

Sentinel-Asia Project

*for establishing Disaster Management Support System
in Asia-Pacific Region*

The 49th Session of Committee on the Peaceful Uses of Outer Space
7-16 June, 2006

Kazuya Kaku
Office of Space Applications
Japan Aerospace Exploration Agency (JAXA)



Contents

1. What's "Sentinel-Asia"?
 - 1-1. Background / Philosophy / Framework
 - 1-2. Main Activities
 - 1-3. How it works (Information-sharing Platform)
2. What's expected of you (Wanted data)
3. Future Evolution (After Sentinel-Asia)
4. Summary



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Asia-Pacific Regional Space Agency Forum

APRSAF

<http://www.aprsaf.org/>

Established in 1993 after the Asia-Pacific International Space Year Conference (APIC) in 1992
Enhance the development of space programs in the Asia-Pacific region and promote regional cooperation in the field of space technology and its applications.

[Participation] Space agencies, related governments, regional and international organizations, institutions responsible for applying space technology.

[Organizers] MEXT, JAXA and co-host organizations

➤ **Past co-organizers:** Government entities of Mongolia, Malaysia, The Republic of Korea, Thailand, Australia

Working Groups



**Earth
Observation**



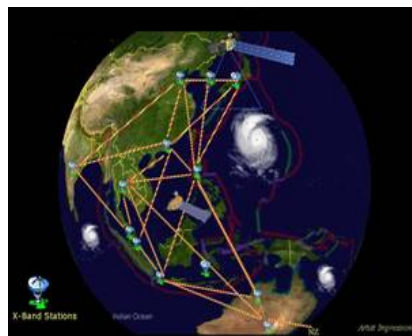
**Communication Satellite
Applications**



ISS



**Space Education &
Awareness**



Sentinel Asia Project
 establishing Disaster Management
 Support System

The 13th Session of APRSAF (APRSAF-13)

22-24 Nov. 2006 in Jakarta Indonesia



Development of Asian Project for Disaster Management Support

- APRSAF-11, Nov 2004, Australia, agreed that a coordinated rapid-response pilot project should be developed for effective disaster reduction in Asia-Pacific region.
- At UN-WCDR, Jan 2005, JAXA hosted “Asian WS on Space Technology & Data Utilization for Disaster Management” with participation of ESCAP.
- APRSAF technical WS “Disaster Reduction through Effective Space Technology Utilization in the Asia Pacific Region”, May 2005, Malaysia, hosted by MACRES (Malaysian Centre for Remote Sensing) and supported by ESCAP, discussed the pilot project plan.
- APRSAF-12, Oct 2005, Kitakyushu, approved the plan and to initiate the pilot project.
- The 1st Joint Project Team Meeting, Feb 2006, Hanoi, discussed the project implementation plan and JPT membership.
- The 2nd Joint Project Team Meeting is planned for June 27-28, in Bangkok, Thailand.

(APRSAF: Asia-Pacific Regional Space Agency Forum)

Philosophy

- APRSAF(Space community) should contribute to disaster management in Asia-Pacific region aiming at:
 - To construct life first society by IT and Space technology
 - To improve speed and accuracy for disaster preparedness and early warning
 - To minimize victims and social economic losses
- Stepwise approach:
 - Step1: Utilization of earth observation satellite data for disaster management, which is called “Sentinel-Asia Project” (2006-2007)
 - Step2: Utilization of satellite communications system besides earth observation satellites (2008-2009)
 - Step3: Establishment of comprehensive disaster management support system (2010-)
- Best-efforts, Voluntary initiative by participating organizations

Framework

- Cooperation among APRSAF, ADRC, Digital Asia and international organizations
- Joint Project Team(JPT) consists of total 27 organizations including 23 agencies from 14 countries and 4 international organizations
- JAXA establishes two project offices in Tokyo and Bangkok



Framework of Sentinel-Asia Project

Best-efforts, voluntary initiative by participating organizations

Space Community

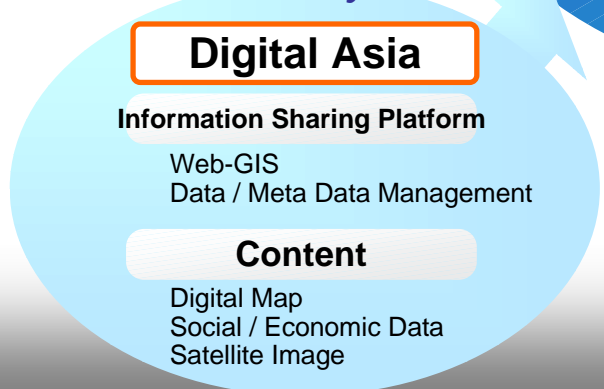


* Asian-Pacific Regional Space Agency Forum

International Community



Digital Earth / Web-GIS Community



Disaster Reduction Community

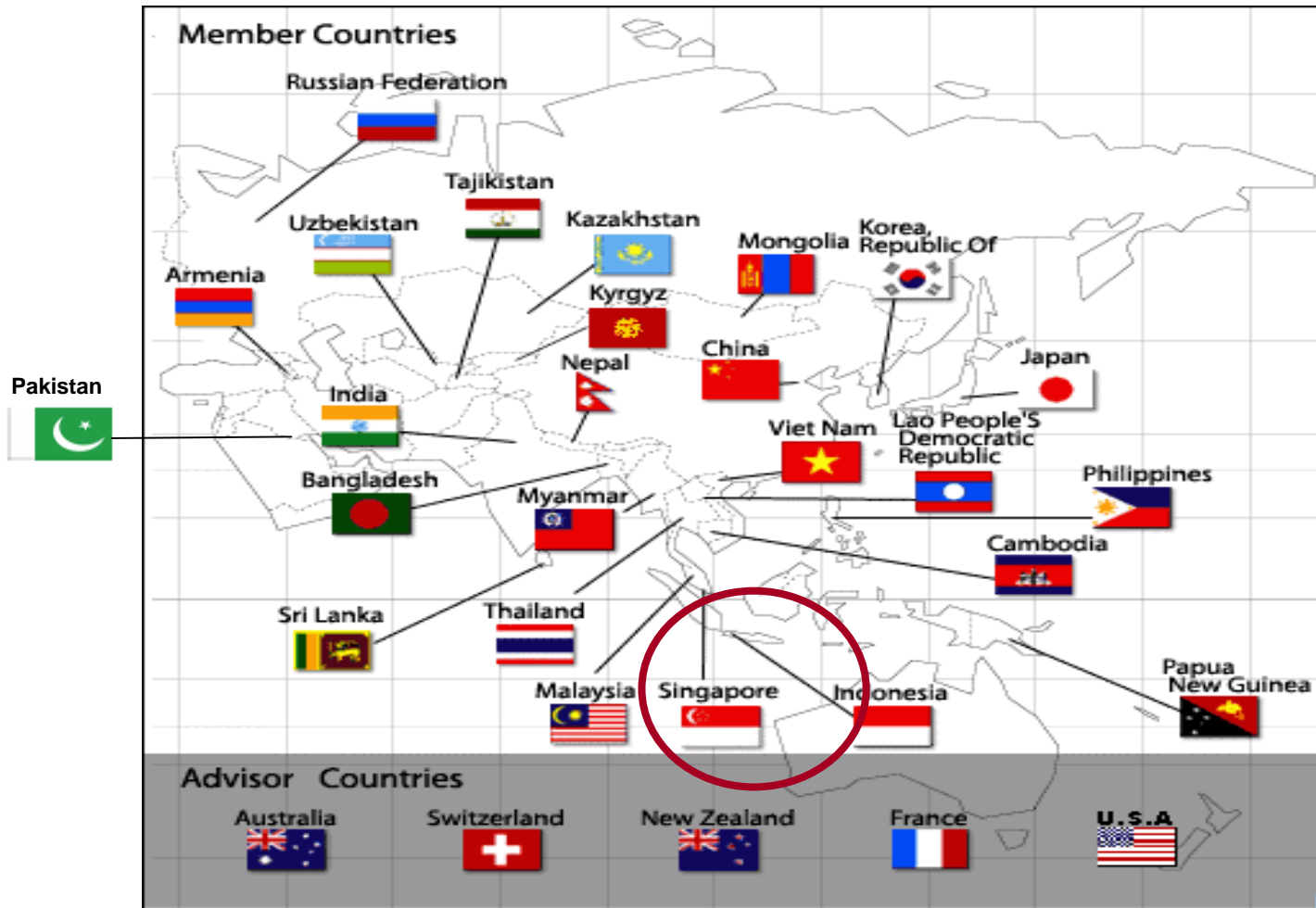


** Asian Disaster Reduction Center



ADRC Member Countries

25 Member Countries, 5 Advisor Countries, 1 Observer



* Implement Various Projects in cooperation with UN/ISDR, UN/OCHA, UNESCO, UNU, WMO, UN/ESCAP, etc.



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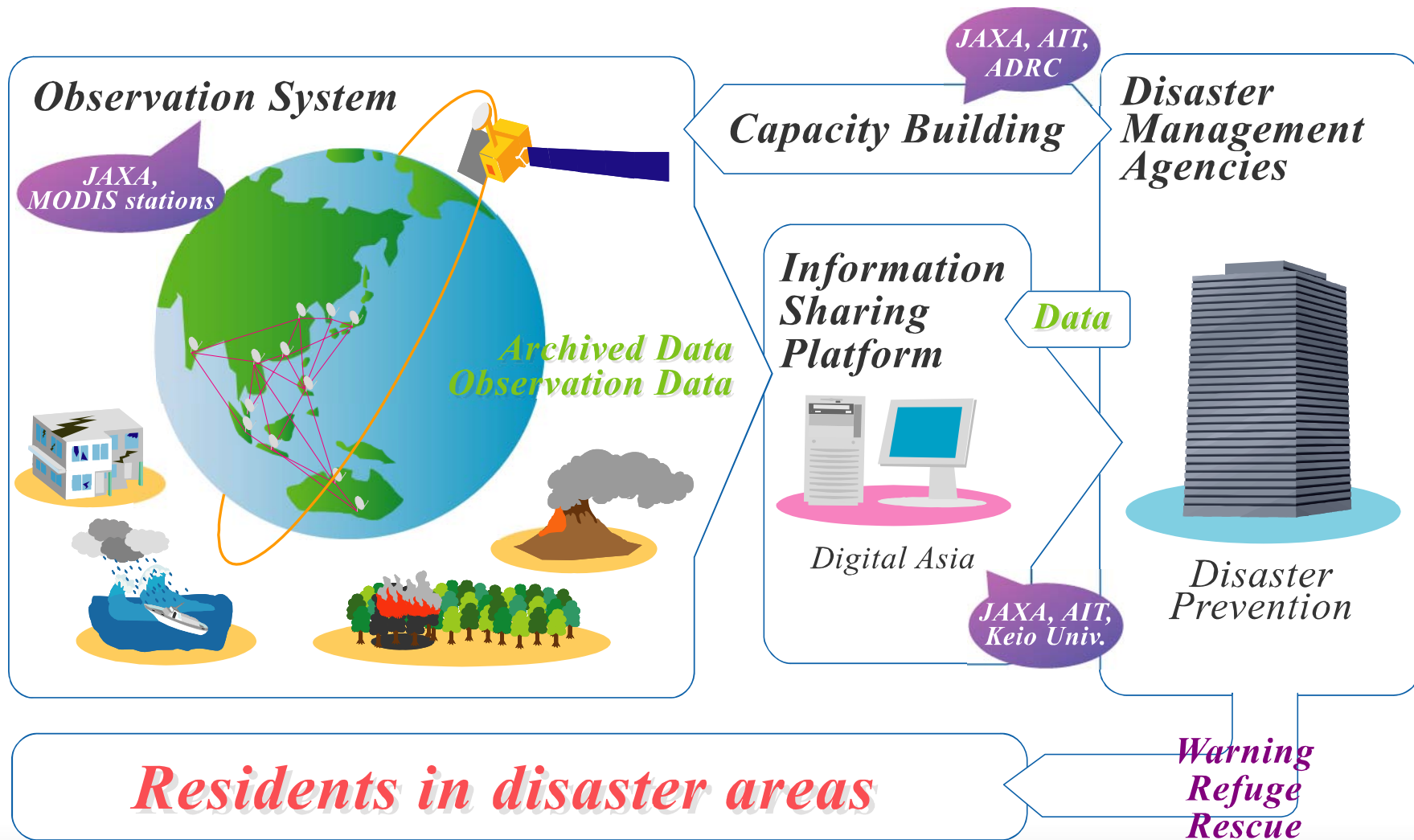
Main Activities

- Emergency observation in case of major disasters by ALOS + ...
- ALOS accepts observation request from ADRC members
- Wildfire monitoring by MODIS and NOAA
- Flood monitoring
- Capacity building for utilization of satellite image for disaster management

Operations will start in October 2006

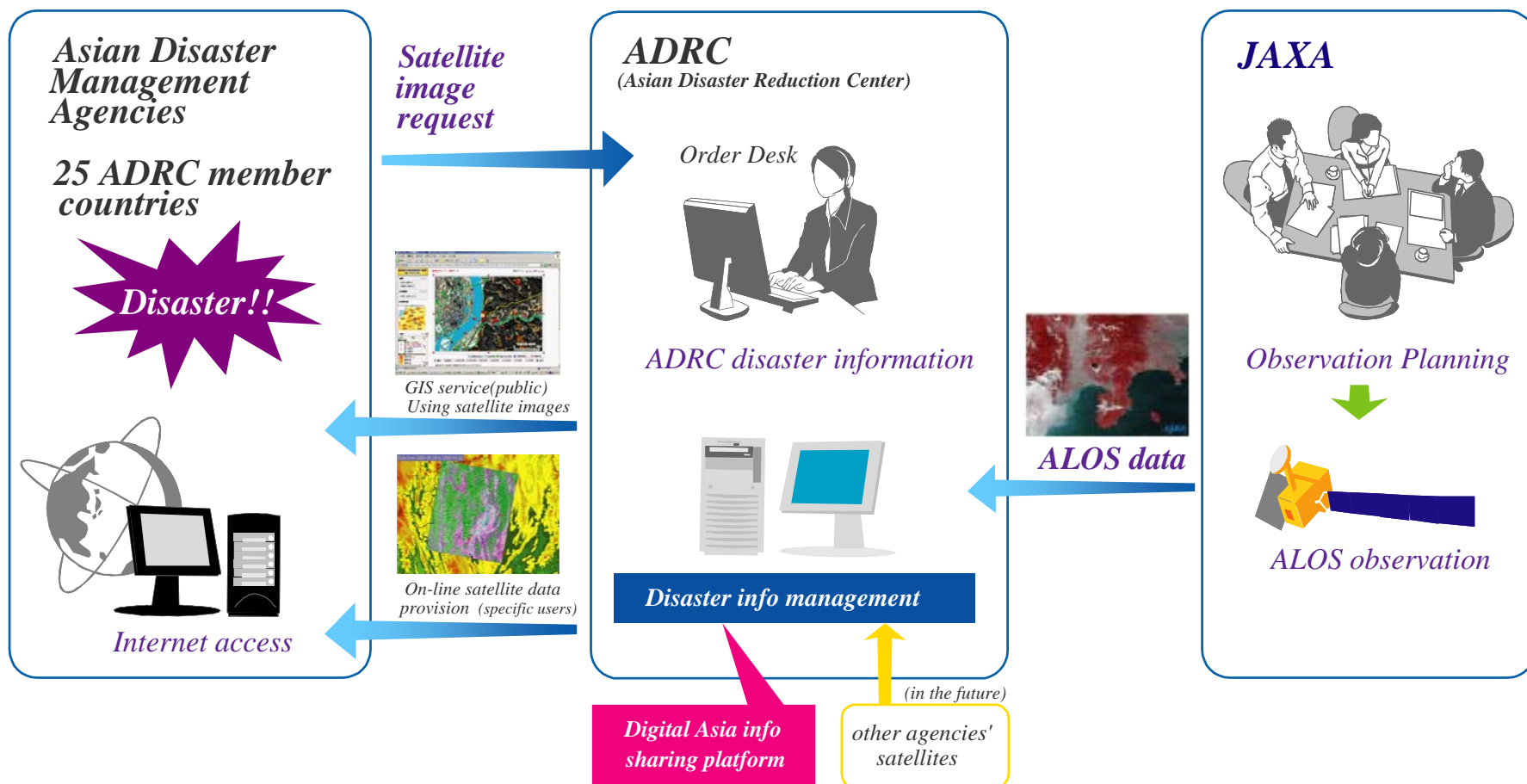


Overall Flow of Sentinel-Asia



Emergency Observation Request for Major Disasters

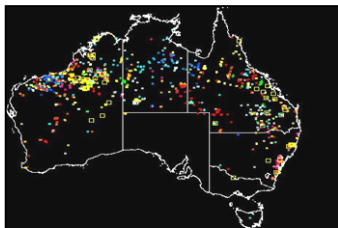
JAXA accepts ALOS observation request from ADRC member countries through ADRC



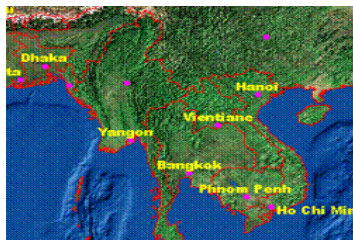


Sentinel Asia (MODIS Wildfire Monitoring)

Regional wildfire maps by MODIS



CSIRO (Australia)



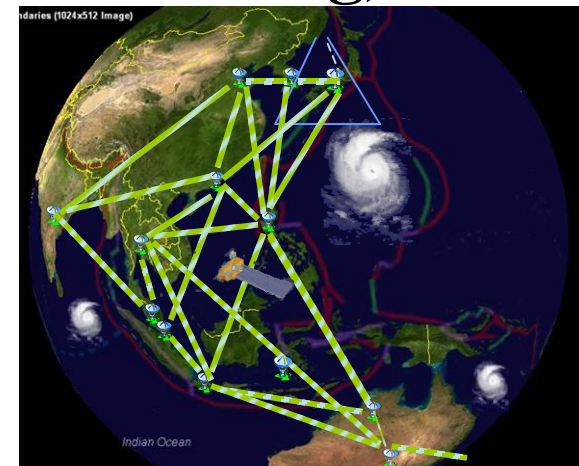
AIT/Tokyo Univ. (Thailand)



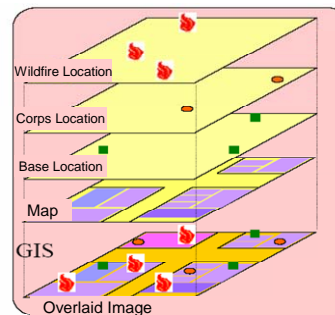
CRISP (Singapore)



MODIS data reception by ground stations
And wildfire map generation



Satellite observation network



Integration by Digital Asia
Web-GIS interface
(developed by Keio Univ.)



Wildfire map of Asia

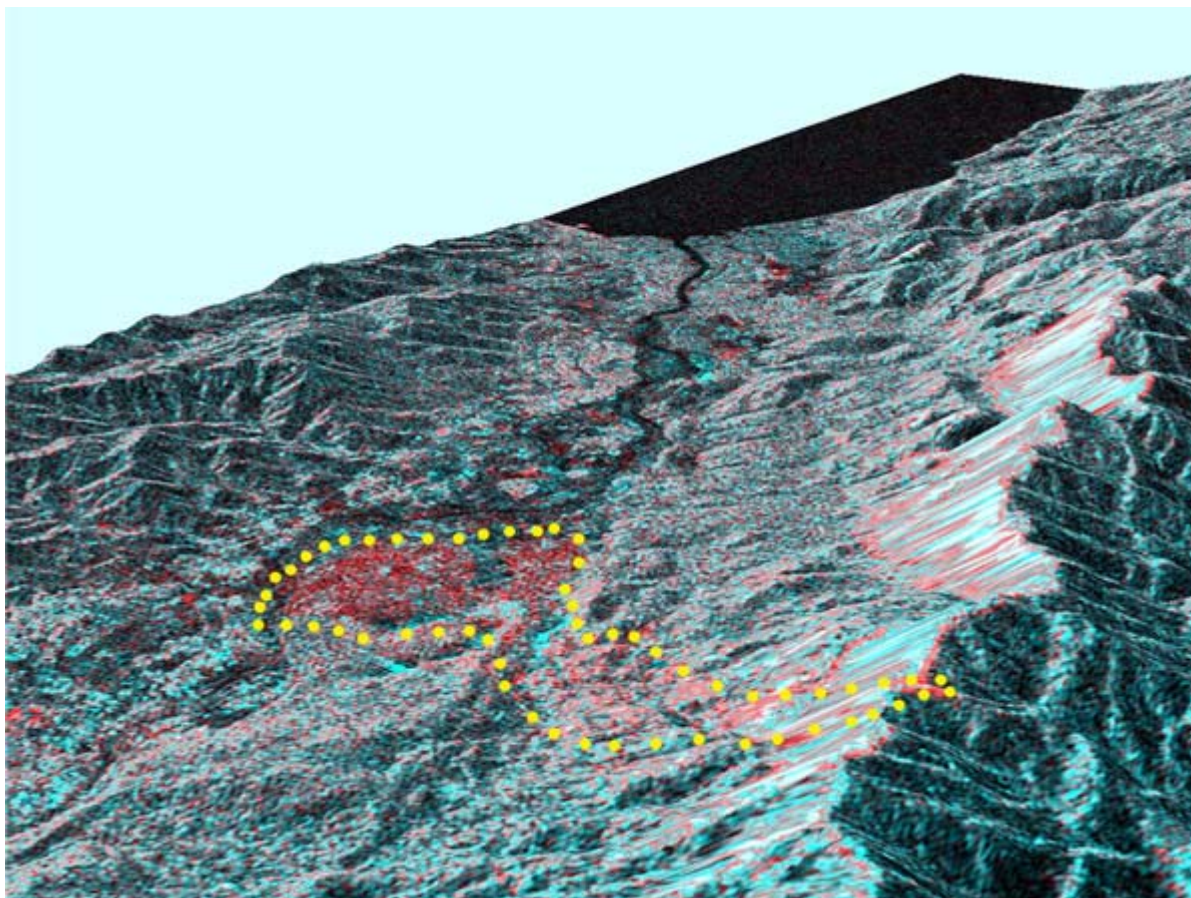
Future plan

- addition of wildfire agencies
- expansion to other disasters, e.g.

flood



Bird's eye view of landslide area in Leyte Island, Philippines observed by ALOS/PALSAR on 24 Feb. 2006



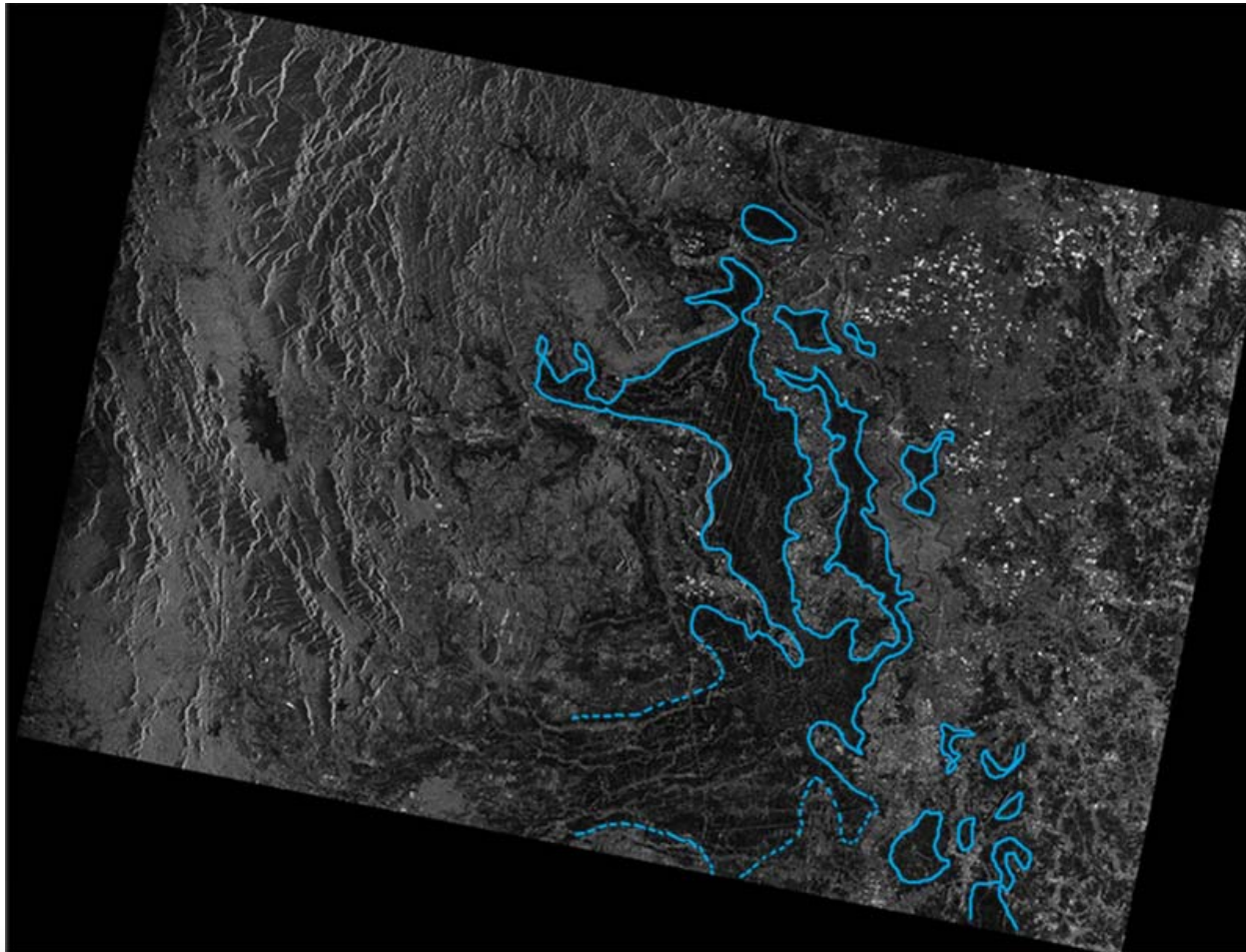


Mt. Merapi volcano, Indonesia observed by ALOS/AVNIR-2 on 16 May 2006



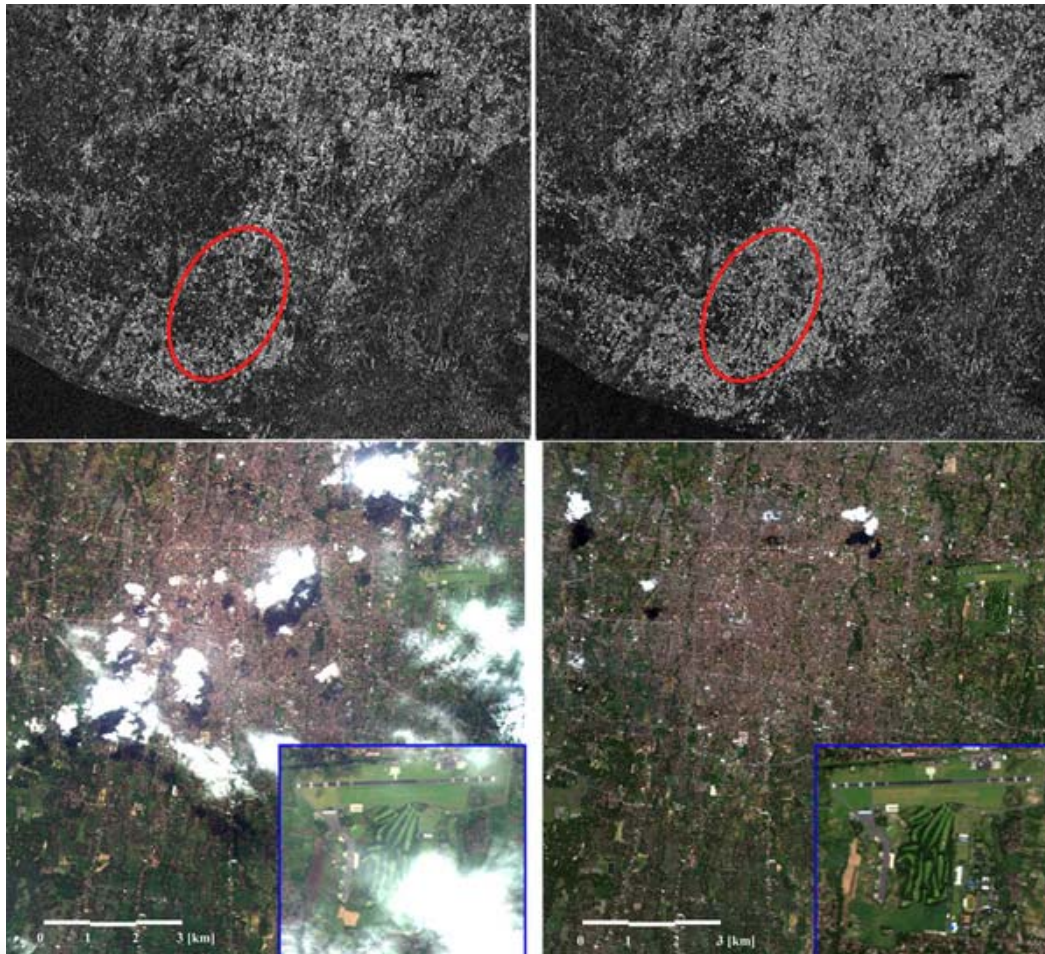


Flood in northern Thailand observed by ALOS/PALSAR on 25 May 2006





**Earthquake stricken area in Yogyakarta, Indonesia
observed by ALOS/PALSAR and AVNIR-2 on 28 May 2006
compared with image of 16 May on the right**



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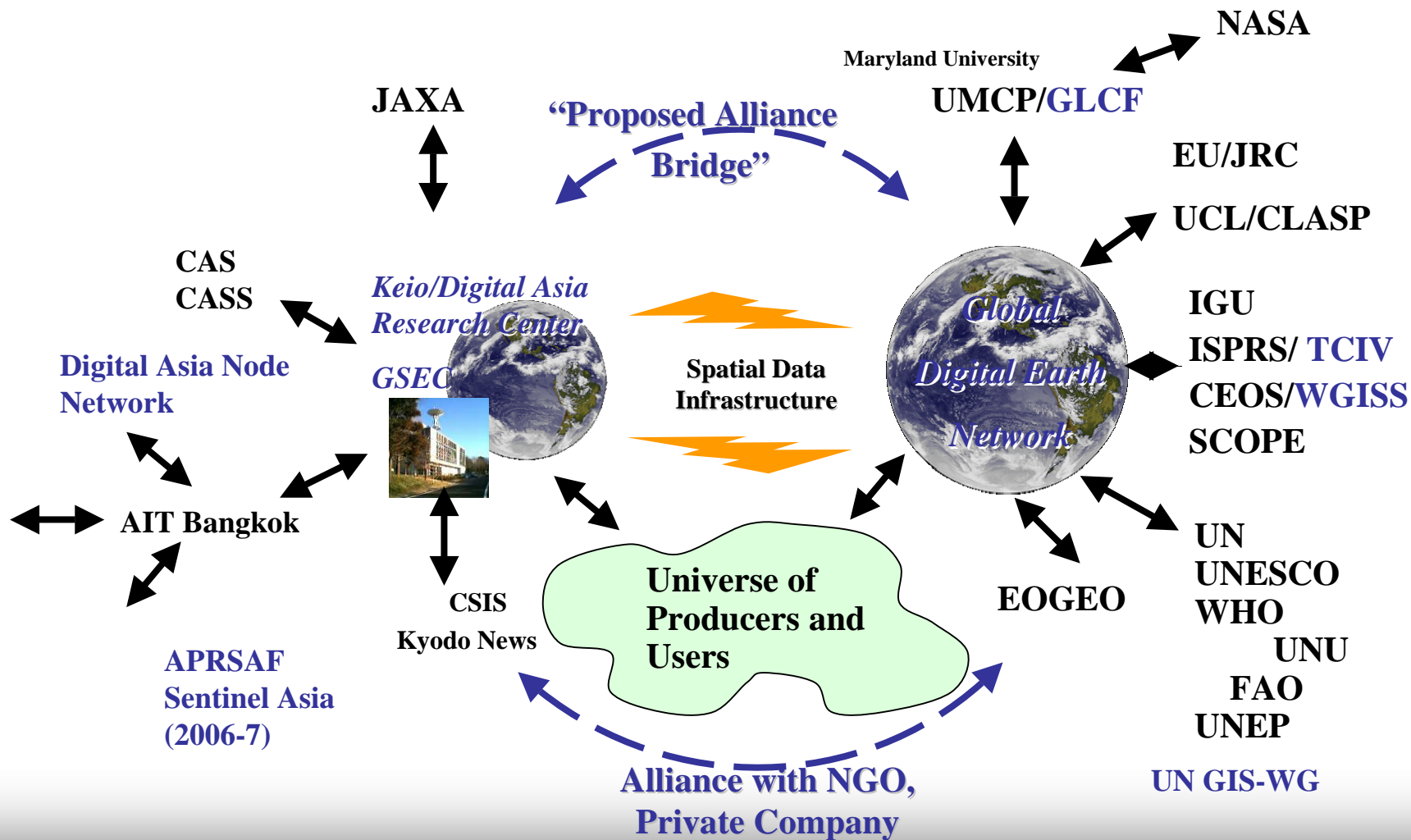
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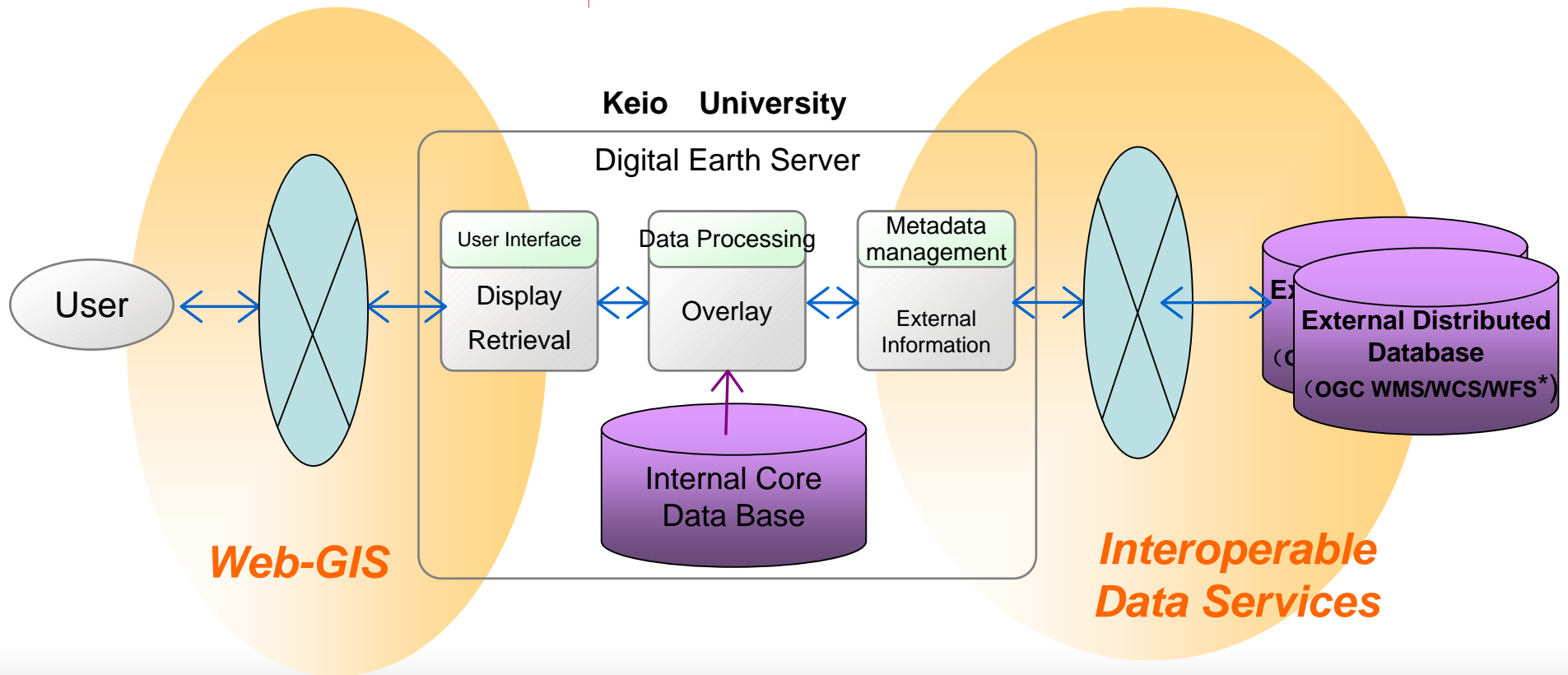
Information-sharing Platform

- Digital Asia (Internet-based Web-GIS) is used
- We can see satellite image overlaid on map with disaster-related information on Internet
- We can easily upload data by putting them on Digital Asia server (OGC-based)

Digital Asia Research Centre for Strategic Design, Keio University Academic Frontier Project, Matching Fund Subsidy from MEXT (2004-2009)

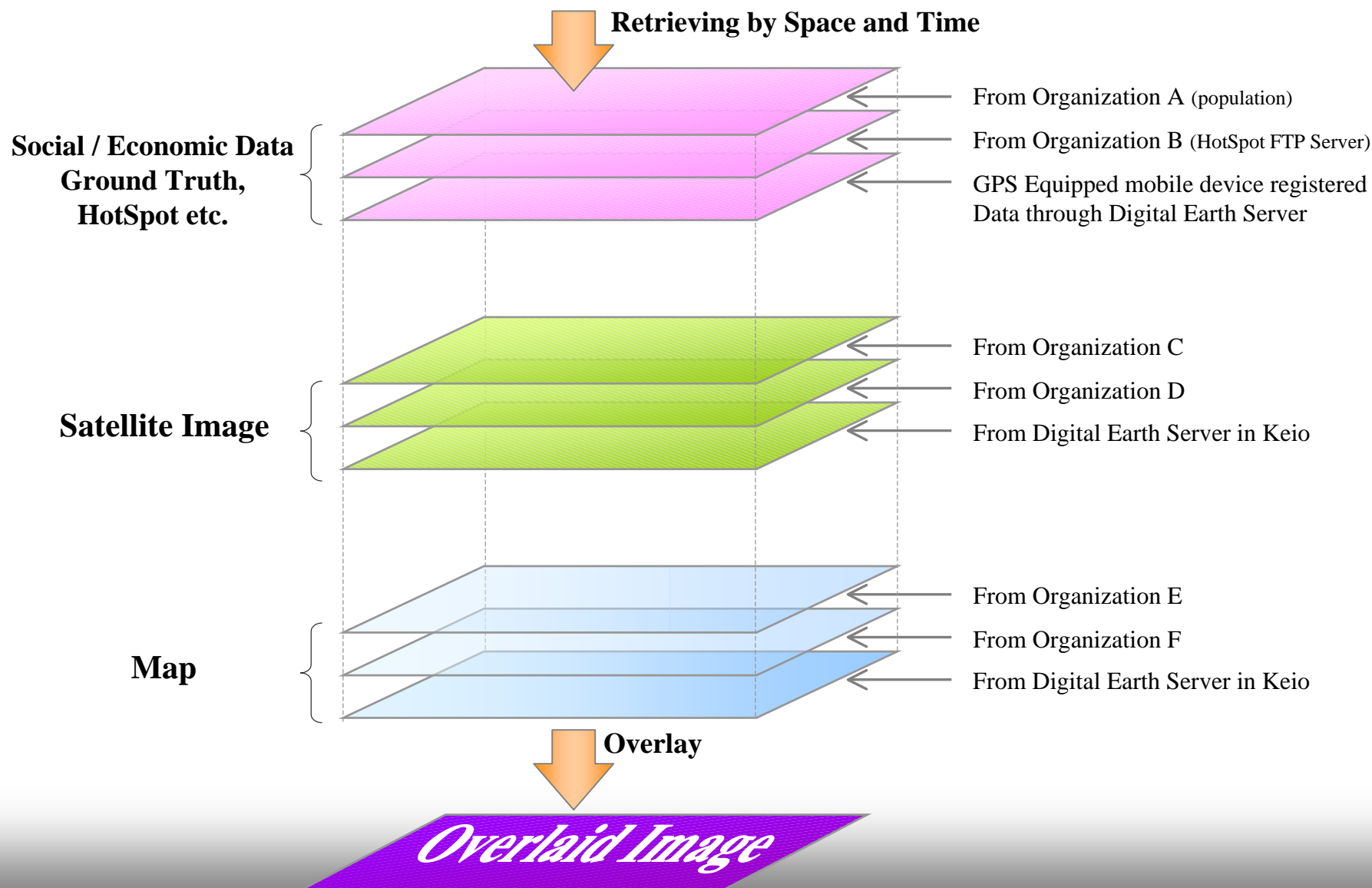


DIGITAL ASIA



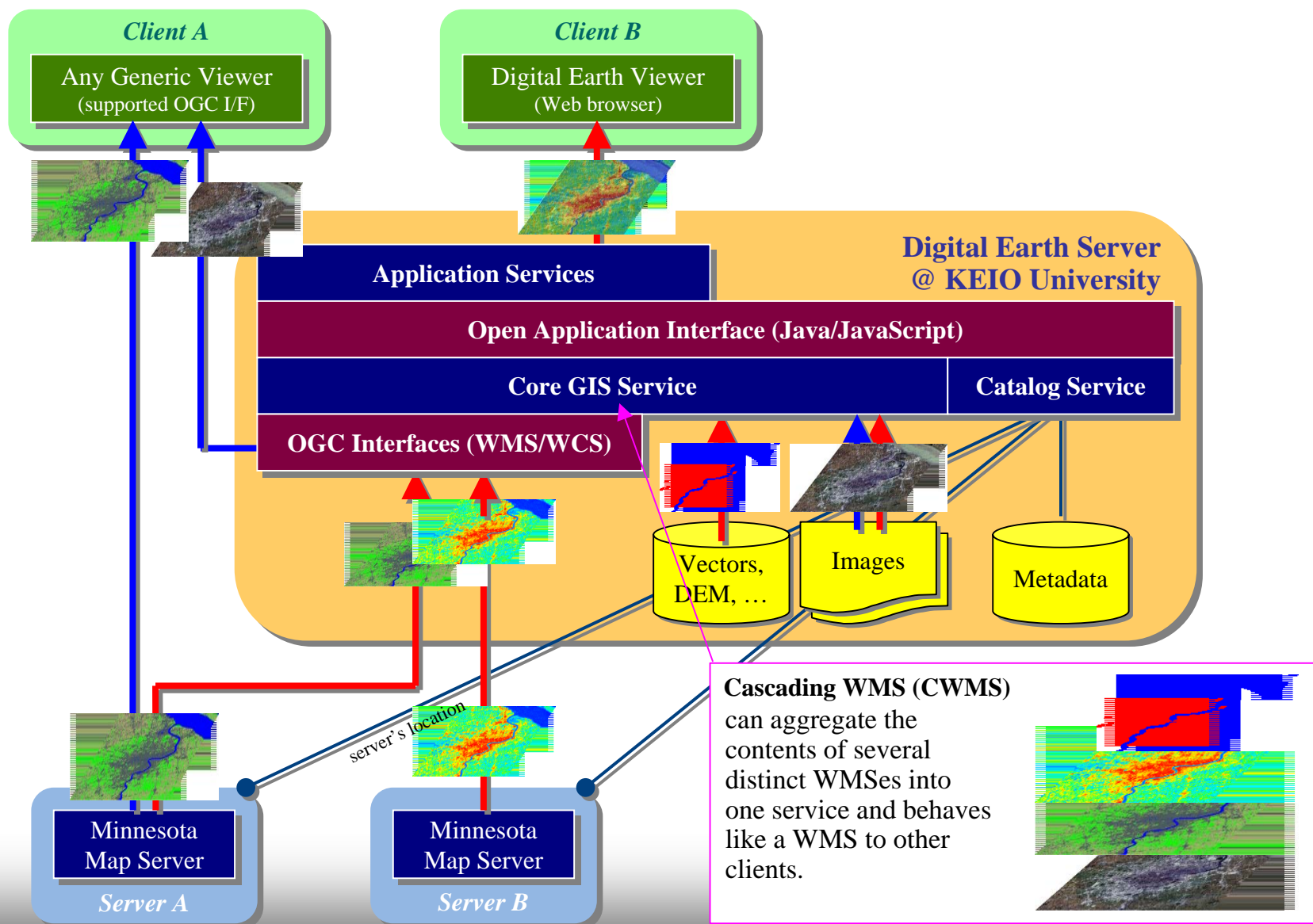


Overlay Processing of Digital Asia





Interoperability Mechanism of the DAN



Sample Image : North Sumatra LANDSAT Image before and after Earthquake

SFC & JAXA Joint Project
[Japanese]

~ SFC & JAXA Joint Project ~

digital earth viewer

View: Tile 2D and 2D views

North Sumatra Landsat Image May 5, 2002

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Click to:

Re-center Identify

Layers/Legend:

Boundaries Capitals Rivers

Lat.4.75N Lon.95.57E Metadata Finder

North Sumatra Landsat Image Dec. 29, 2004

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Click to:

Re-center Identify

Layers/Legend:

Boundaries Capitals Rivers

Lat.4.75N Lon.95.57E Metadata Finder

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Mar. 10, 2005 Rev.3.00



Sample Image : Area of Steep Slope in Danger of Collapsing in Gifu Pref. in Japan

SFC & JAXA Joint Project

~ SFC & JAXA Joint Project ~

digital earth viewer [Japanese]

View: Maximized 2D view

Areas of steep slope in danger of collapsing (points), Sand erosion control designated land (lines), Sites of avalanche hazard, Sand erosion control designated land (polygons), Vmap0, Landsat/TM

20 km

Click to:

Re-center Identify

Layers/Legend:

Boundaries Capitals Rivers

Lat.35.79N Lon.137E

Metadata Finder

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- Landslide Hazard Information by Gifu Pref.
- Digital Map with 50m mesh by Geography Network Japan



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Content (Sharing Data) Wanted!!

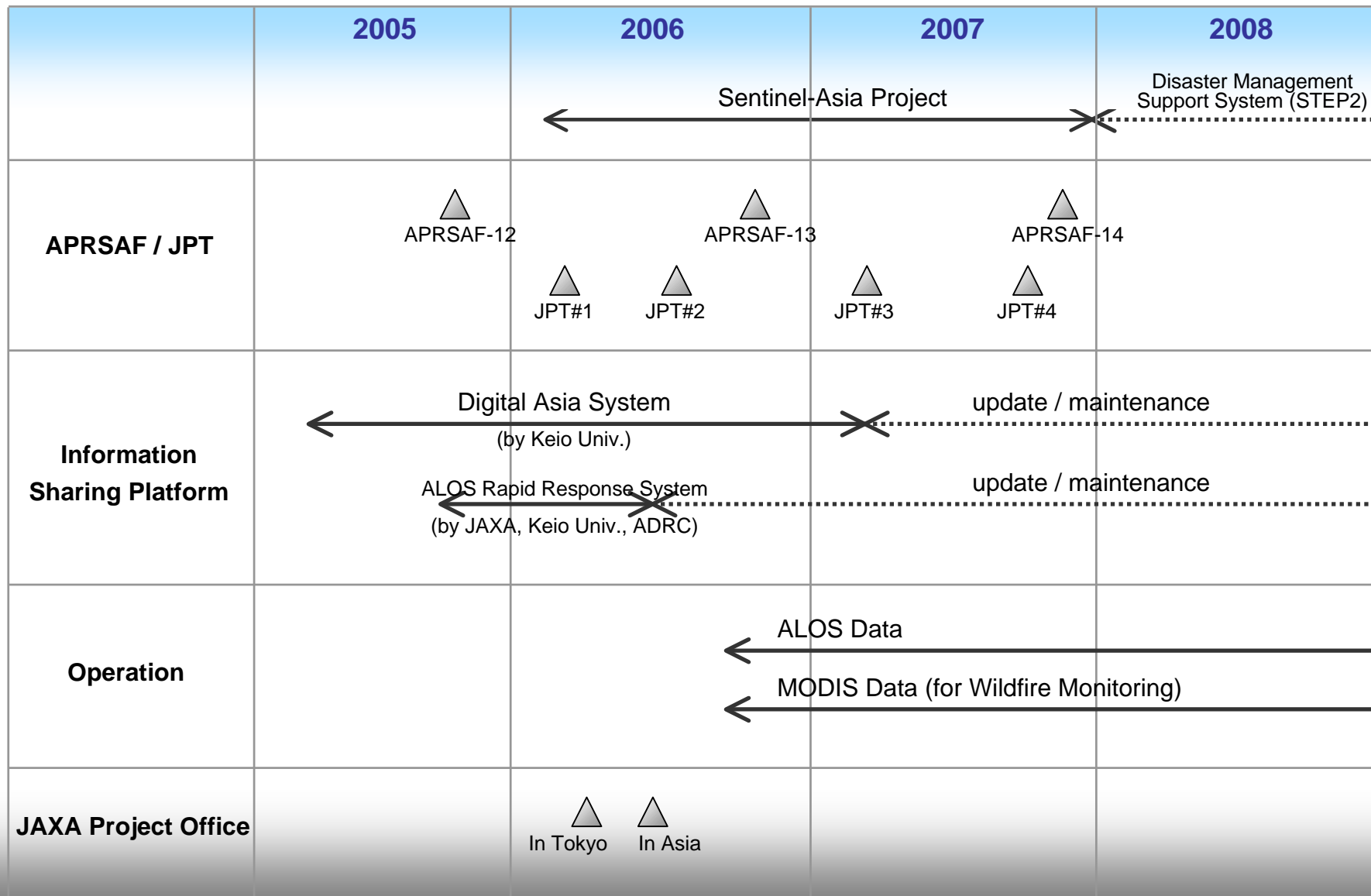
- Disaster information including on-site digital camera image
- Satellite image from space organizations
- Fine regional digital map from geography organizations etc.
- Regional social / economic data



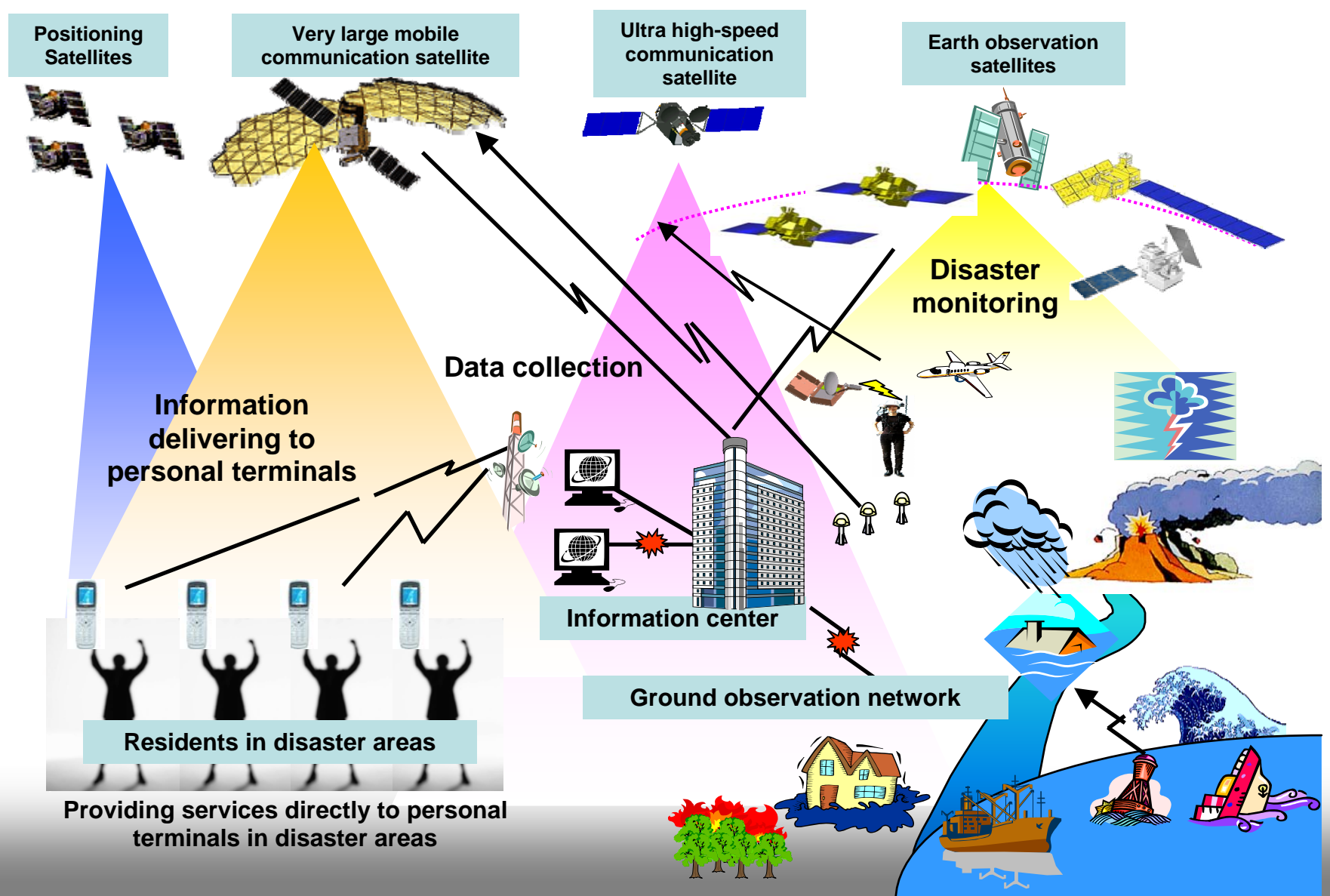
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Sentinel-Asia Project Milestone



JAXA Vision of Disaster Management Support System in Asia-Pacific Region





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Summary

1° Sentinel-Asia Project was initiated for disaster management support in Asia-Pacific region under cooperation among APRSAF, ADRC, Digital Asia and international organizations based on best-efforts and voluntary initiative

2° Main activities : Operations will start in Oct. 2006

- Emergency observation in case of major disasters by ALOS + . . .
- ALOS accepts observation request from ADRC members
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3° Information-sharing platform

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- Satellite image from space organizations
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- Regional social/economic data

Thank you for your attention.

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