



Challenges of Space Data Utilization for Disaster Management

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YUCARS

Yamaguchi University, Center for Research and Application of Satellite Remote Sensing
応用衛星リモートセンシング研究センター

TOP About YUCARS MISSION NEWS MEMBERS ACCESS 日本語

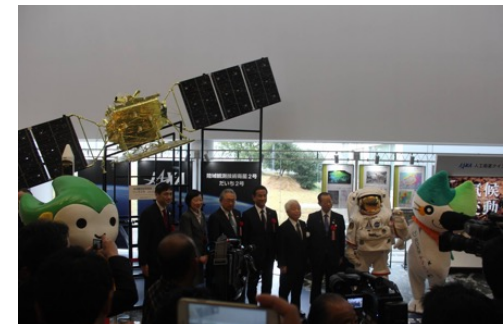
To promote world-class research in
satellite remote sensing

Our center hosts researchers from various academic backgrounds including engineering, agriculture,
humanities, economics, and
medicine and health sciences and uses this fact
to promote interdisciplinary research.

As we continue our work, we aim to work even harder
to strengthen our partnerships with overseas researchers.

ABOUT US

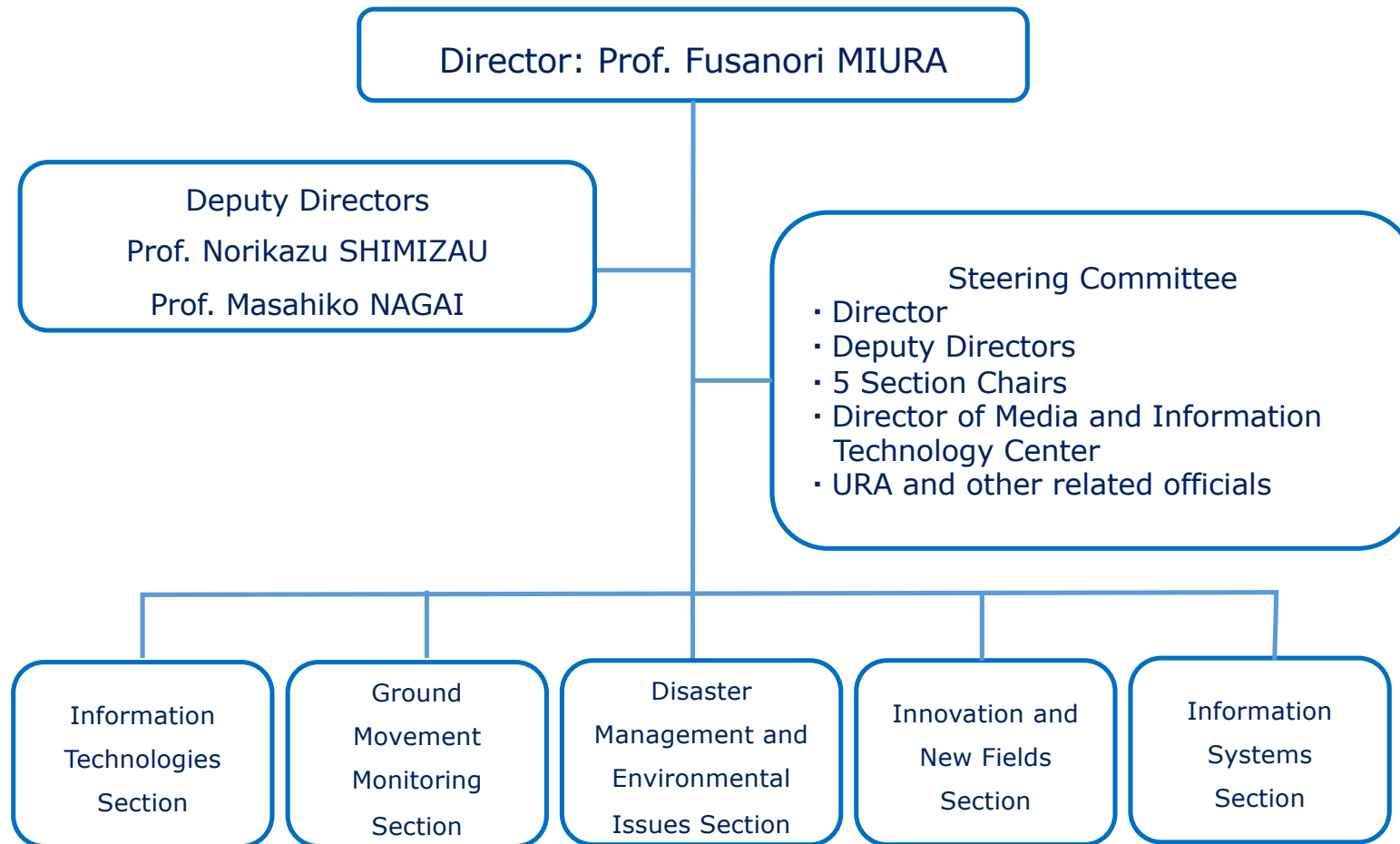
Opening Ceremony, Feb. 2017



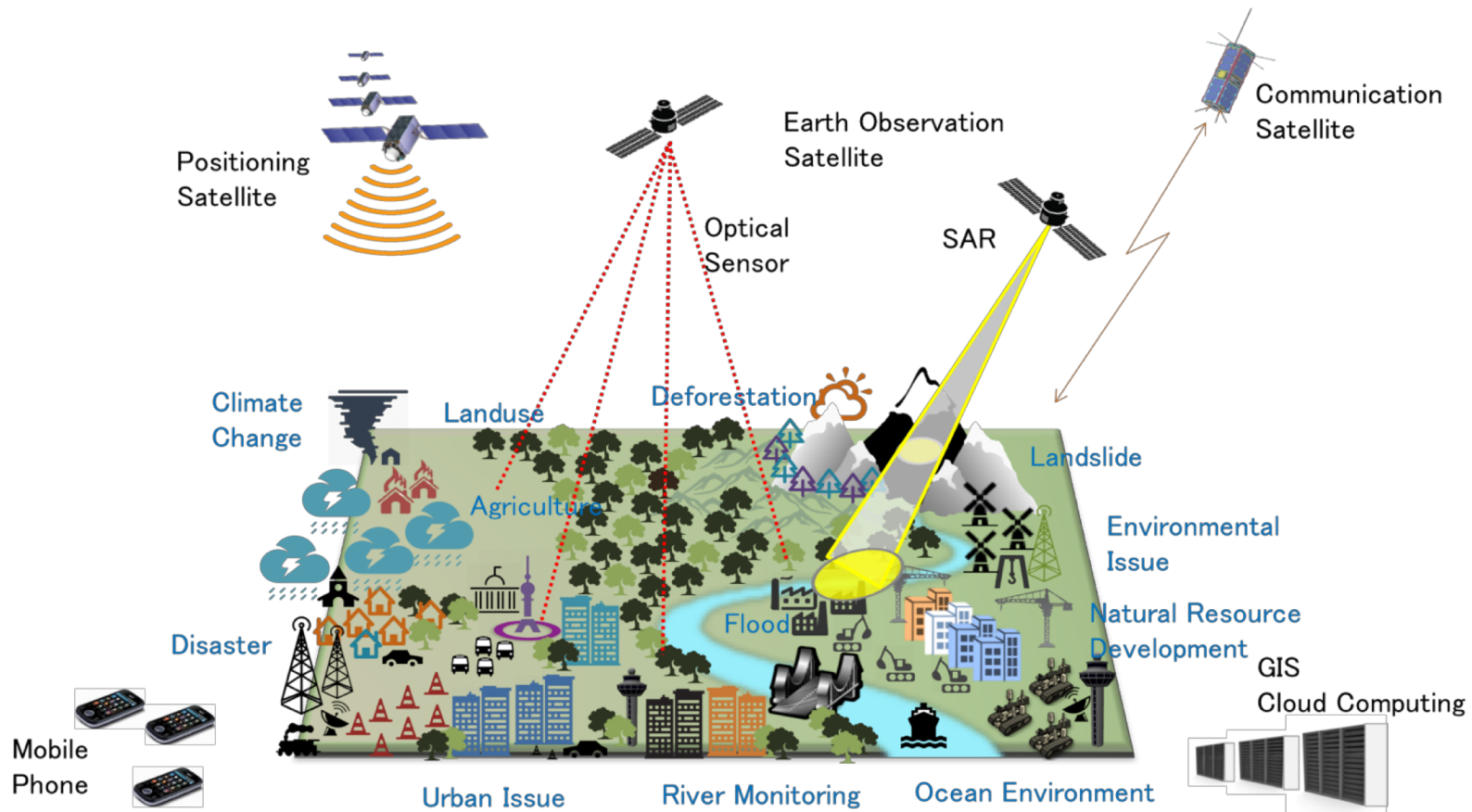
http://yucars.eng.yamaguchi-u.ac.jp/index_e.html

YUCARS

Center for Research and Application of Satellite Remote Sensing (YUCARS)



Integration of Space and Society



- WEB GIS
- Emergency Observation
- Wildfire Monitoring
- Flood Monitoring
- MTSAT Imagery
- Capacity Building
- Library

Welcome To Sentinel Asia Web Site
 Sentinel Asia is a voluntary basis initiative led by the APRSAF (Asia-Pacific Regional Space Agency Forum) to support disaster management activity in the Asia-Pacific region by applying the WEB-GIS technology and space based technology, such as earth observation satellites data.


- Emergency Observation**
- 12/Oct/2018 Tropical cyclone in United Arab Emirates
 - 28/Sep/2018 Earthquake in Indonesia
 - 17/Sep/2018 Typhoon in Vietnam
 - 15/Sep/2018 Typhoon in Philippines
 - 05/Sep/2018 Earthquake in Japan
 - 29/Aug/2018 Flood in Myanmar
 - 27/Aug/2018 Flood in Vietnam
 - 25/Aug/2018 Flood in Taiwan
 - 09/Aug/2018 Flood in India
 - 29/Jul/2018 Flood in Thailand

[more...](#)

- Current Topics**
- 27/Sep/2018 October 2018 News from Sentinel Asia Project Office [link...](#)
 - 31/May/2018 Next Sentinel Asia Web (trial version) updated [link...](#)

[more...](#)

A collaboration between space agencies and disaster management agencies



Home About Activations News Library English Login

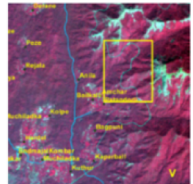
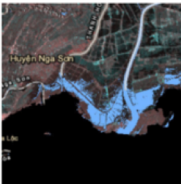
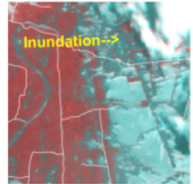

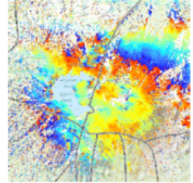

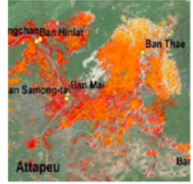

The International Charter Space and Major Disasters

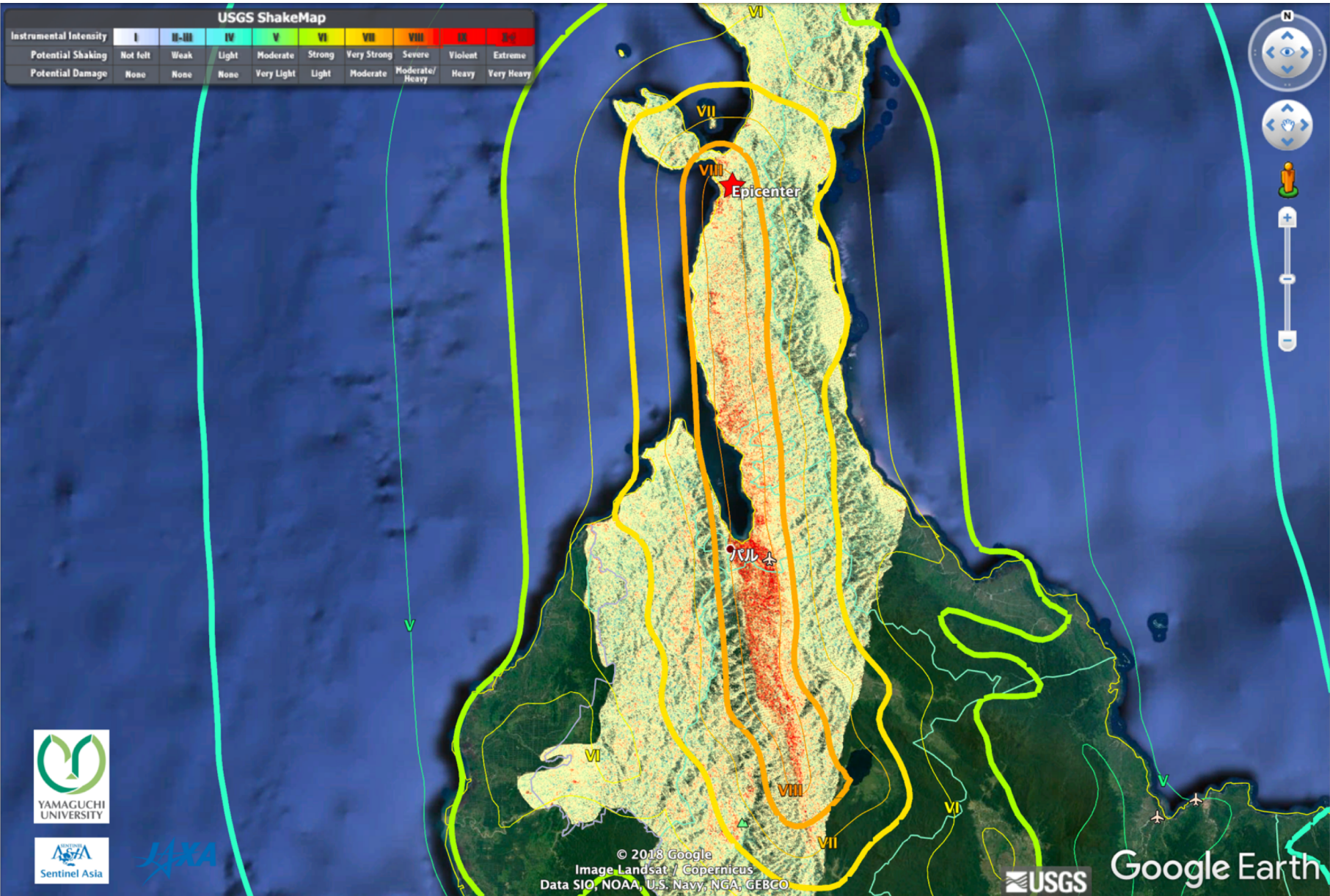
Providing satellite data to those affected by natural or man-made disasters through registered organisations, for use in monitoring and response activities.

[Read more](#)

[How the Charter Works](#) [How to become a user](#)

Latest Charter Activations

 <p>21 AUGUST 2018 Landslide in Karnataka State, India ▶</p>	 <p>16 AUGUST 2018 Flood in Vietnam ▶</p>
 <p>16 AUGUST 2018 Flood in Kerala State, India ▶</p>	 <p>15 AUGUST 2018 Flood in Venezuela ▶</p>
 <p>06 AUGUST 2018 Earthquake in Indonesia ▶</p>	 <p>24 JULY 2018 Fire in Greece ▶</p>
 <p>24 JULY 2018 Flood in Laos ▶</p>	 <p>07 JULY 2018 Flood in Japan ▶</p>





インドネシア地震 被害は150キロ 帯状に 専門家が解析

2018年10月7日 16時47分

インドネシア津波

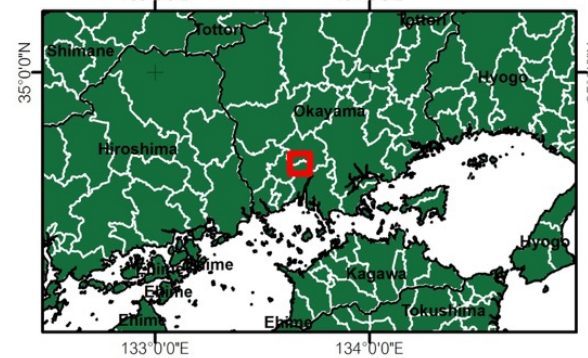
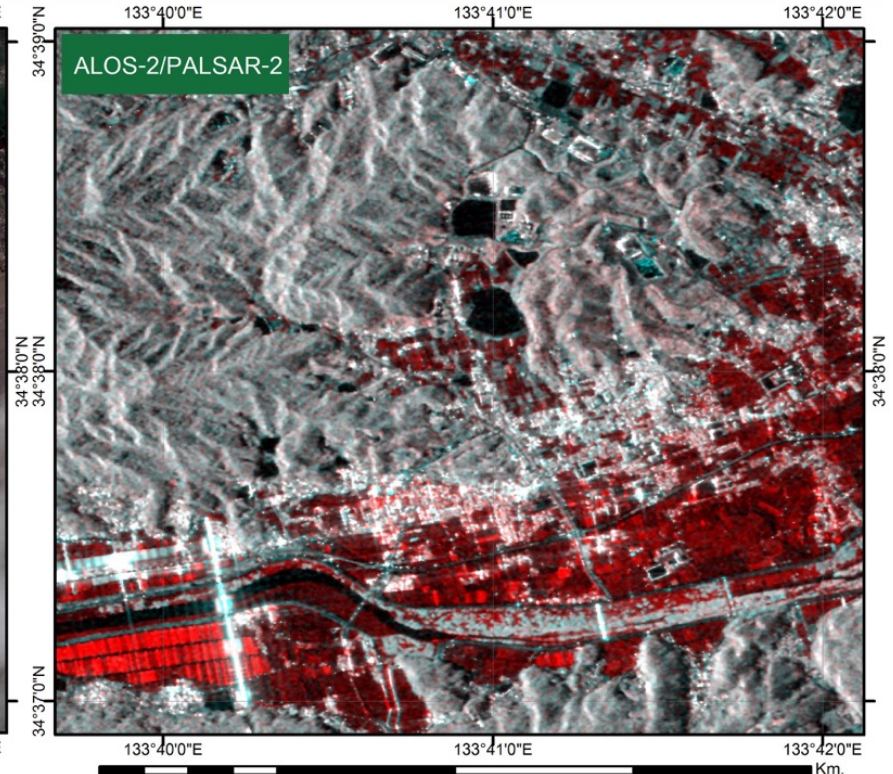
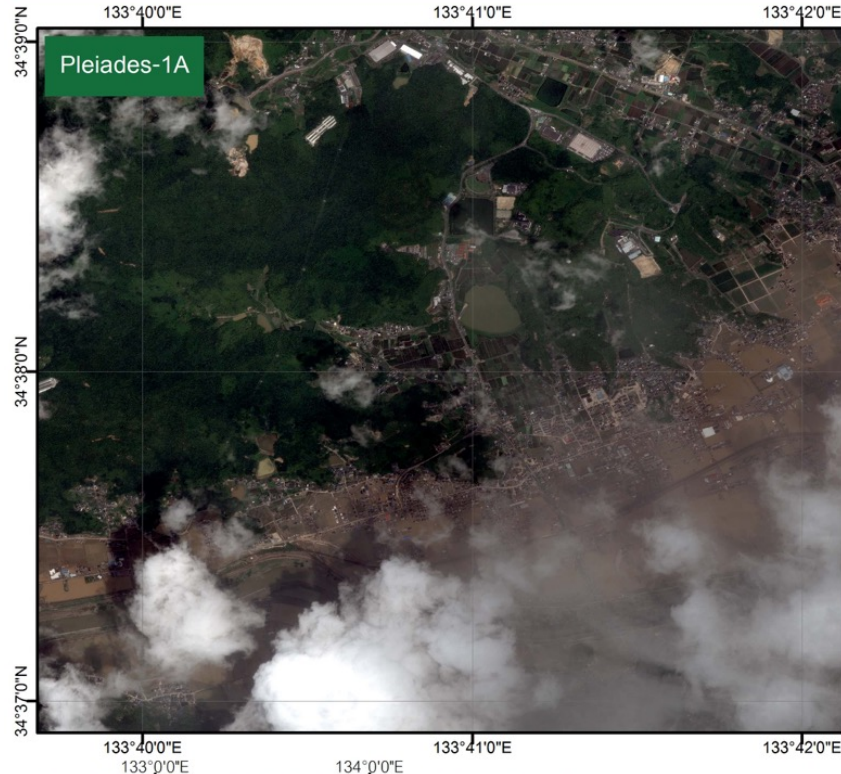
インドネシアのスラウェシ島で発生した地震の被害について、専門家が衛星のデータを使って解析したところ、被害の大きいエリアは、沿岸の都市パルを中心に南北およそ150キロにわたって帯状に広がっているとみられることがわかりました。

山口大学応用衛星リモートセンシング研究センターの長井正彦副センター長らの研究グループは、先月28日に発生したインドネシアのスラウェシ島中部の地震の被害の広がりについて、地球観測衛星「だいち2号」が地震の前と後に観測したデータを使って解析しました。

解析はおよそ50m四方ごとに観測されたデータを基に行われ、地表の変形が地震の後で大きくなるにつれ赤色で示されています。

その結果、建物の倒壊や地滑りなどの被害で地表が大きく変形したエリアは、沿岸の都市パルを中心に南北およそ150キロにわたって、帯状に広がっているとみられることがわかりました。

Flood Detection in Mabi, Kurashiki, Okayama, Japan



Information

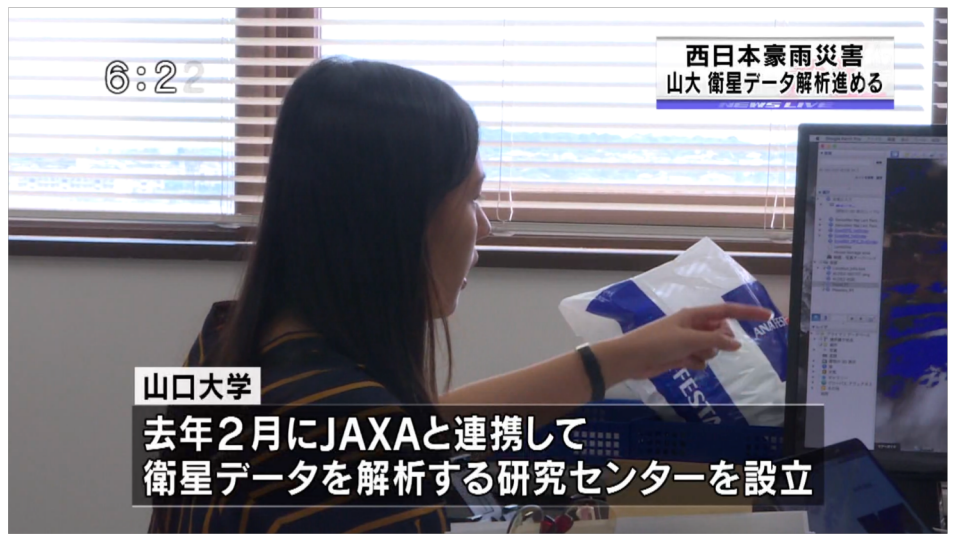
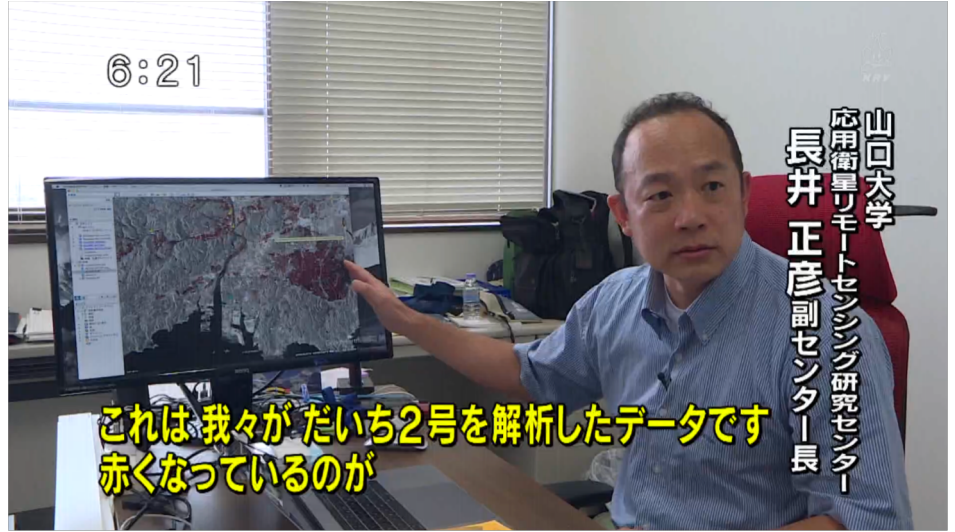
Right image: Pleiades-1A
 Date: 2018-07-09
 Image Copyright: Pleiades © CNES (2018) - Distribution: Airbus Defence and Space, all rights reserved.

Left image: ALOS-2/PALSAR-2 (SM1 mode)
 Color Composite:
 Red band: Before disaster: 2018-04-14 at 15:05 (UTC)
 Green band: After disaster: 2018-07-07 at 15:05 (UTC)
 Blue band: After disaster: 2018-07-07 at 15:05 (UTC)

Image Copyright © Japan Aerospace Exploration Agency, all rights reserved. Map produced by Yamaguchi University

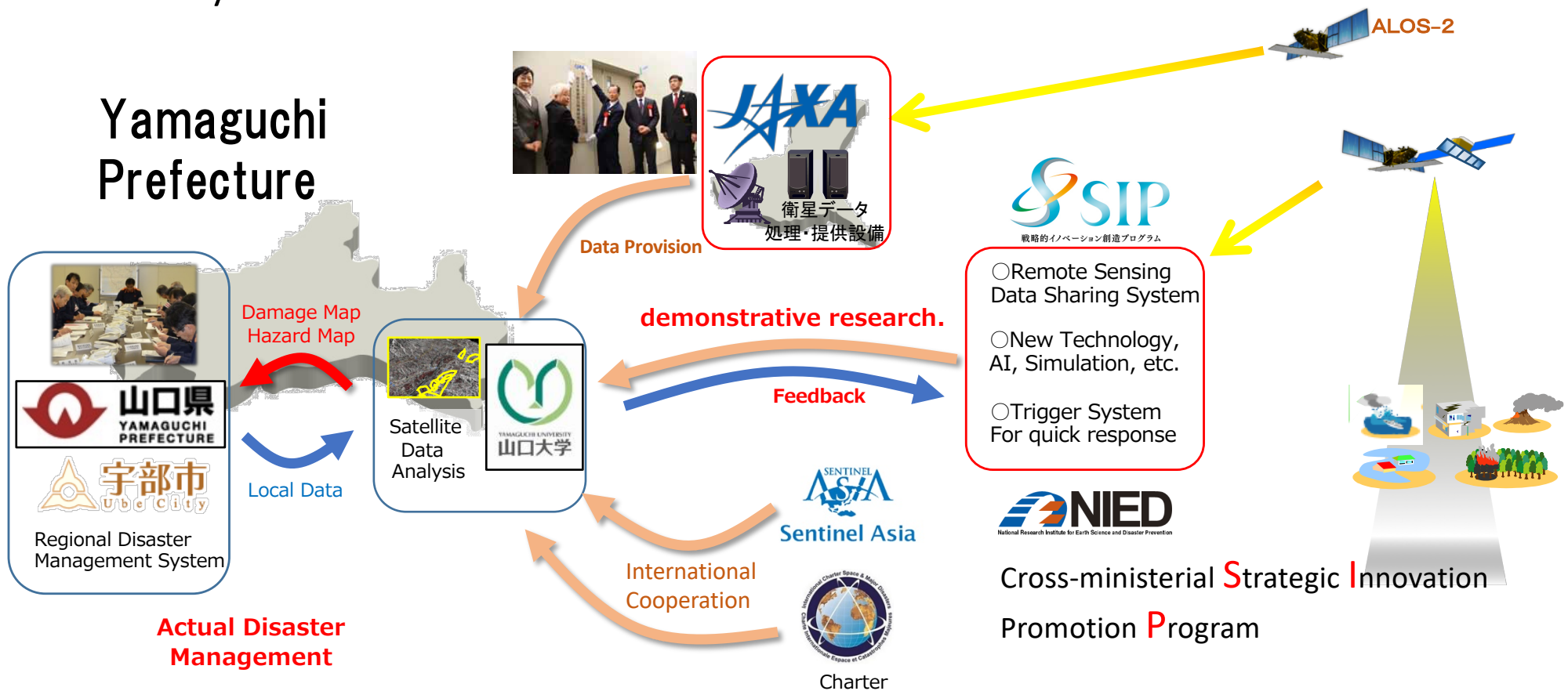
Legend of left image

Red color is possible to be flood area



Yamaguchi MODEL

Create New Framework for Satellite Data Utilization for Disaster Response.
 Closely work with Local Government.



Heavy Rain (5th to 6th July, 2017) in Kyushu, Activity in Yamaguchi University (YU)

7th July 12:53 Observation by ALOS-2

↓ 2 Hours

7th July 14:50 Data Provision from JAXA

Automatic process

0.5 HOUR

Data download in YU

7th July 17:00 Data Download Completed
(6.4 GB x 6)

Automatic process

1.0 HOUR

Single look complex (SLC) Level 1.1
→ multi-look image level 1.5
→ Ortho Rectify Level 2.1
→ Data Analysis, Color Composite Image

7th July 20:00 Data Analysis Completed

Close collaboration with Local Government

1.0 HOUR

Data Validation,

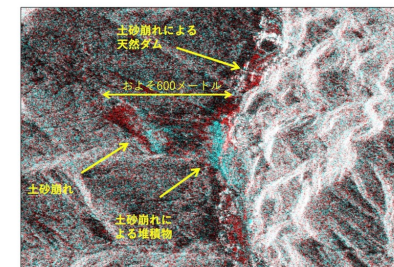
7th July 23:00 Validation Completed, Provide to Local Government

Capacity Building
University Network for New technology and



2.5 HOUR

大分県日田市の小野地区の土砂崩れ

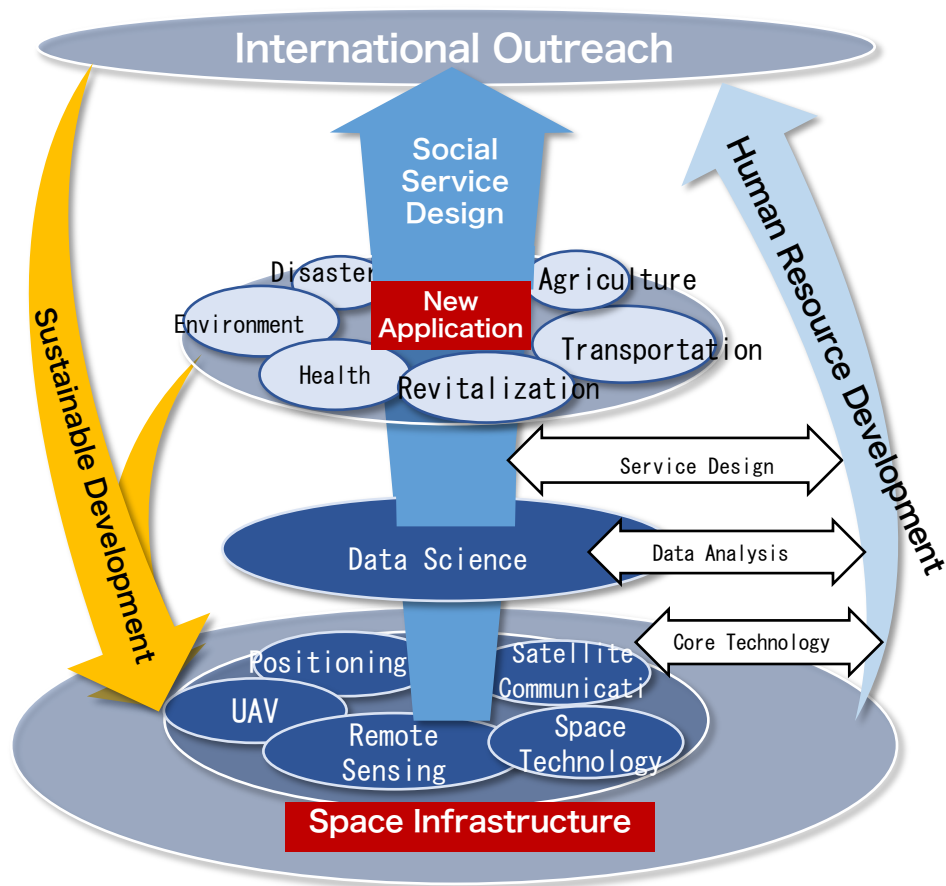


大分県日田市の小野地区の土砂崩れやそれに伴う天然ダムの状況をALOS-2(©JAXA)の災害前後のデータを比較して被害域を検出。変化の箇所を赤と青で表示。

データ：
ALOS-2 ©JAXA
災害前
観測日：2016年4月29日
災害後
観測日：2017年7月7日
山口大学 JAXA

解析：山口大学 長井正彦研究室 (2017年7月7日)

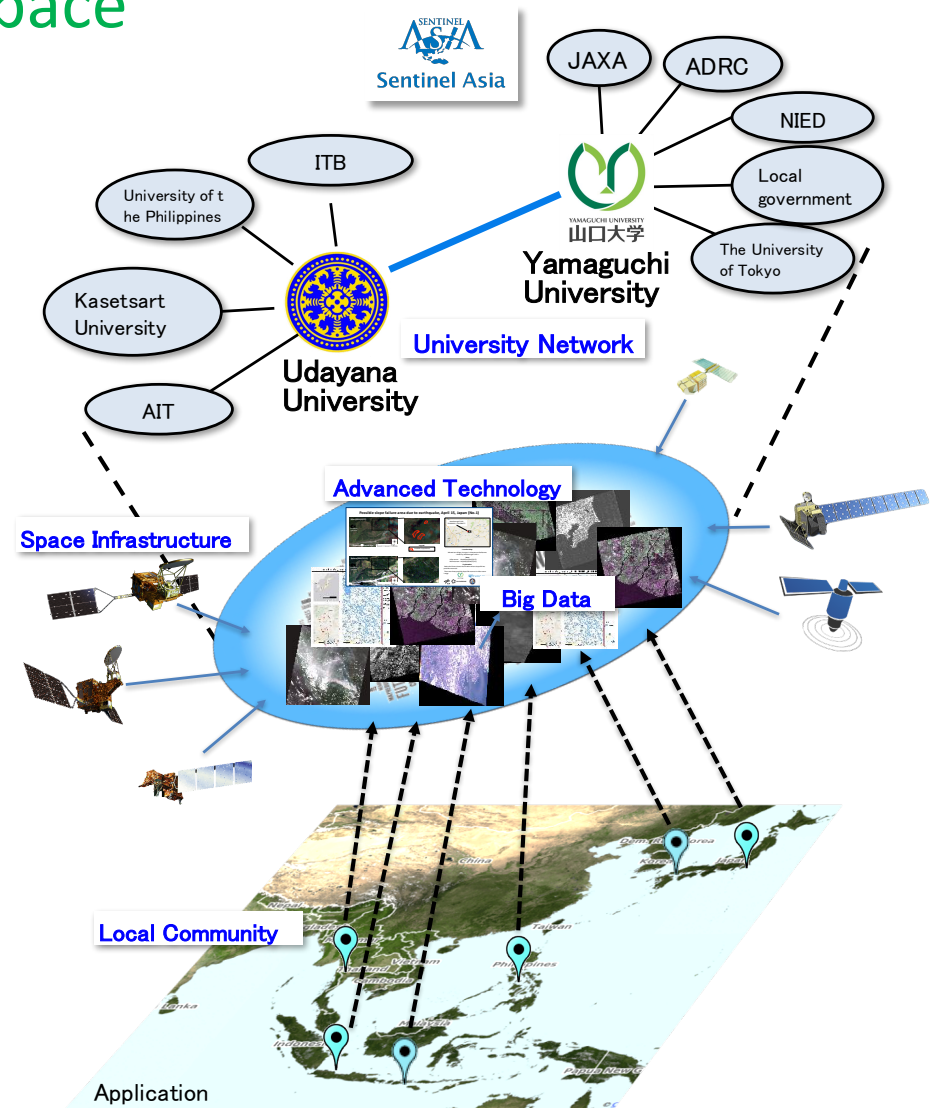
IS4D (Institute on Space for Development)



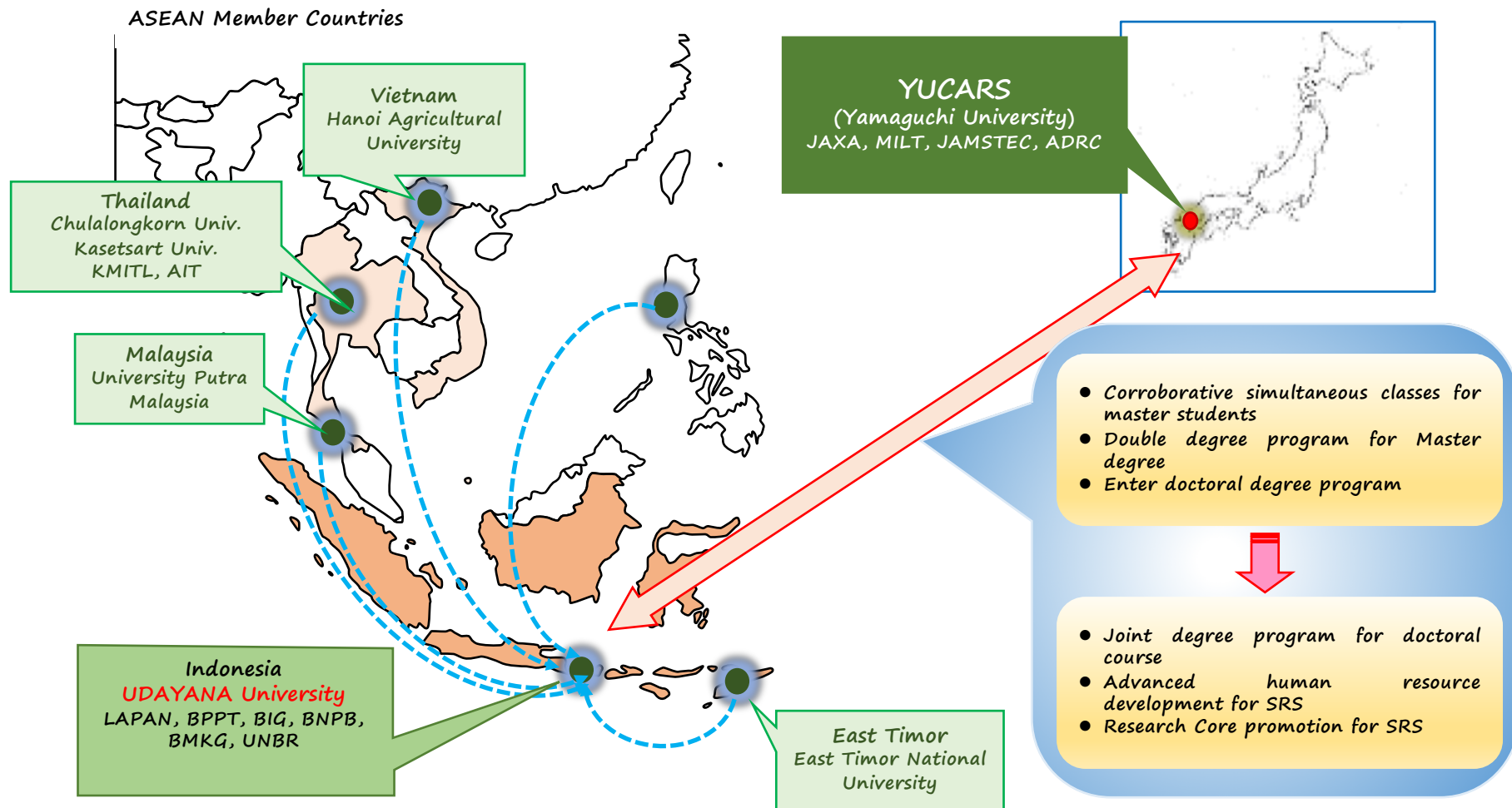
Human Resources Development for Space Utilization in Yamaguchi University

Target

- Human Resources Development for **Space Data Utilization**, based on Disaster Management as a Satellite Data Scientist in Asia.
- Development for **University Data Analysis Network** for Disaster, collaborating with Sentinel Asia and International Disaster Charter.
- Space Infrastructure, Usage of Micro-Satellite, UAV, Io, AI for **Educational Course Material**.
- Joint Degree Program for **Doctoral Students**.

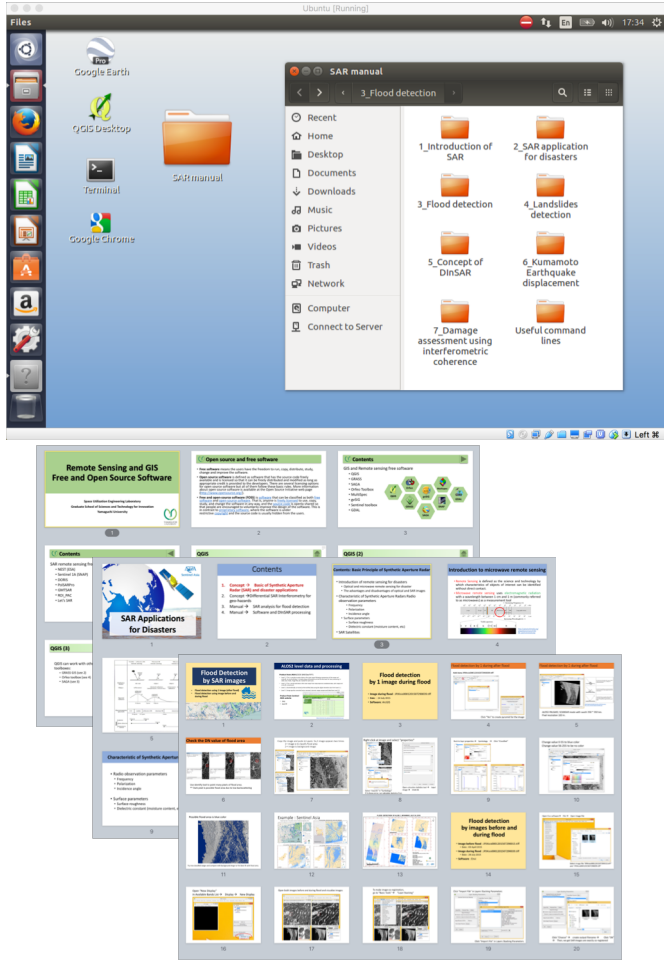


Development of the Joint Degree Program in the Asian Region

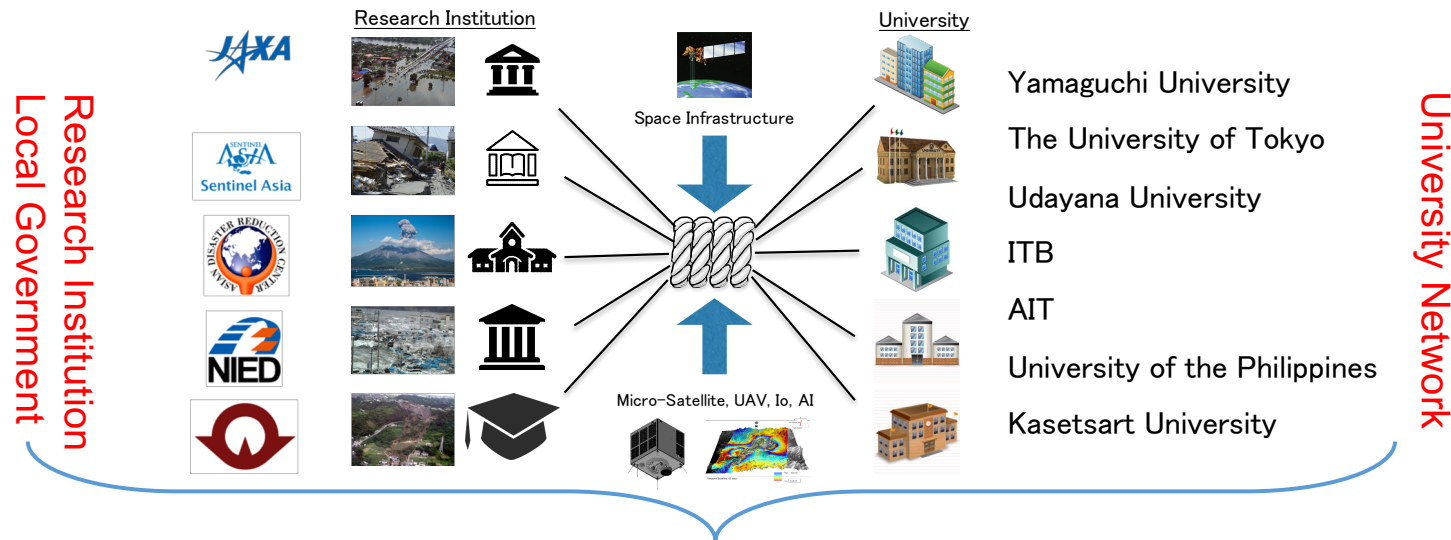


Remote Sensing Analysis Instructions for Disasters

Lesson 1	Lecture
•Synthetic Aperture Radar (SAR) and Applications for Natural Disasters	
Lesson 2	Lecture
•Useful Linux Command Lines and Geospatial Free Software	
Lesson 3	Tutorial
•Flood Detection Using After Event Image	
Lesson 4	Tutorial
•Flood Detection Using Before and After Events Images	
Lesson 5	Tutorial
•Landslides Detection	
Lesson 6	Lecture
•Introduction of Interferometry Technique (InSAR)	
Lesson 7	Tutorial
•Earthquake Displacement Detection	
Lesson 8	Tutorial
•Earthquake Damage Assessment Using Interferometric Coherence Change	



Human Resources Development for Space Utilization in Yamaguchi University



Sharing New Data, New Methodology
 Disaster as a case study and applying for other Application

