

Sentinel Asia Activities



October 31 , 2018

Shiro Kawakita

Sentinel Asia Steering Committee Secretariat
Japan Aerospace Exploration Agency



Sentinel Asia

Sentinel Asia is a voluntary initiative by a collaboration between space agencies and disaster management agencies, applying remote sensing and Web-GIS technologies to assist disaster management in the Asia-Pacific region.

In Oct 2005, APRSAF-12, in Kitakyushu, Japan, the plan to initiate the pilot project was approved.

http://www.aprsaf.org/data/aprsaf12_data/day3/5_sswg%20sumrepo.pdf

In Feb 2006, Joint Project Team (JPT) was organized and Sentinel Asia has started.

Sentinel Asia is the first initiative under APRSAF.



<http://sentinel.tksc.jaxa.jp/>



Member Status

(As of October 31, 2018)

Space Community

APRSAF

Satellite Image

Promotion of Utilization

Capacity Building

SENTINEL ASIA

92 organizations from **28** countries & regions and **16** international organizations
In total: 108 organizations

*Three members are increased from last meeting

Joint Project Team (JPT)

International Community

UNESCAP, UNOOSA
 ASEAN, AIT and
 International Disaster Charter
 etc.

International Cooperation

Disaster Reduction Community

ADRC

Member Countries
 (31 member countries)

Disaster Information

Utilization (User)



Data Provider Node (DPN)

International Charter

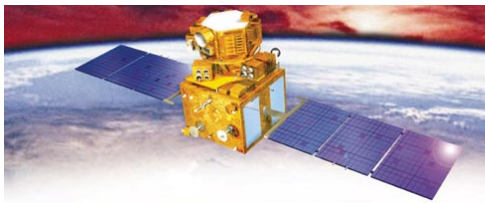


Sentinel Asia Constellation

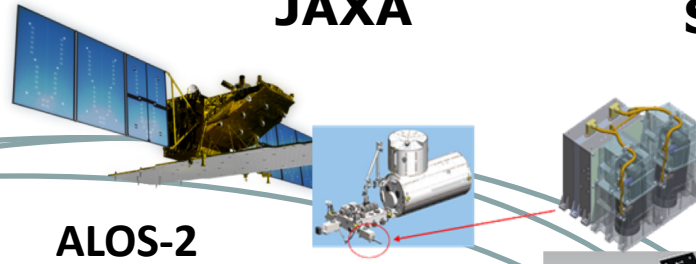
contributing to Emergency Observations

ISRO

RESOURCESAT-2, OCEANSAT-2/OCM
IMS-1, CARTOSAT-1&2, RISAT-1



JAXA



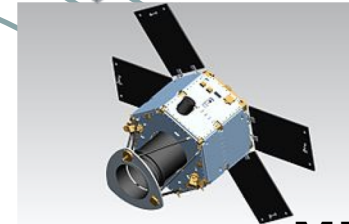
ALOS-2

KIBO HDTV-EF2

escalation from Sentinel Asia

NARLabs

Sentinel Asia Constellation



MBRSC
DubaiSat-2

STI/VAST

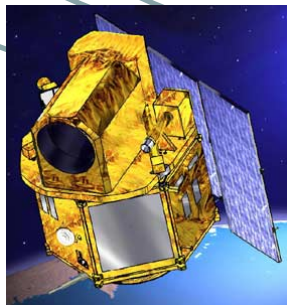


KARI

KOMPSAT-1



GISTDA



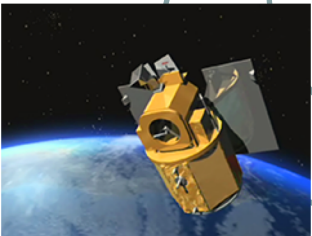
THEOS

CRISP

XSAT

VNREDSat-1A

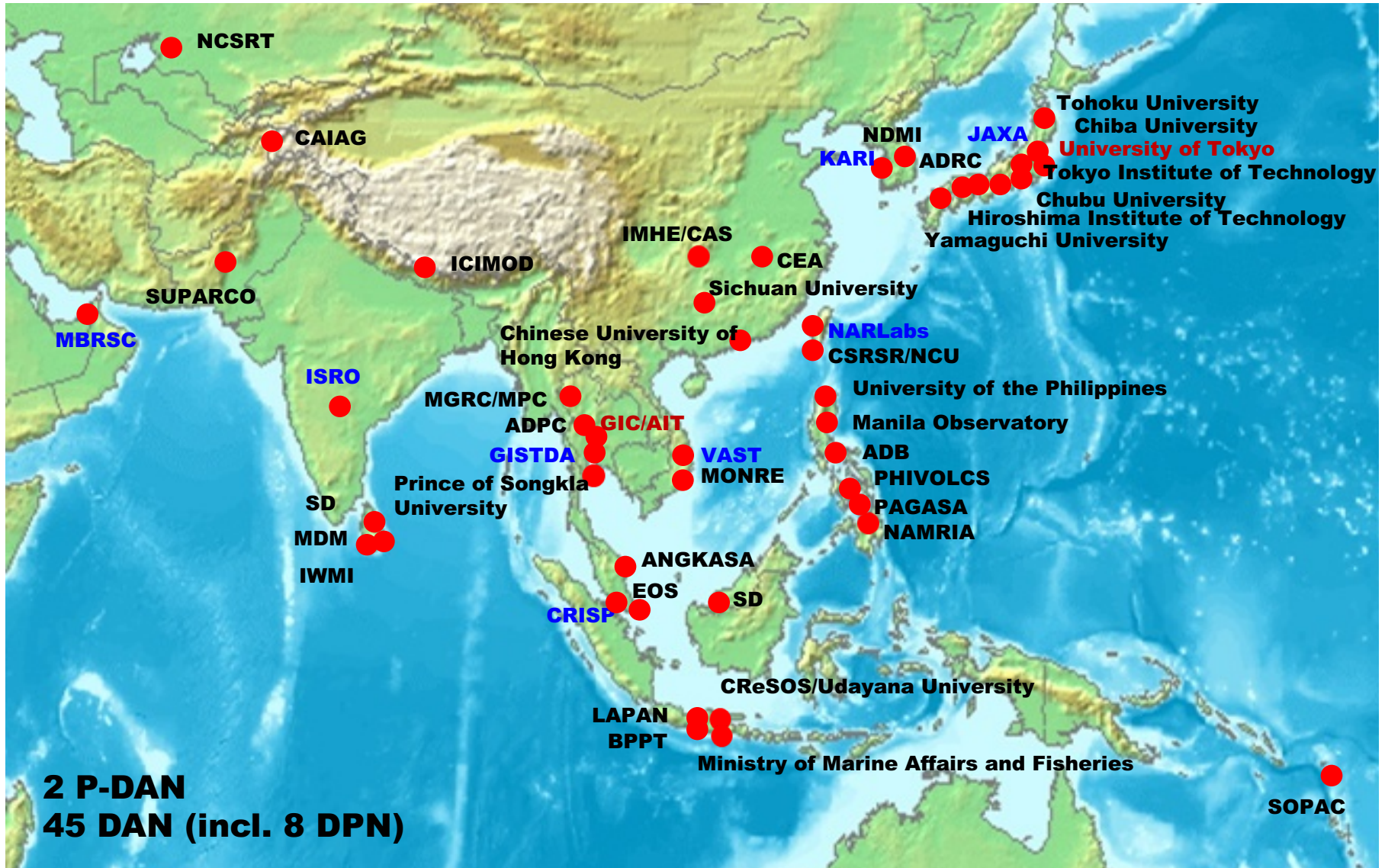
FORMOSAT-5





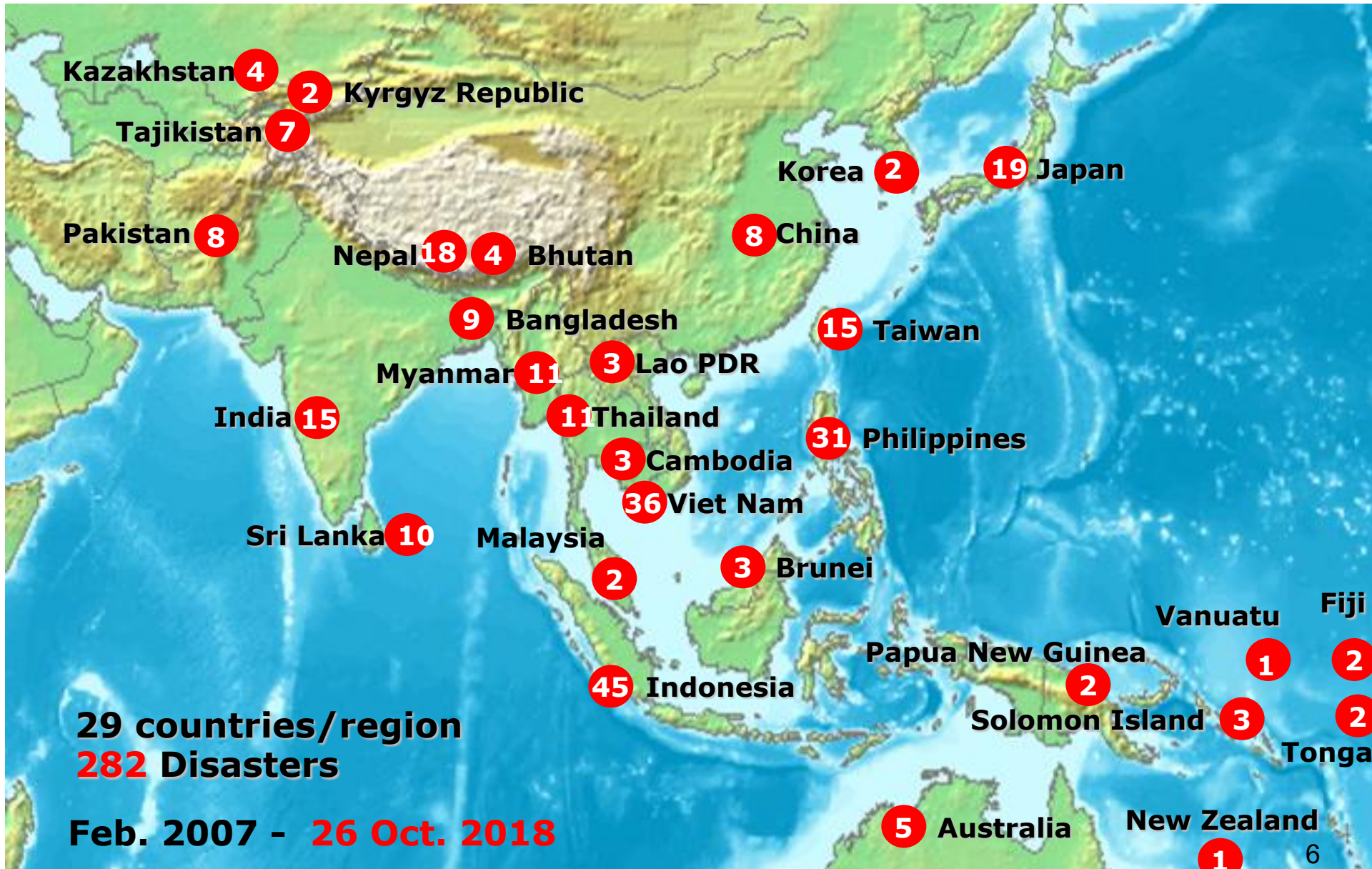
Data Analysis Node (DAN)

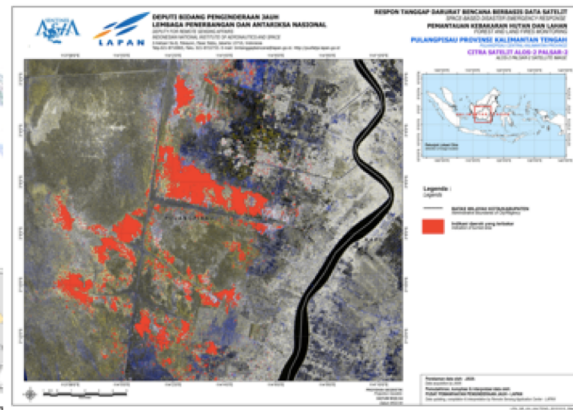
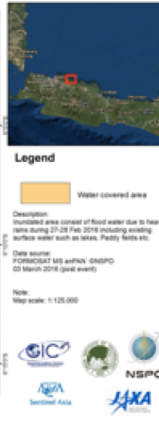
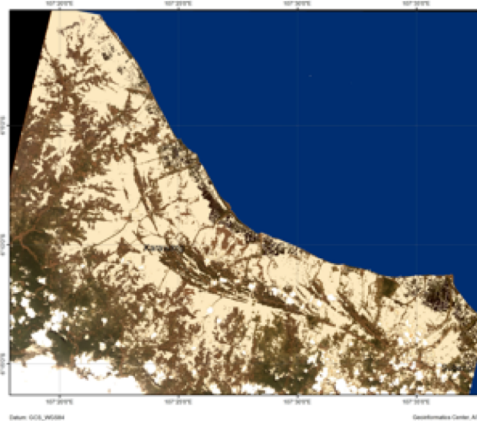
Framework of satellite data analysis to provide analyzed products



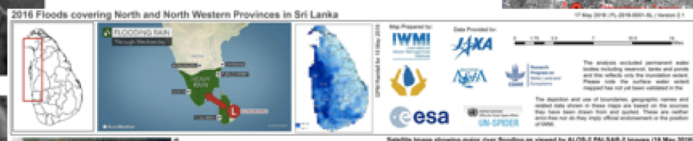
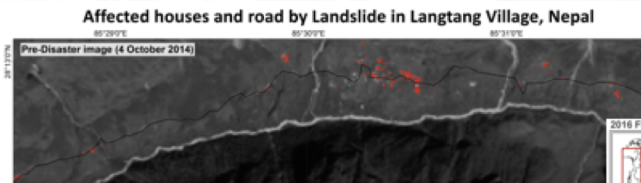
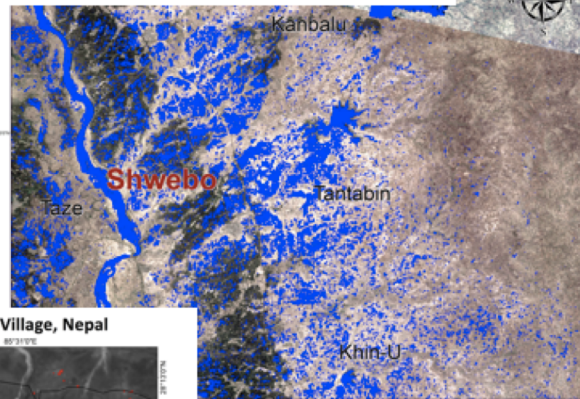
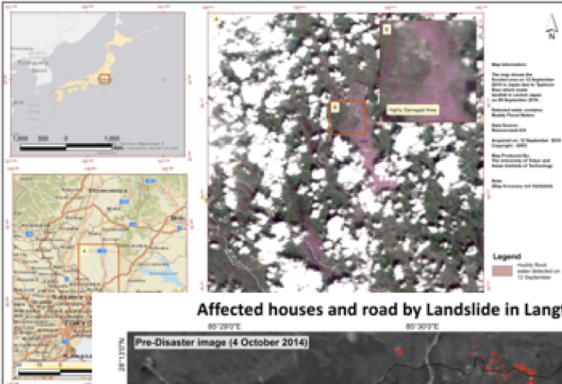


EOR Review, Responded Disaster by Geographical Distribution

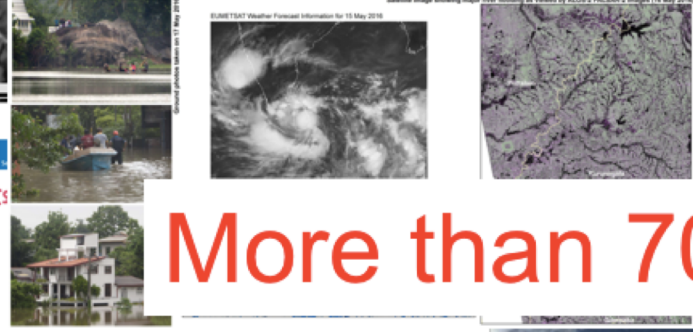




Area Under Water, Detected by Resourcesat-2IA Sept. 14, 2015, Japan



Standing Water Extent due to Flood on 16 May 2016 in Gampaha City of Sri Lanka as Observed by ALOS-2/PALSAR-2 RADAR Satellite

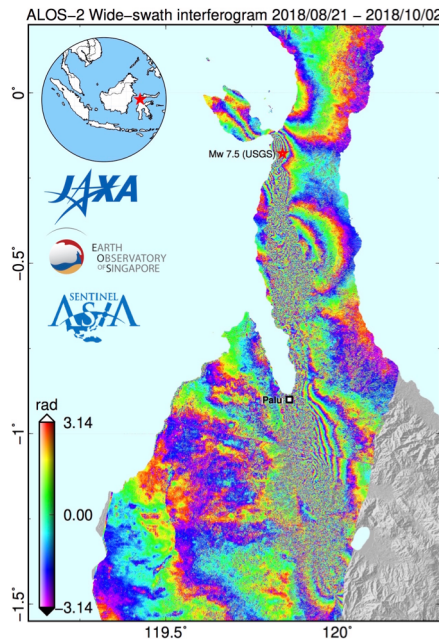


More than 700 VAPs !

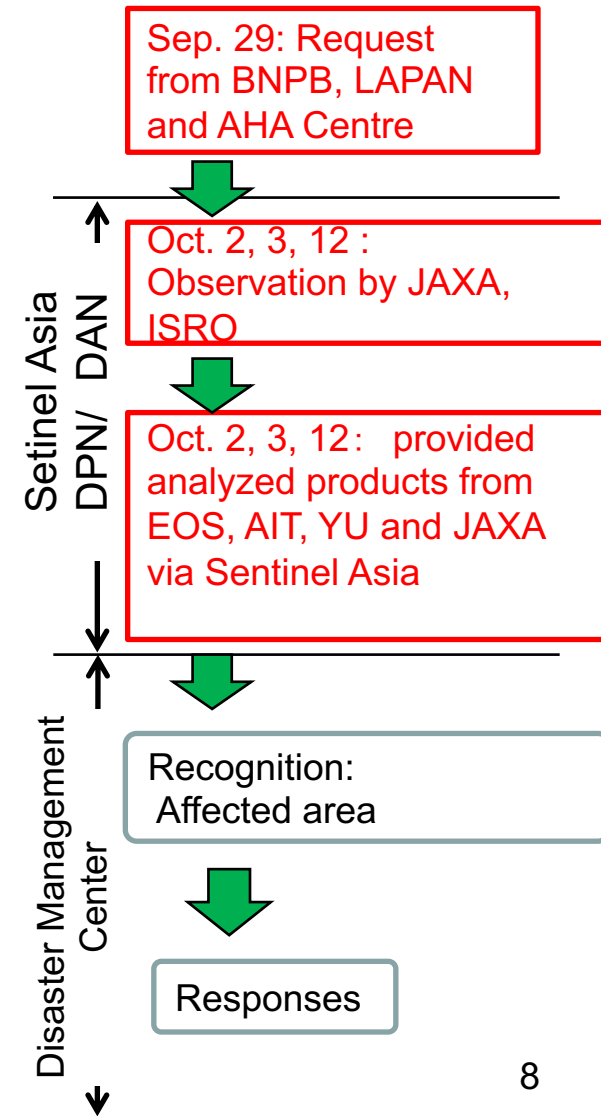


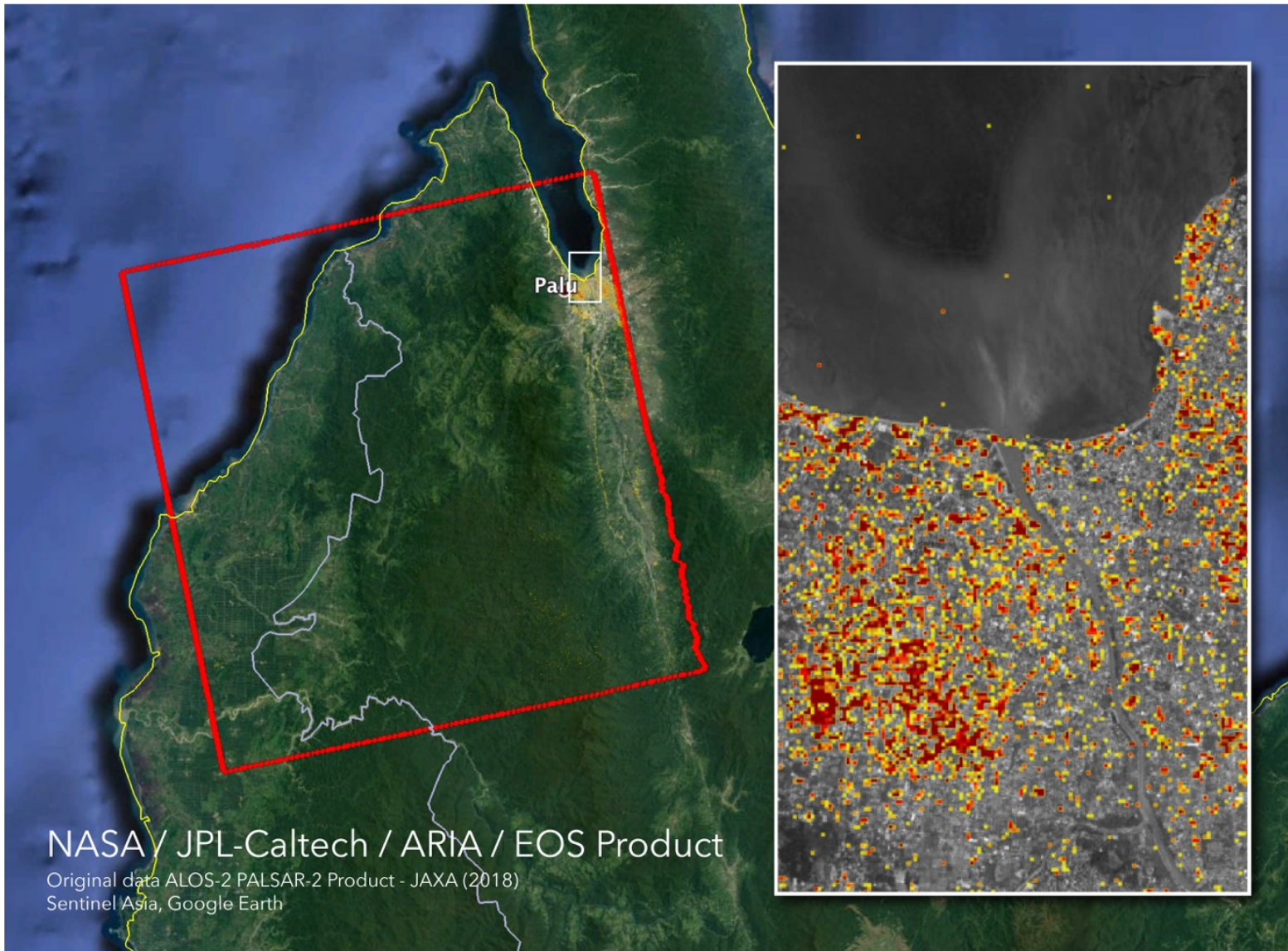
Earthquake and Tsunami in Indonesia, 2018.

A magnitude 7.5 earthquake struck Indonesia's Central Sulawesi Province on Sept. 28, 2018, triggering a tsunami and landslides that caused widespread destruction and loss of life. More than 2,000 people are known to have died and at least 2,500 are seriously injured, according to the Indonesia disaster management agency.



SAR Interferogram produced by EOS



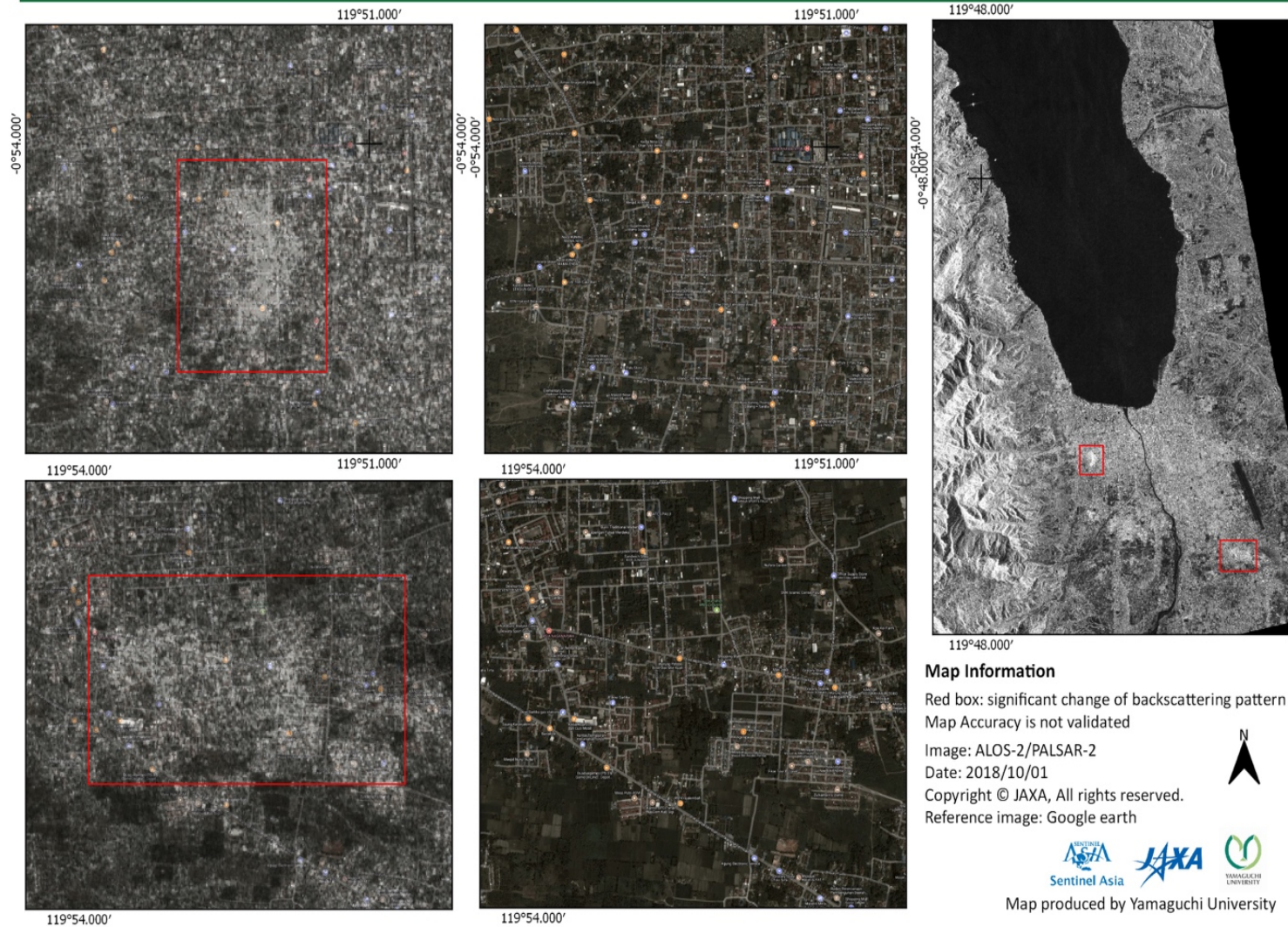


Building Damage Proxy Map produced by Liquefaction

Lorem ipsum



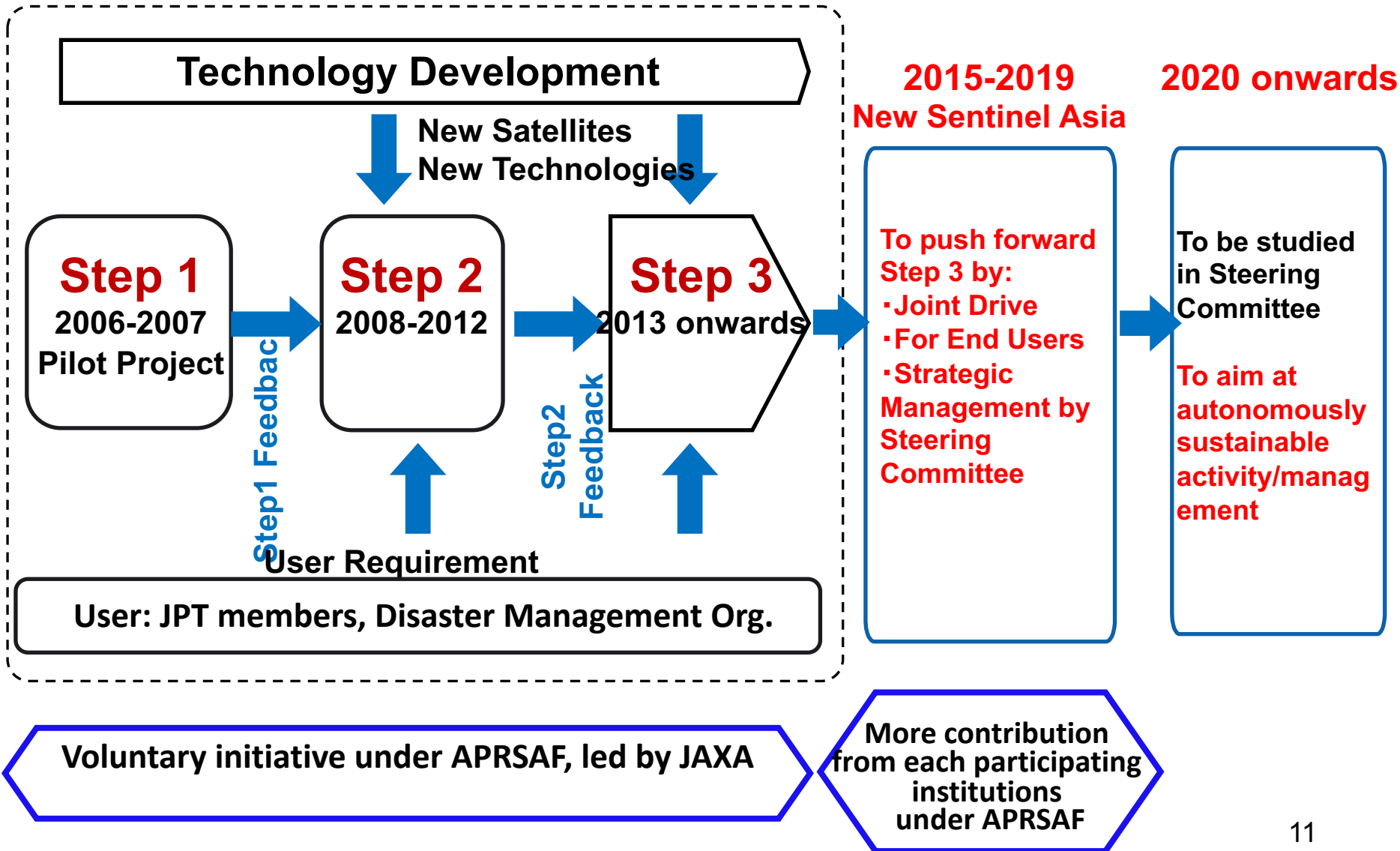
Damaged areas after tsunami by post-event ALOS-2 in Sulawesi, Indonesia



Buildings damaged by Liquefaction



Sentinel Asia Evolution Image





Concept of SA Strategic Plan

“Challenges for Disaster Risk Reduction by a Collaboration between Space and Disaster Management Agencies”

MITIGATION

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

RECOVERY

- Mid/Long-term monitoring
- Recovery Status



PREPADNESS

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

RESPONSE

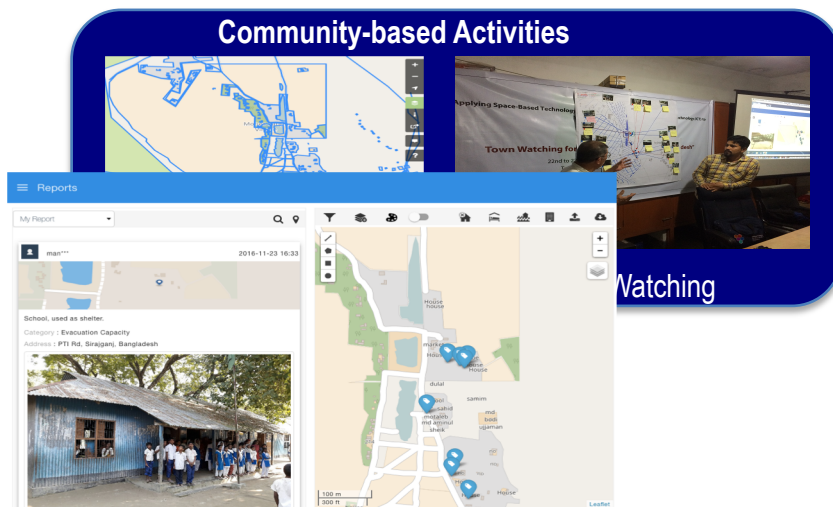
- Emergency Observation
- Data Analysis
- Damage Assessment



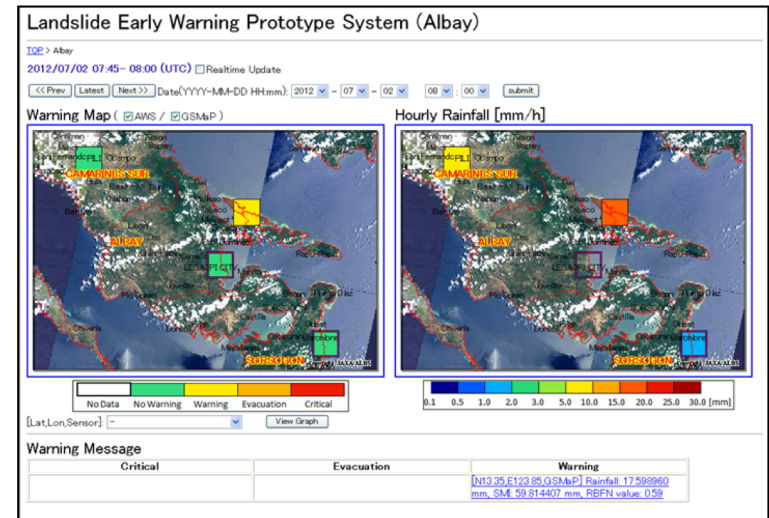
Mitigation/Preparedness

Key points;

- Recognition of Disaster occurrence spots by Hazard Map produced by space-based information.
- Expand Philippines Success Story, (Hazard maps, Early warning system of landslide etc.) to other countries.
- Development of new early warning system as a result of WGs activity.
- User enhancement by show-case, use-case of Sentinel Asia activity
- Capacity building for organization/agency ,(not individual person) on remote-sensing and GIS technology. One DAN in each country.



Applying Space-Based Technology and ICT to Strengthen Disaster Resilience (GIC-AIT)



Landslide Early Warning System in Philippines

Response

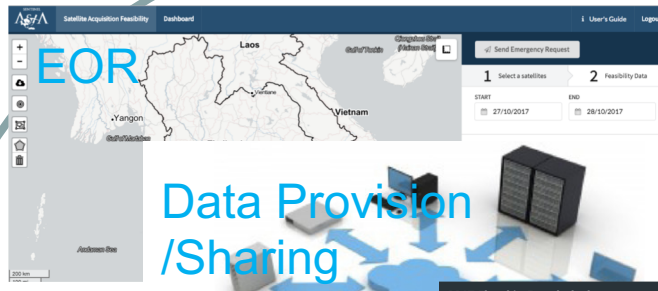
Key points;

- Sharing all information on the Web
- Easy registration of EOR
- Visualization on the Status of DPN and DAN activity
- Quick response from requirement to data provision
- More useful and helpful products and information



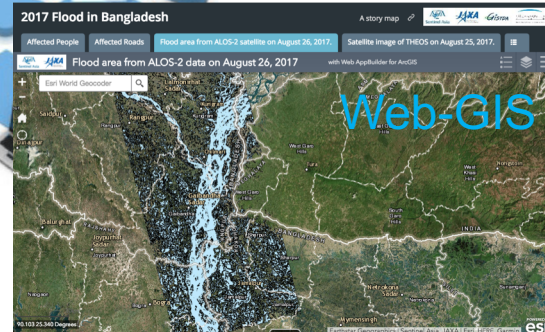
DPN

All Web-based System

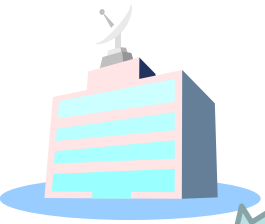


EOR

Data Provision /Sharing



Web-GIS



USER (DMO/DMA)



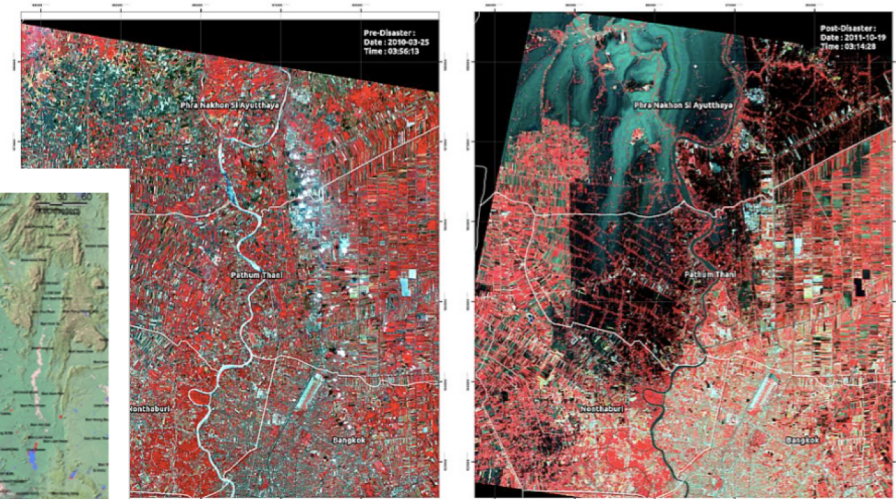
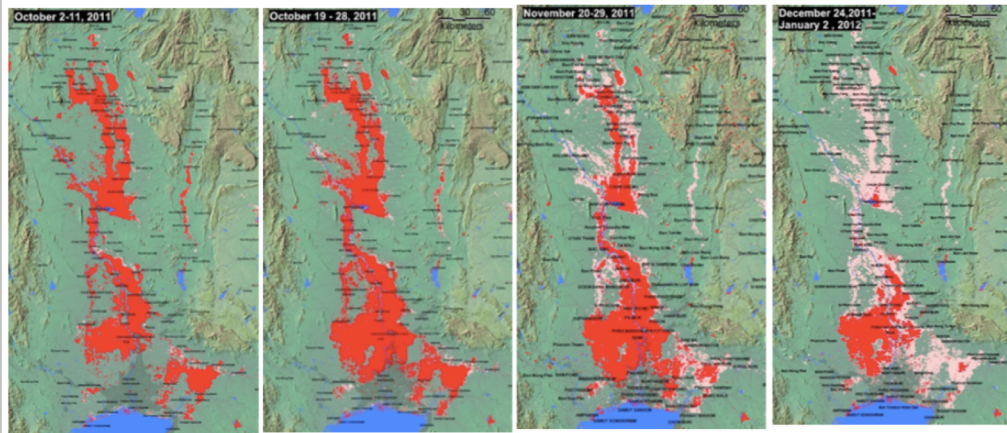
DAN



Recovery

Key points;

- Monitor devastating damage, like huge flood, caused by big disaster in regular.
- Monitor the situation related to secondary disaster, like landslide dam, in regular.



Cartographic information
 Projection: UTM 47N
 Datum: WGS84

Data Sources
 Satellite: SPOT-5
 Resolution: 10m
 Observation Date (Left): 2010-03-25, (Right): 2011-10-19

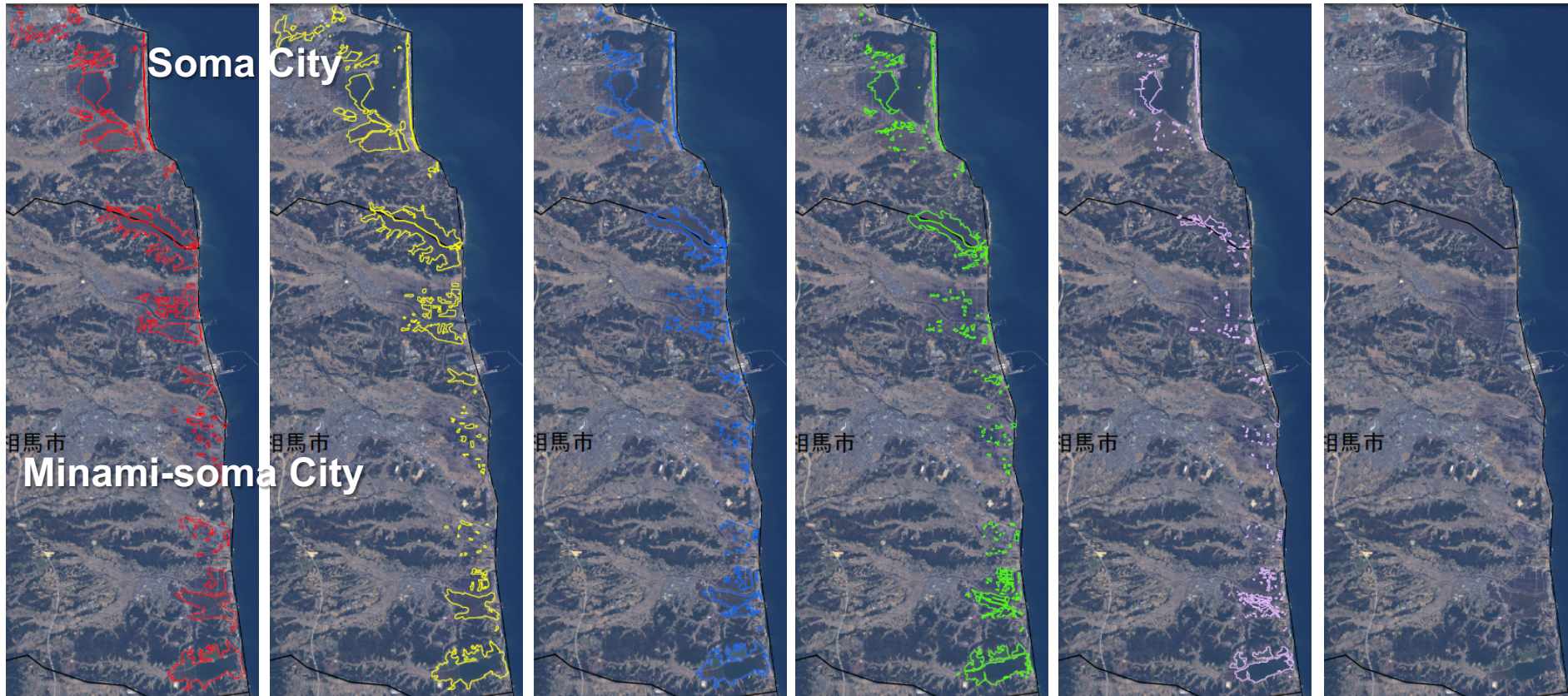
Map Produced by Asian Institute of Technology
 Website: <http://www.aist.ac.th>

2-11 Oct 2011 19-28 Oct 20-29 Nov 24 Dec 2011 - 2 Jan 2012

Huge Flood in Thailand, 2012

Flood Analysis using AVNIR-2 image

Background image: Apr. 17, 2011



As of Mar. 14	As of Mar. 19	As of Apr. 5	As of Apr. 10	As of Apr. 17	As of Apr. 20
25.902 [km ²]	21.521 [km ²]	13.943 [km ²]	11.025 [km ²]	5.847 [km ²]	0.094 [km ²]

- ✓ Generating flooded area polygon at regional government
- ✓ Calculating surface at flooded area
- ✓ Providing those data to Government of Japan and local governments

Surface: Fukushima Pref.

Flooded areas decreasing with time



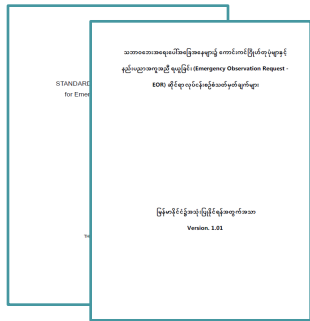
Current Status of the Strategic Plan

- Currently the first draft of long-term plan is drafted,
- Action items identified during the discussions are summarized and shared with SC members to identify possible contribution of partners and the time frame of achieving them,
- Action plan was summarized into 5 main themes and supported by 5 leading agencies with their voluntary worked;
 - I. New Satellite Data Provisions and Systems: JAXA
 - II. Value Added Product(VAP): Yamaguchi University
 - III. End-user Enhancement: GIC-AIT
 - IV. Step-3 Activities (Complete DRR cycle): ADRC, IWMI and GIC-AIT
 - V. Communication, Collaboration and Cooperation: ADRC

And Concept Paper on SDG, Sendai-framework and the relationship/benefit/usage of Sentinel Asia is being prepared by IWMI and GIC-AIT

Developing Standard Operation Procedure (SOP) for Sentinel Asia

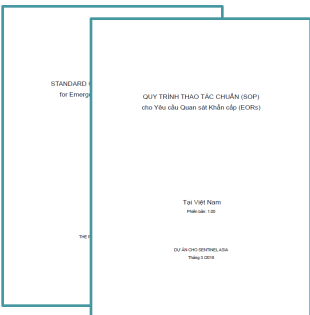
The purpose of SOP is to make clear each role and to strengthen the network between JPT members and other agencies in Myanmar, Thailand and Viet Nam.



English and Myanmar language



English and Thai language



English and Vietnam language

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- 1-1. Introduction
- 1-2. Objectives
- 1-3. Essential Conditions
- 1-4. Member List in Myanmar
- 1-5. Scope of this Manual

2. Discussion for EOR among Members in Myanmar

- 2-1. Disaster Information Sharing
- 2-2. Confirmation for EOR

3. Preparing and Submitting EOR Sheet

- 3-1. About EOR Sheet
- 3-2. Preparing EOR Sheet
- 3-3. Submitting EOR Sheet

4. Registration into Sentinel Asia Server

- 4-1. About Sentinel Asia Server
- 4-2. User Name and Password for Sentinel Asia Server
- 4-3. Registration Disaster Information into Sentinel Asia Server

5. Providing Disaster Information and Feedbacks



Conducting workshops in 3 countries for SOP



In Myanmar

Date: 30 January 2018

Venue: Horizon Lake View Resort

Participants: 39
(RRD, DMH, ADPC, MIMU, One map Myanmar, etc.)



In Thailand

Date: 22 February 2018

Venue: Wayupak Convention Center

Participants: 21
(DDPM, GISTDA, MOI, RID, DWR, RFD, ADPC, etc.)

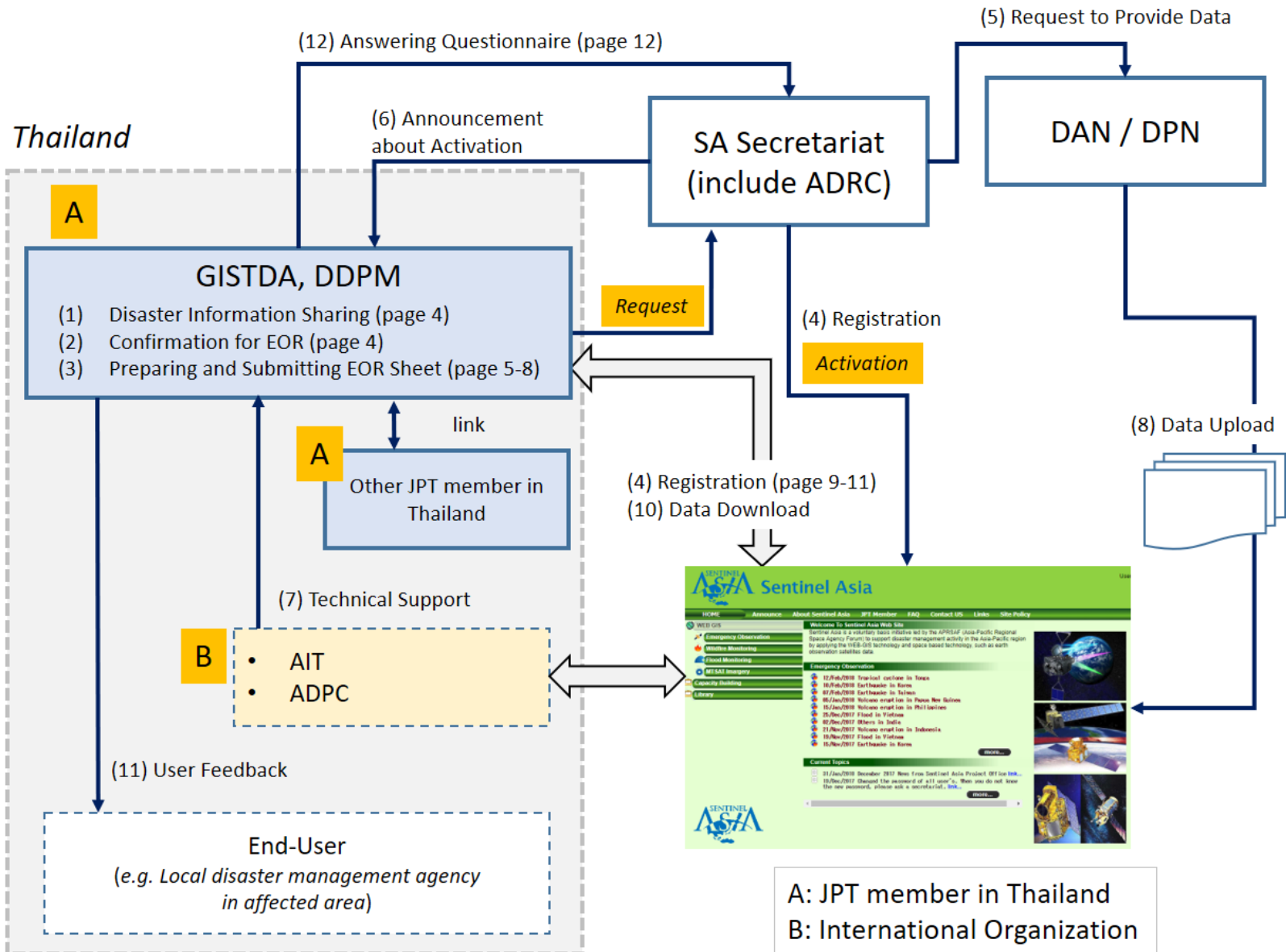


In Vietnam

Date: 19-20 March 2018

Venue: STI building

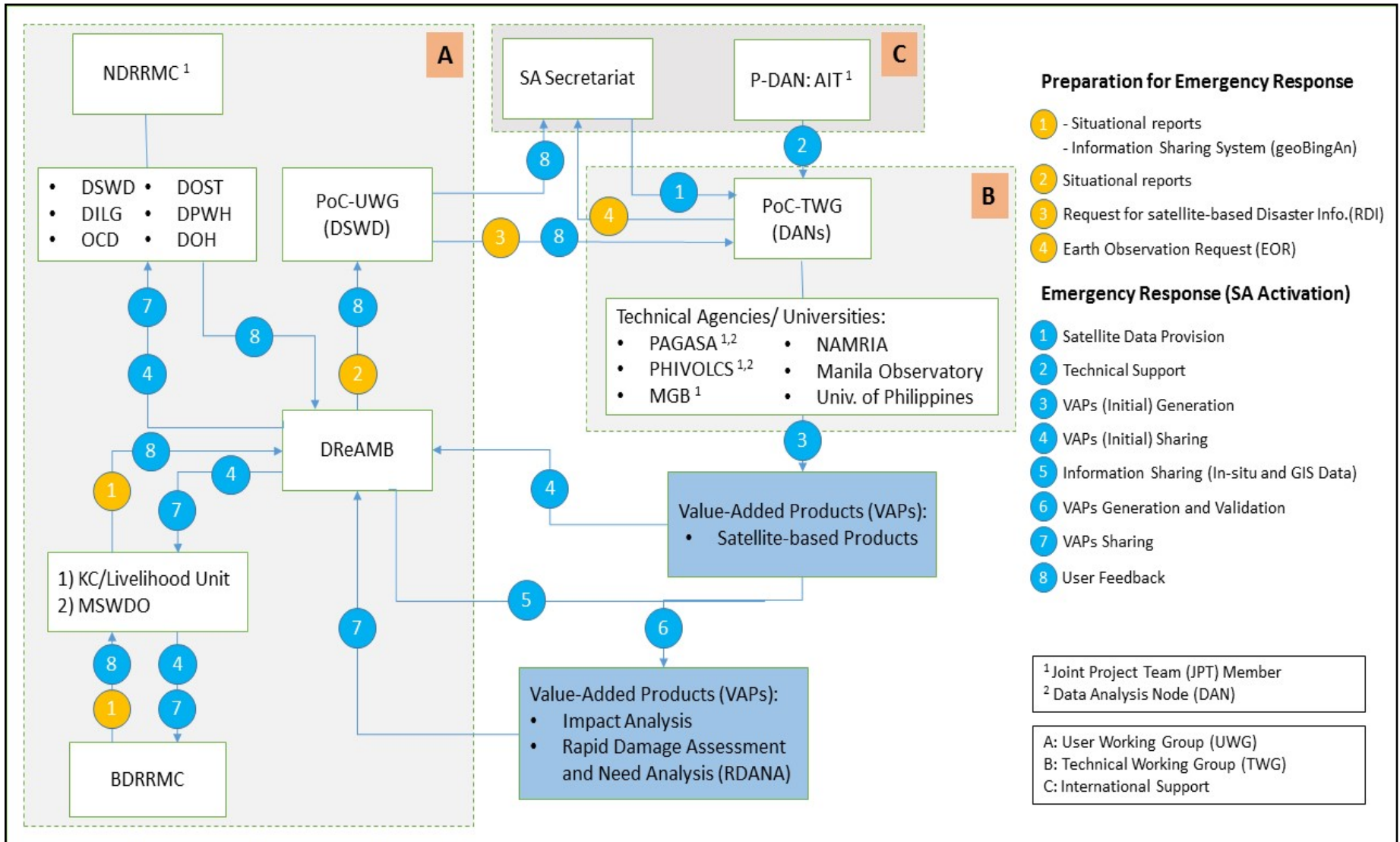
Participants: 36
(STI, MONRE, DMPTC, etc.)



This figure was confirmed by participants in each workshop.



Framework of Workflow with Sentinel Asia in Philippines





Summary

- Sentinel Asia (SA) is a voluntary initiative by a collaboration between space agencies and disaster management agencies to reduced disaster risk in Asian-Pacific region.
- SA has responded over 280 requirements from JPT and ADRC members since 2007.
- SA is expected to implement not only emergency observation but activities covering entire disaster management cycle including mitigation/preparedness and recovery phase after a disaster.
- Space-based technology would have great potential to contribute to more activities for DRR in Asia and the Pacific.