.



Dr. Jamal of Center for Geological Survey, Ministry of Energy and Mineral Resources (ESDM) emphasized the importance of **Satellite Data** to be used to **accelerate updating Geological Mapping** to 127 active volcanoes which only 69 is currently covered by conventional methods.

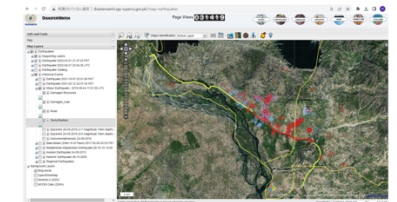
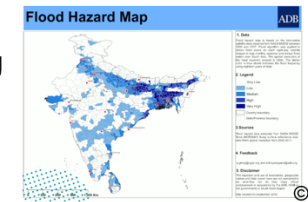
Dr. Yenni of BRIN expressed the **importance of high temporal/spatial/spectral resolution images** for **regular monitoring of volcanoes** with the example of Mt. Semeru erupted repeatedly in recent years.



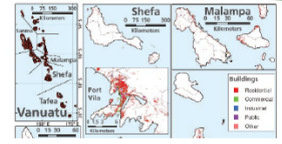
## 6.8 Applications of Sentinel Asia by End Users

Participants shared their applications utilizing Sentinel Asia’s data in various phases of disaster risk reduction cycle such as **mitigation, preparedness, response and recovery**

- **Flood forecasting**
- **Drought monitoring/ forecasting**
- **Hazard Map** (Flood, wildfire, tsunami...)
- **Disaster Watch**



Country Risk Profile of Vanuatu

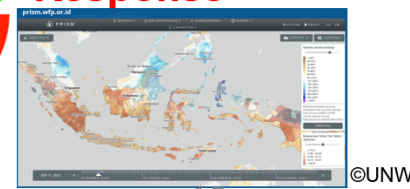


**Mitigation**  
**Recovery**



**Preparedness**  
**Response**

- **Identify the suitable areas for relocation**
- **Validate the impact of disaster** and implement to the **urban planning**
- **To estimate the replacement cost** of the buildings and infrastructures to inform **risk financing** aspect of the country



**Estimate affected population and amount of humanitarian aids**

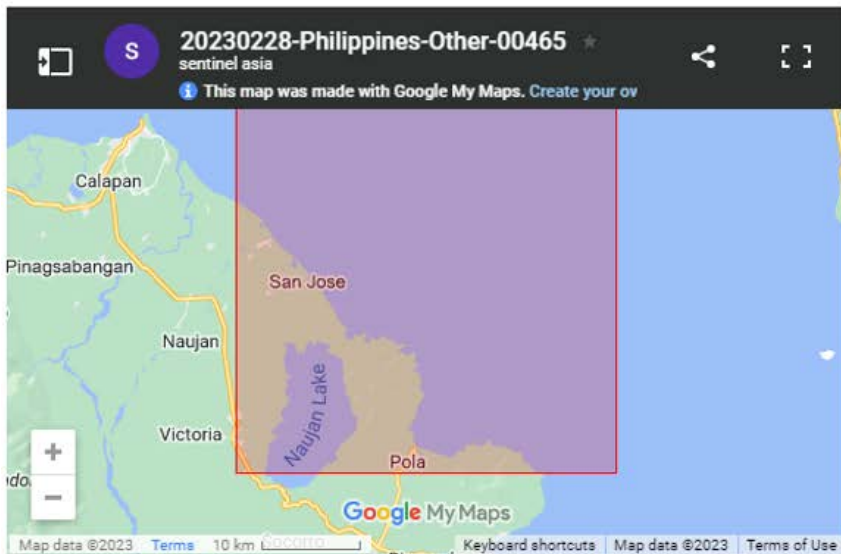
✓ Mr. Noel Jerome B. Borlongan of Philippine Space Agency (PhilSA)

## Disaster Monitoring using Satellite Imagery: The Case of Mindoro Oil Spill in Feb. 28, 2023

2023-02-28

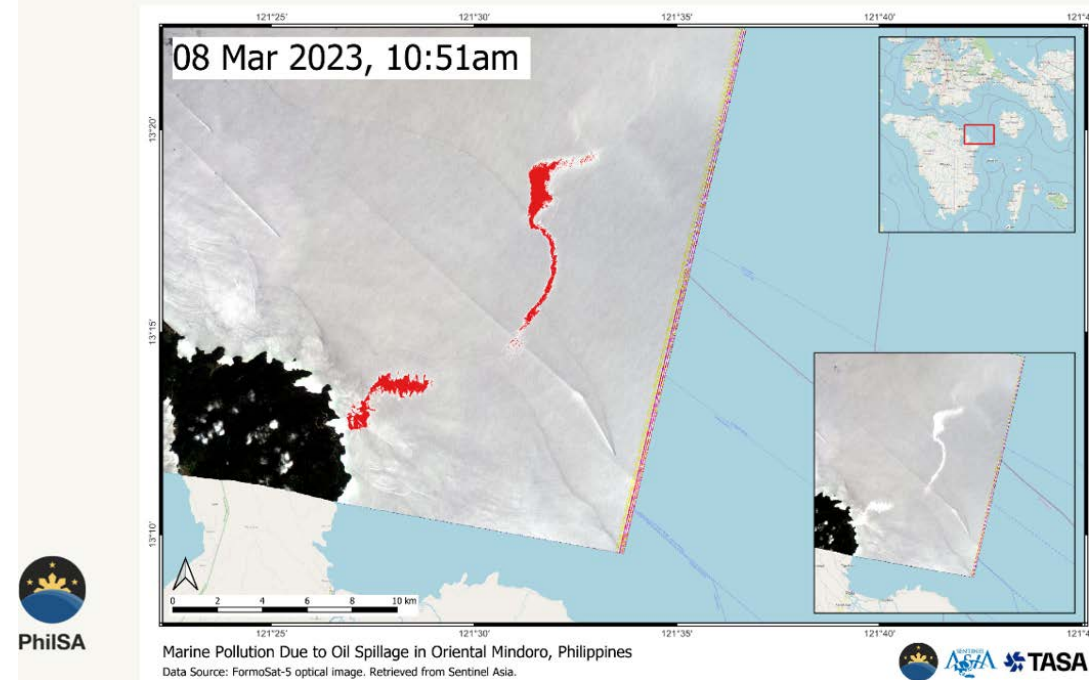
### Oil spill in Philippines on 28 February, 2023

#### Emergency Obs. Request Information



Disaster Type: Oil spill  
Country: Philippines  
Occurrence Date (UTC): 28 February, 2023  
SA activation Date(UTC): 01 March, 2023  
Requester: Philippine Space Agency (PhilSA)  
Escalation to the International Charter: Yes  
GLIDE Number:

#### ASSESSMENT OF OIL SPILL EXTENT



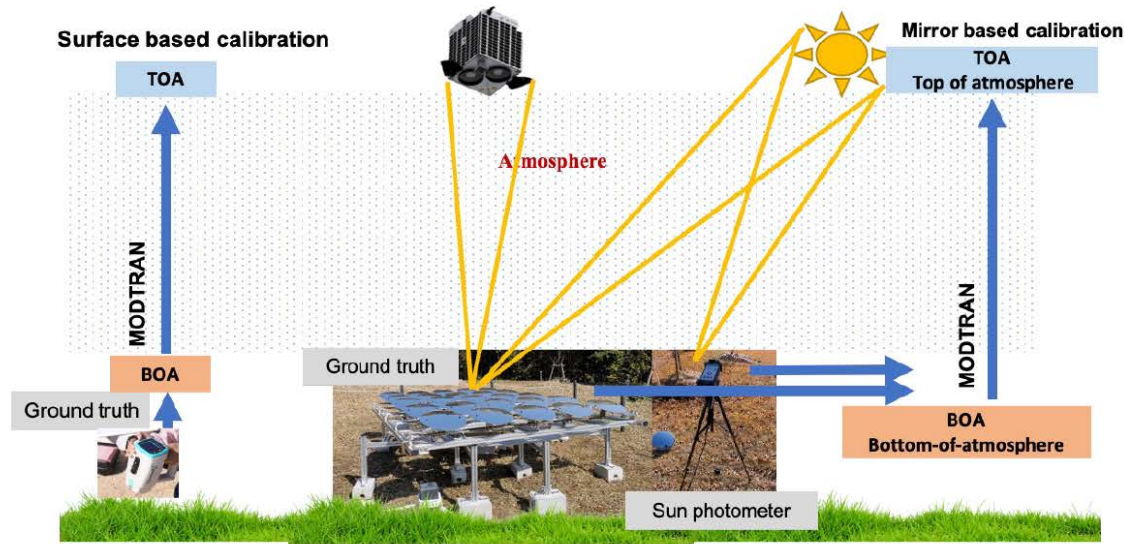


# 5.4 Topics of Sentinel Asia Session APRSAF29

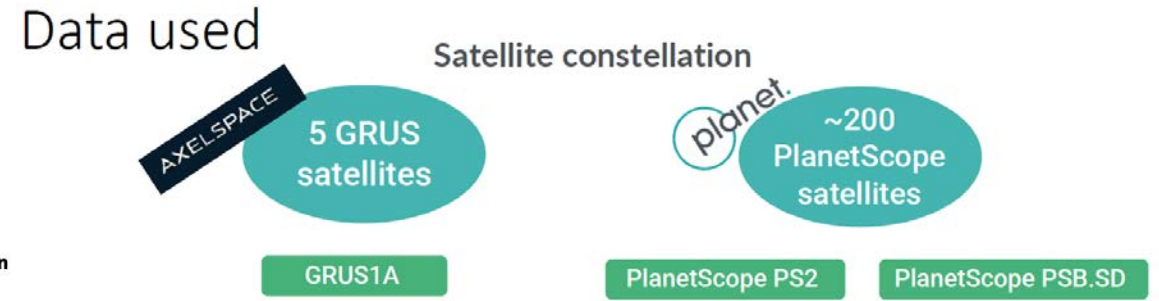
✓ Prof. Masahiko Nagai from Yamaguchi University  
 Development and Utilization of a Mirror Array Target for the Calibration and Harmonization of Satellite Imagery

Methods to minimize the differences among different satellite images.

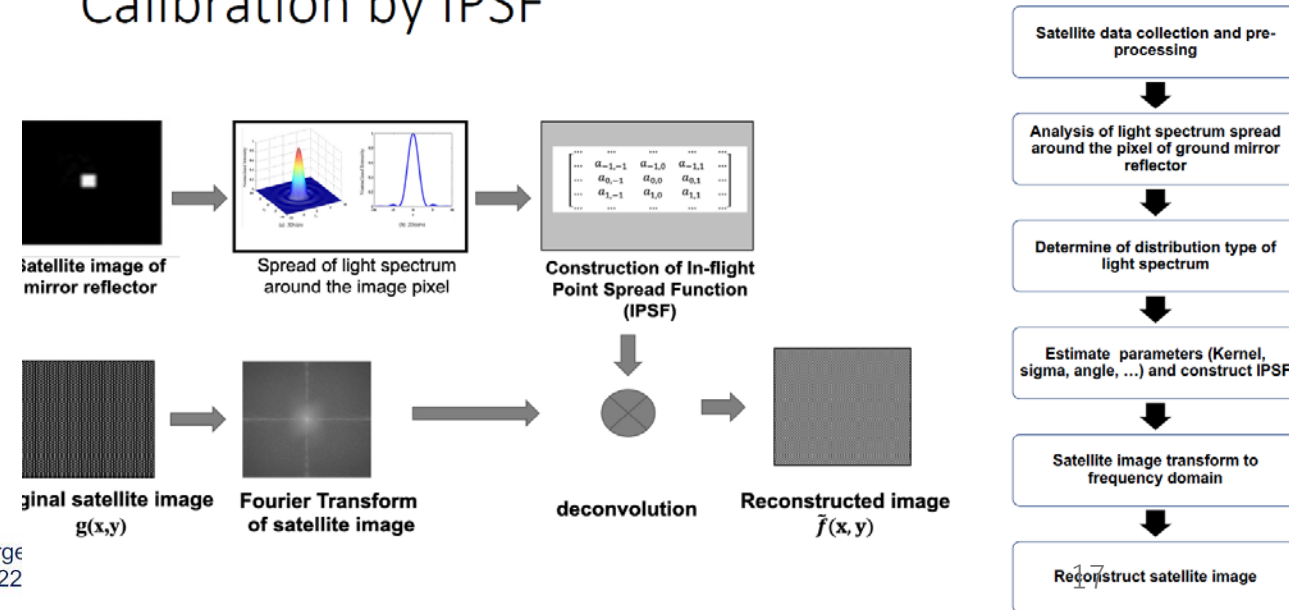
## How satellite harmonization performed



Overview of the calibration and harmonization\* setup at Yamaguchi University



## Calibration by IPSF



Mirror reflectors and Point Spread Function for optical satellite data calibration

\* Ichikawa, D.; Nagai, M.; Tamkuan, N.; Katiyar, V.; Eguchi, T.; Nagai, Y. Development and Utilization of a Mirror Array Target for the Calibration and Harmonization of Micro-Satellite Imagery. Remote Sens. 2022, 14, 5717. <https://doi.org/10.3390/rs1422>

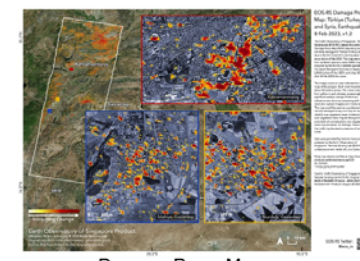
# 5.5 Report of SA at Plenary of APRSAF29

✓ Mr. Koji Suzuki from ADRC gave Sentinel Asia Report (Major Disasters, Early Warning System by QZSS and JTPM)

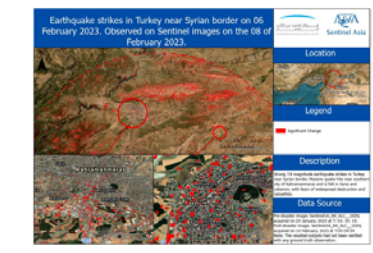


## 4.1 Earthquake in Turkey in February 2023

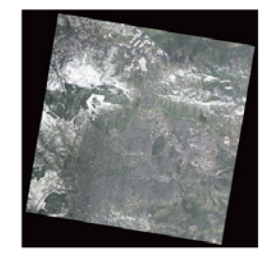
- ✓ Disaster and Emergency Management Presidency of Turkey (AFAD) requested emergency observation
- ✓ AFAD, disaster relief team and UNWFP used disaster assessment map to monitor the impact of the earthquake
- ✓ 5 organizations provided satellite data and 8 organizations provided analyzed disaster assessment maps



Damage Proxy Map by Earth Observatory of Singapore (EOS)



Significant damage map by MBRSC



Cartosat3 data by ISRO



Web-GIS overlaying potentially damaged areas and maps  
<https://storymaps.arcgis.com/collections/3933d7b09edf4187a2e969e39558aa7f?item=1>



## 6. 8th Joint Project Team Meeting

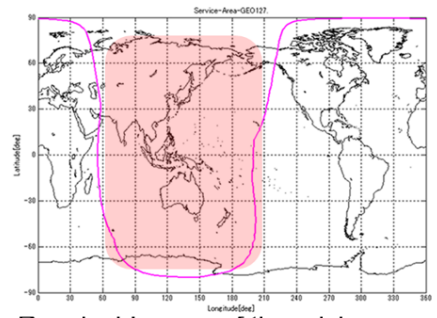
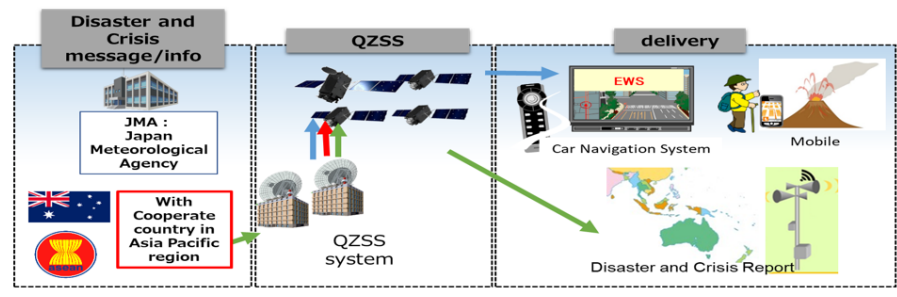
- September 17-18, 2023
- 85 participants from 35 organizations
- ✓ Presentations from new Sentinel Asia members, Users, Data Analysis Nodes
- ✓ Indonesia Session: Accelerating satellite-based data and information for disaster risk management in Indonesia
- ✓ Discussion session to further promote the STEP-3 Strategic Plan of Sentinel Asia
- ✓ Training workshops for Capacity Building



## 5.2 Messaging services

### Early Warning Service (EWS)

- QZSS L1S signal is sharing 250 bps data stream with SLAS(\*1) and Disaster and Crisis Report (DCR) service.
- DCR service is currently providing weather information generated by JMA for domestic users in Japan.
- Common EWS format collaborate with Galileo (EC/EU).
- **QZSS EWS system will be enhanced to Asia Pacific region in 2024-2025.**
- **Demonstration will be conducted for Australia, Thai and Fiji.**



Receivable area of the crisis management information by QZSS

\*1: Sub-meter Level Augmentation Service

## 6. Future Event

- The 30th session of the Asia-Pacific Regional Space Agency Forum (APRSAF-30)
  - November 2023, Perth, Australia
  - Co-organized by Australian Space Agency, MEXT, and JAXA

For detail, please refer to below URL:

[https://www.aprsaf.org/annual\\_meetings/aprsaf30/meeting\\_details.php](https://www.aprsaf.org/annual_meetings/aprsaf30/meeting_details.php)

- SC Face to Face Meeting will be held at Sri Lanka hosted by IWMI on December 12-13, 2024

If there are any issues/concerns/opinions about Sentinel Asia, please consult SC members.

(we will include them in the discussion topics of SC meetings)

Thank you for your attention