

*A New Development for Satellite
Technology Application to Disaster Risk
Reduction in Asia*

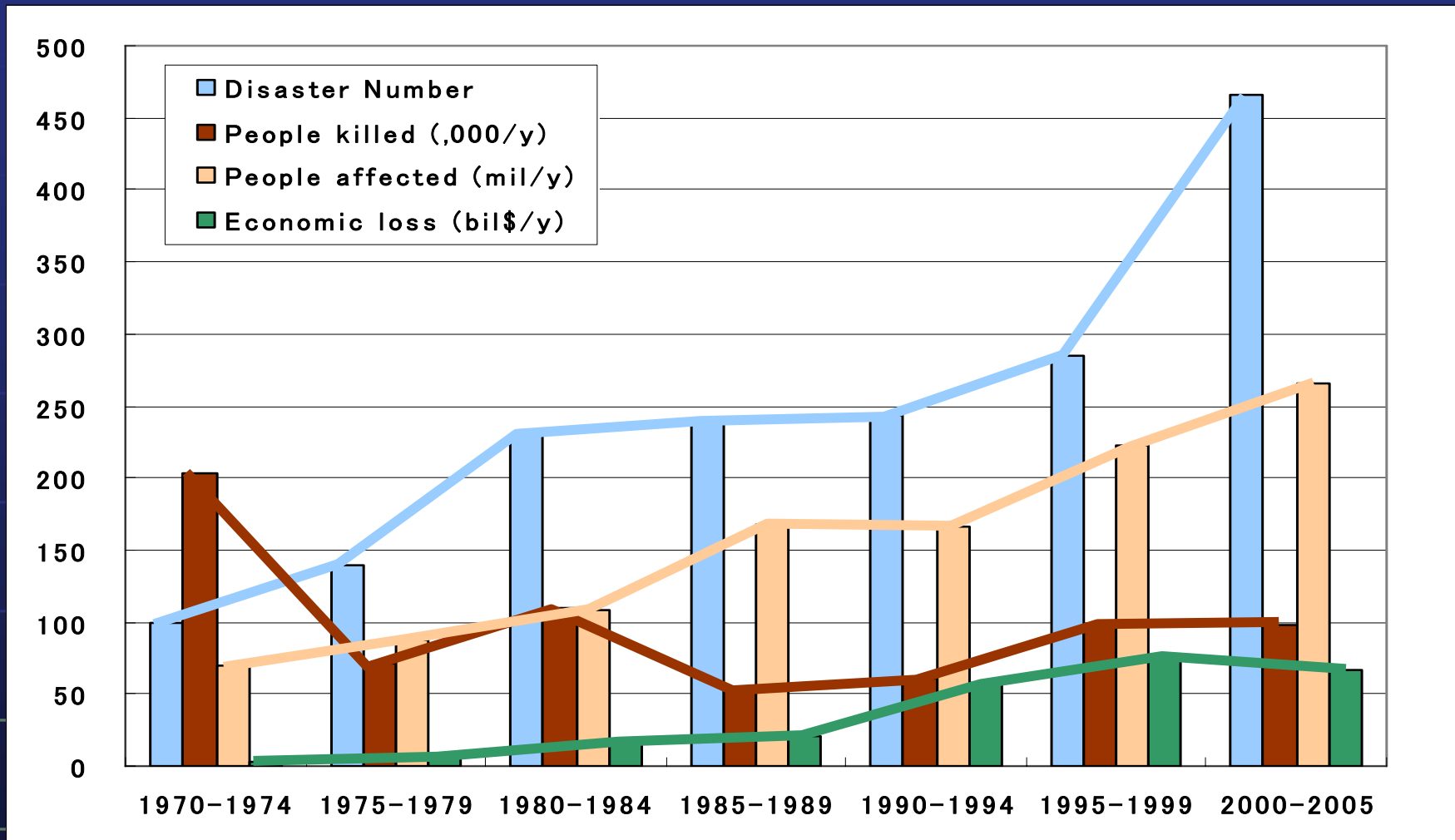
*Koji Suzuki, Executive Director
Asian Disaster Reduction Center (ADRC)*

Contents

- *Disasters of the world and Asia*
- *Introduction of Sentinel Asia*
- *ADRC in Sentinel Asia*

➤ *Disasters of the World and Asia*

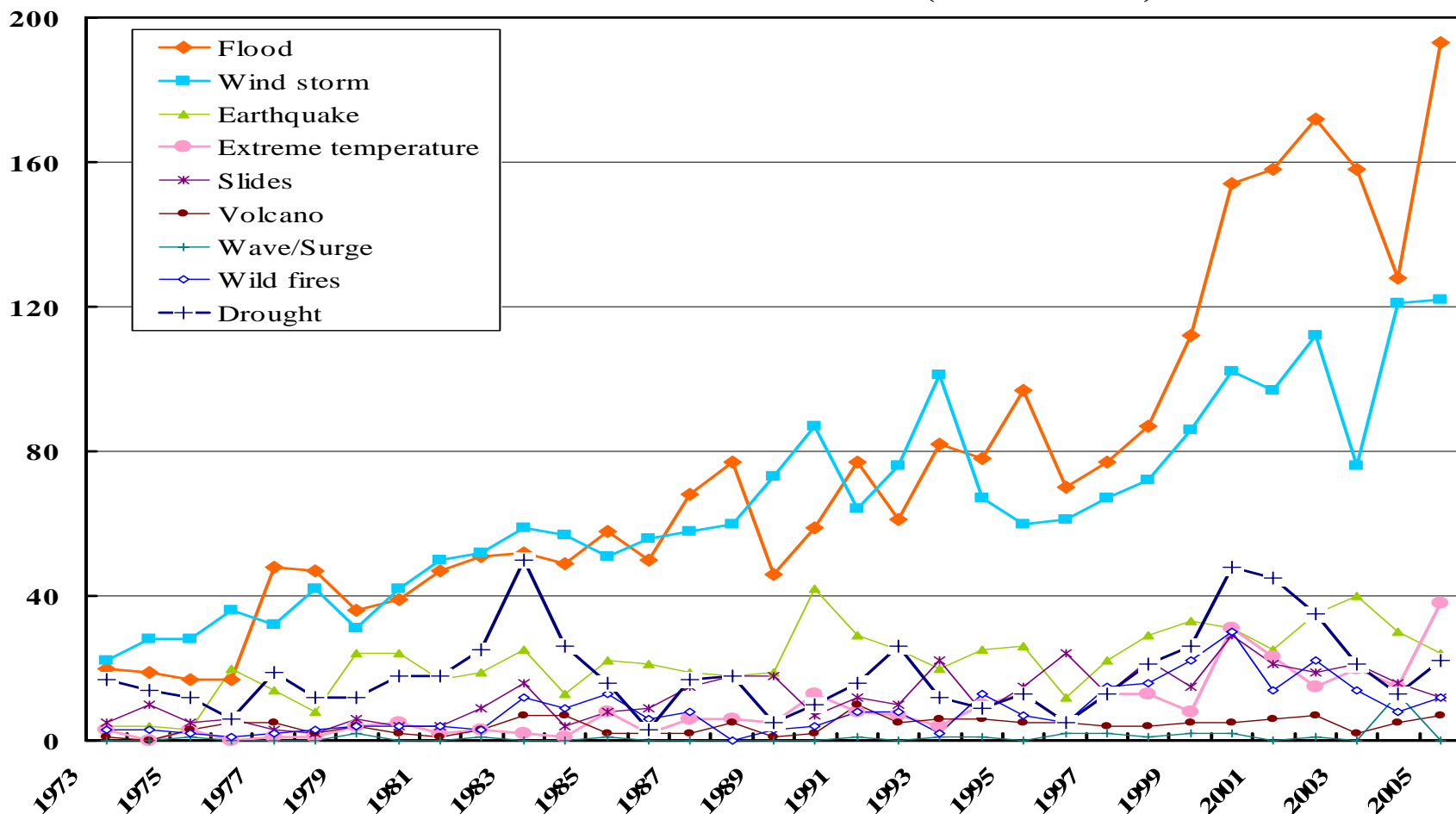
Disaster Trends of the World in the Past 30 Years



We are living with disaster risks and the disaster risk management is indispensable for the sustainable development

Disaster Trends in Terms of Disaster Types

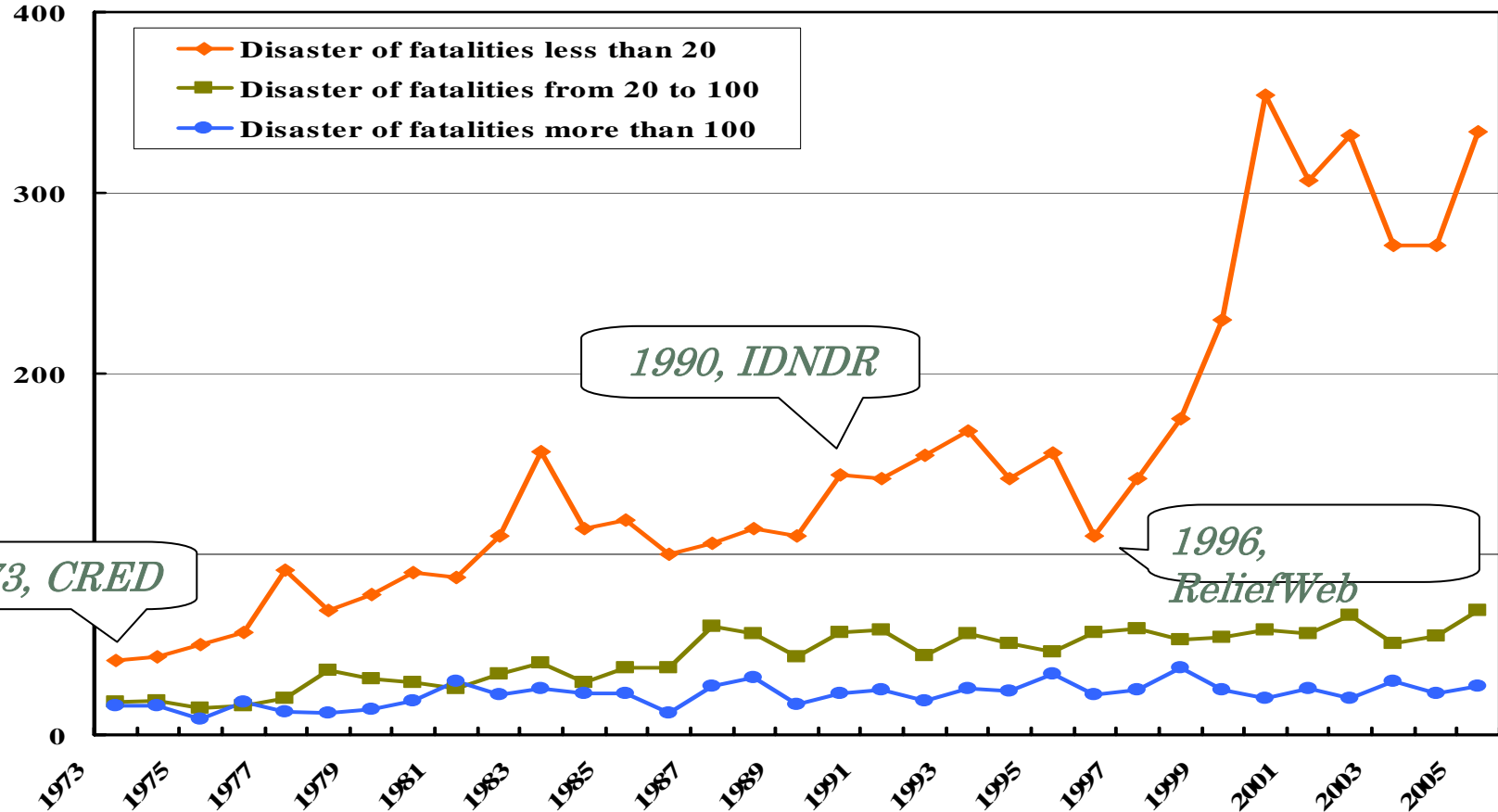
Number of Disasters (1973-2005)



Disasters related to meteorological event (flood, wind storm, extreme temperature, etc.) keep continuing increase in the past thirty years

Disaster Trends in Terms of Disaster Scales

Number of Disasters (1973-2005)



1973, CREC

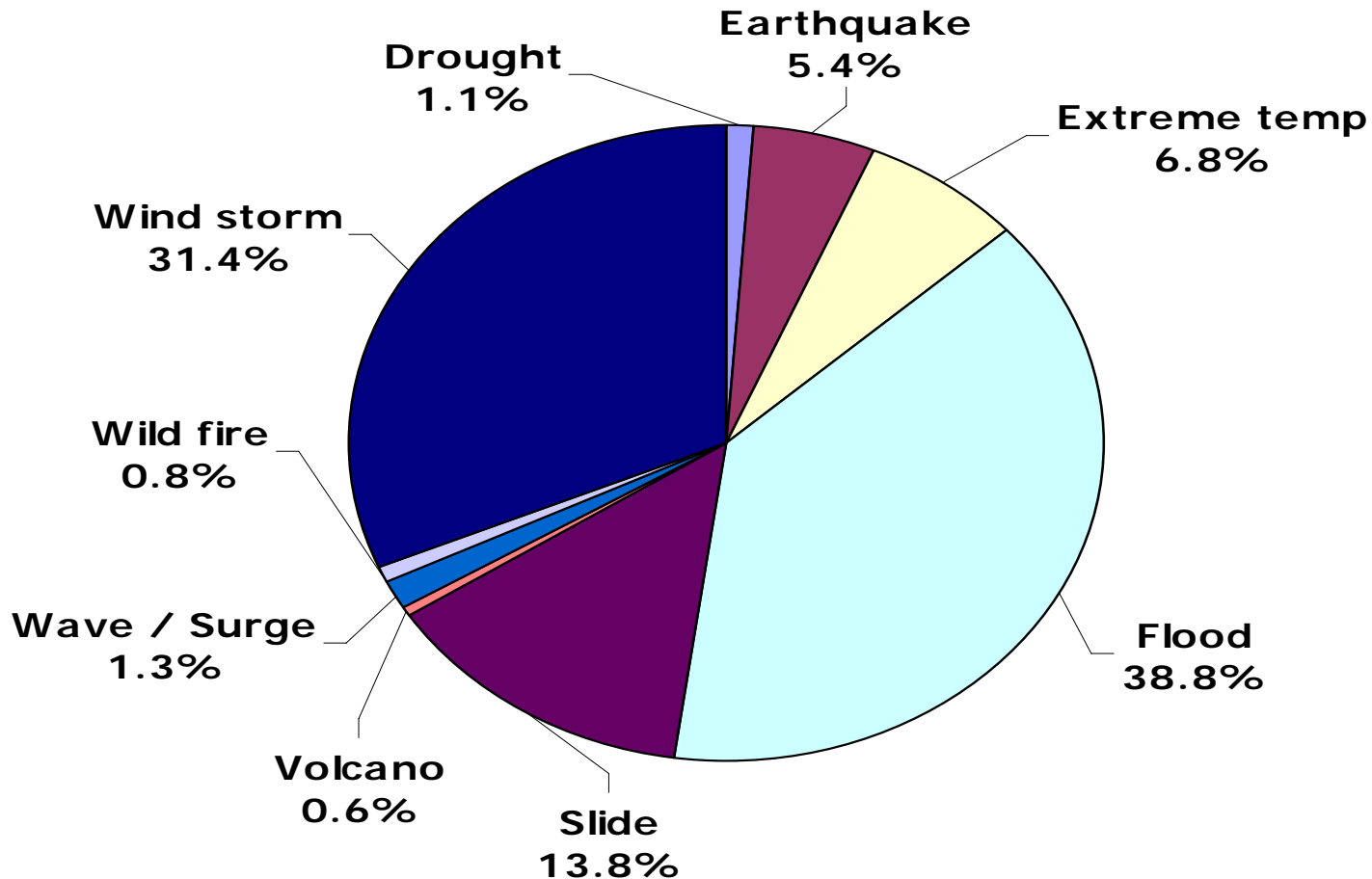
1990, IDNDR

1996, ReliefWeb

The increase of disasters could be mainly attributed to small scale ones. The progress of IT may partially explain the disaster number surge between 1996-2000

Disasters of Asia

Number of Disasters (1986-2005)



Disasters of Asia Comparing with Other Continents



Asia has a large number of disasters and is more severely affected than the other continents. Dense population, less preparedness in infrastructure and management, etc. could be considered as the reason

- *Introduction of Sentinel Asia*
 - *Satellite technology application on disaster risk reduction and Web-GIS based disaster information sharing system for Asia-Pacific –*

Background

- *APRSAF : Asia-Pacific Regional Space Agency Forum, Established in 1993, aims at the development of space programs in the Asia-Pacific region and promote regional cooperation in the field of space technology and its applications*
- *APRSAF-11, Nov 2004, Australia, agreed that a coordinated rapid-response pilot project should be developed for effective disaster reduction in Asia-Pacific region*
- *APRSAF technical WS: “Disaster Reduction through Effective Space Technology Utilization in the Asia Pacific Region”, held in May 2005, Malaysia, discussed the pilot project plan*
- *APRSAF-12, Oct 2005, Japan, approved the plan and initiated the pilot project*
- *The 1st Joint Project Team (JPT) Meeting, Feb 2006, Vietnam, discussed the project implementation plan and JPT membership.*

Framework

Voluntary and best-efforts initiative by participating organizations and cooperation with APRSAF, ADRC, Digital Asia and international organizations

Space Community

APRSAF

Satellite Image

Promotion of Utilization

Capacity Building

International Community

**UNESCAP, UNOOSA,
ASEAN, AIT etc.**

International Cooperation

Sentinel Asia

Joint Project Team (JPT)

Joint Project Team consists of total 51 organizations including 44 agencies from 18 countries and 7 international organizations as of July 2006.

Digital Asia

Web-GIS Platform

*GIS Data
Satellite Image
Meta Data Management*

Digital Earth Community

ADRC

Disaster Information

Utilization (User)

User Community

Main Activities

Sentinel Asia - Microsoft Internet Explorer

ファイル(E) 編集(E) 表示(V) お気に入り(A) ツール(T) ヘルプ(H) アドレス(D) http://dms.tks.c.jaxa.jp/sentinel/index.php 移動

戻る 検索 お気に入り

Sentinel Asia

Disaster Management Support System in the Asia-Pacific Region

About Sentinel Asia

How to provide data

How to request ALOS observation

JPT Members

Library

FAQ

Web Forum

Links

Site Policy

Contact

Recent Disasters and Emergency Observation

- ▶ **Satellite Image Products** / Photos
- ▶ **GIS: User Guide** / Disasters with Sat.Images/Photos / All Disasters
- ▶ **Emergency Observation Request**

For Narrowband Users:
Satellite Image Products / Disaster Information / Emergency Observation Request

Wildfire Monitoring

Flood Monitoring

Capacity Building

Topics

Flood in Indonesia
[read more >](#)

Web site renewal
[read more >](#)

Commencement of the Sentinel Asia Operation
[read more >](#)

Wildfire Validation Activities
[read more >](#)

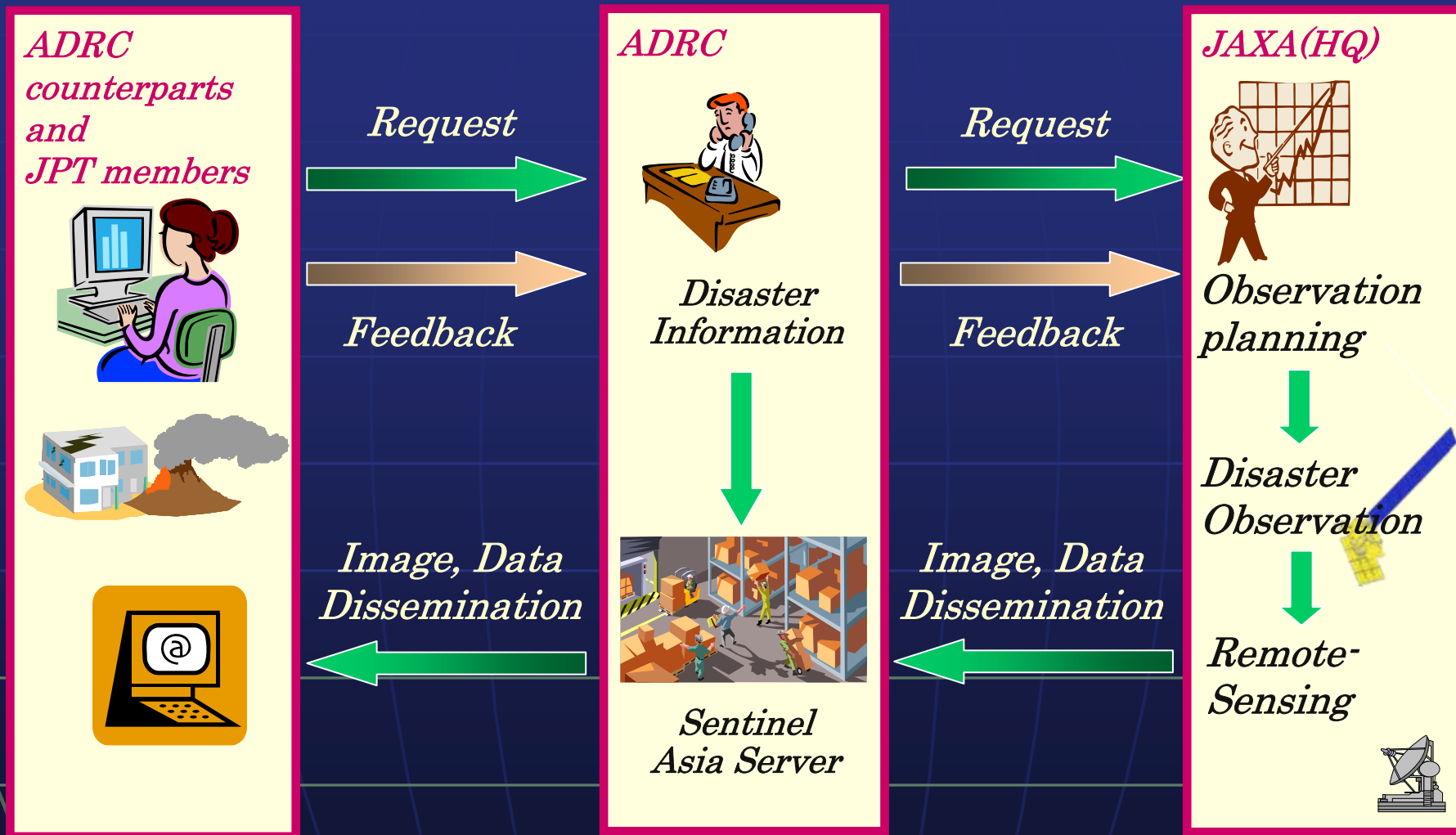
[Past topics >>](#)

[edit](#)

Welcome to Sentinel Asia Web Site

インターネット

Emergency Observation Request Flow



Why Satellite for DRR ?

- You can easily get the information on the disaster affected spot where the access is not available because road is damaged or airplanes and helicopters to observe the spot are not available .*
- Once you get the satellite imagery of the spot, you can roughly assess the damage of the whole affected area and develop the plan for emergency response.*
- The satellite observation image with GIS data could be applied to make hazard mapping.*

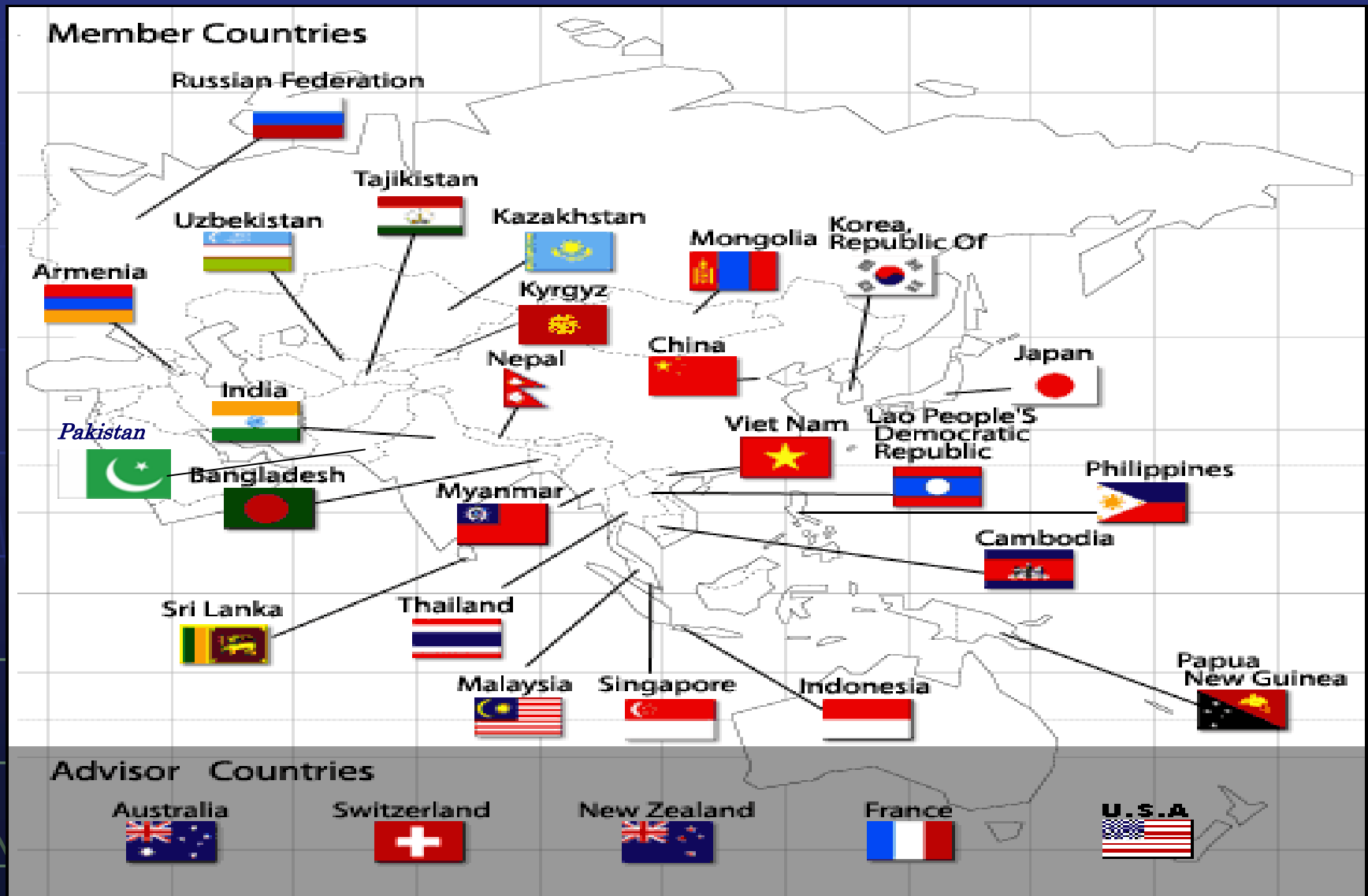
➤ *ADRC in Sentinel Asia*

Background of ADRC

- *1990 International Decade for Natural Disaster Reduction (IDNDR)*
- *1994 World Conference on Natural Disaster Reduction, Yokohama, Japan (Yokohama Strategy)*
- *1995 The Great Hanshin-Awaji Earthquake*
- *1995 Asian Natural Disaster Reduction Conference Kobe, Japan – ministerial level*
- *1996 Asian Disaster Reduction Expert Meeting*
- *1997 Asian Disaster Reduction Cooperation Promotion Meeting (proposed to establish ADRC in Japan)*
- *1998 Establishment of ADRC, (22 member and 4 adviser countries)*



25 Member Countries, 5 Advisor Countries



Major Activities of ADRC

Information Sharing

- *Organizing International Meetings & Seminars*
- *Providing Integrated Disaster Information through Internet*
<http://www.adrc.or.jp/top.php>
- *Promoting GLIDE for Disaster Database*
- *Participating Sentinel Asia Project*

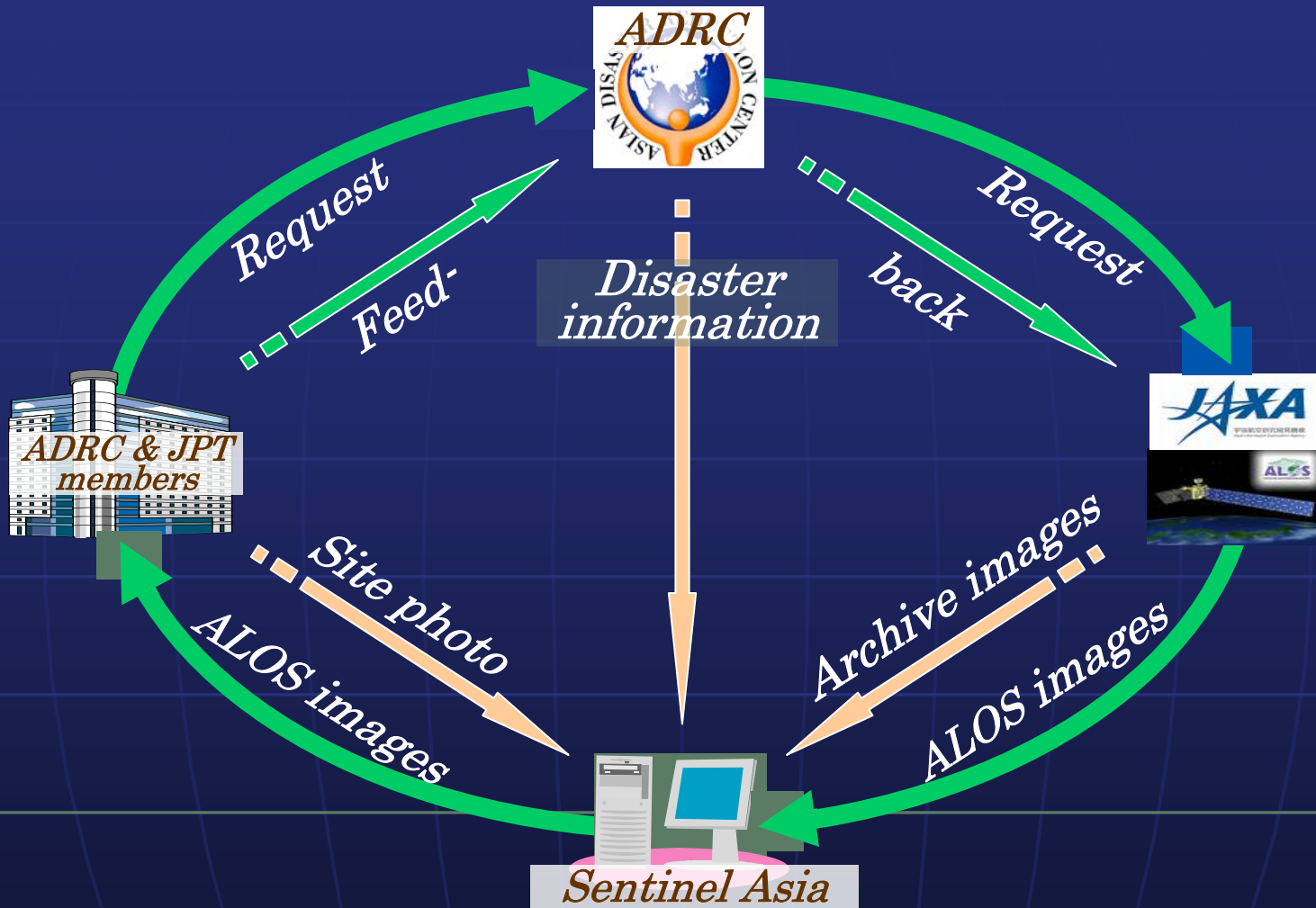
Human Resource Development

- *Conducting Various Training Course in Cooperating with JICA*
- *Providing Regular Visiting Researcher Programs*

Community Capacity Building

- *Developing TDRM and Community Based Hazard Mapping Method*
- *Carrying Out Tsunami Awareness Projects*
- *Publishing Good Practice and Inamuranohi, etc.*

Roles of ADRC in Sentinel Asia



- *Member of JPT for improvement of Sentinel Asia*
- *Gateway of emergency observation*
- *Follow up for data utilization*
- *Value-added information (disaster assessment, CB)*

Proposed ASEAN Project:

Application of Satellite Technologies to Disaster Management (2008-)

- *Advanced satellite technology as powerful tool for disaster management*
- *Applying satellite observation image with GIS data to response, hazard mapping and damage assessment*
- *Enhancing capacity for utilizing satellite observation image with GIS*

Current Status of Sentinel Asia

Sentinel Asia operated from October 2006

Four activities:

Emergency observation

Flooding monitoring

Wildfire monitoring

Capacity building



Emergency observation:

activated 10 times for 7 countries (Indonesia, Bangladesh, Solomon Islands Thailand, Nepal, Pakistan, Tajikistan) and 7 kinds of disasters (earthquake, tsunami, volcano eruption, tropical cyclone, flood, land slide, snowstorm)

Emergency Observation Activities (1)

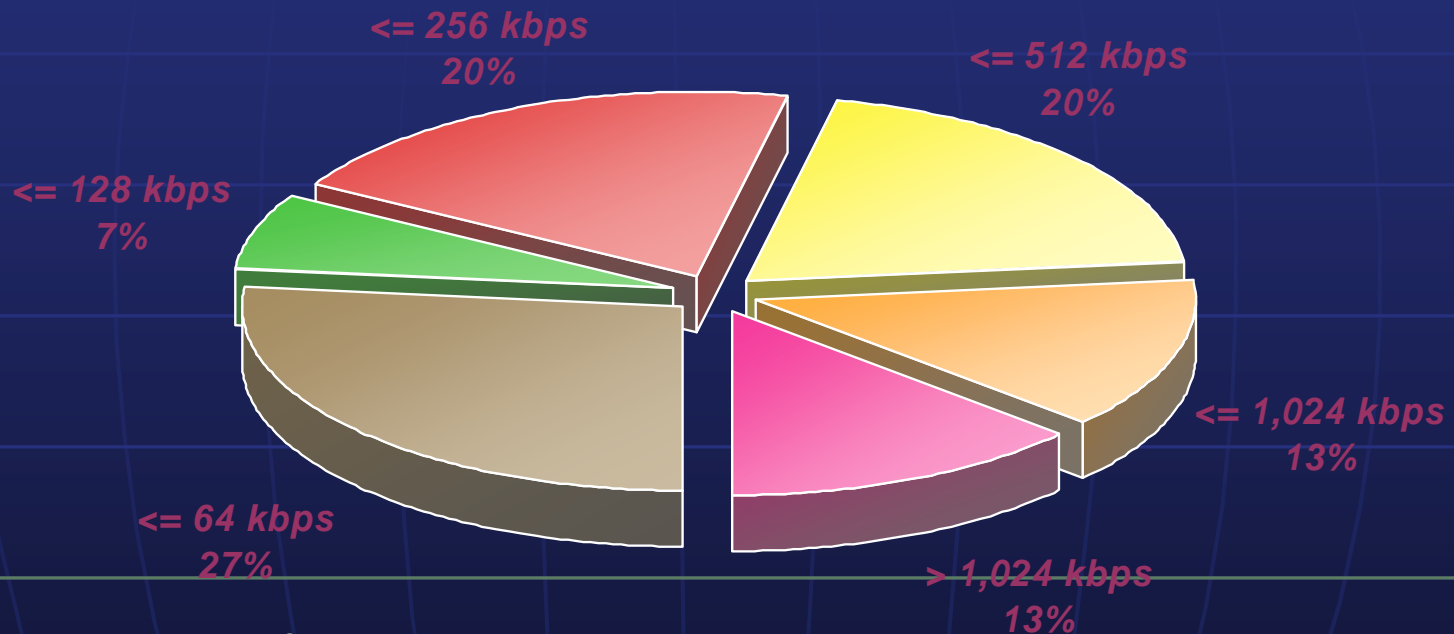
No.	Request			Acceptance	Observation		Remarks
	Date	Institution	Disaster		Date	Sensor	
1			Mudslide (12/1, Philippines)		2006/12/3 2006/12/5	AVNIR-2	Observed because extensive damage
2	2007/2/5	National Institute of Aeronautics and Space (LAPAN), Indonesia	Flood (2/3)	Yes	2007/1/3 2007/2/5	PALSAR	
3	2007/3/6	National Institute of Aeronautics and Space (LAPAN), Indonesia	Earthquake (3/6)	Yes	2007/3/7	AVNIR-2	
4	2007/4/2	Australian Centre for Remote Sensing (ACRES), Australia	Tsunami (4/2, Solomon Islands)	Yes	2007/4/7	AVNIR-2	
5	2007/5/17	Geo-Informatics and Space Technology Development Agency (GISTDA), Thailand	Heavy rainfall	No			No damage reported and sever damage could not be foreseen
6	2007/5/30	Department of Water Induced Disaster Prevention, Nepal	Snowstorm (5/27)	Yes	2007/5/27 2007/6/1	AVNIR-2	
7	2007/6/21	Ministry of Food and Disaster Management, Bangladesh	Landslide (6/11)	Yes	2007/6/22	PALSAR	Providing Archive images

Emergency Observation Activities (2)

No.	Request			Acceptance	Observation		Remarks
	Date	Institution	Disaster		Date	Sensor	
8	2007/7/2	Space and Upper Atmosphere Research Commission, Pakistan	Tropical cyclone (6/26)	Yes	2007/6/26	PALSAR	Providing Archive images
9	2007/7/17	National Institute of Aeronautics and Space (LAPAN), Indonesia	Volcano eruption (7/9)	Yes	2007/7/10	PALSAR	Providing Archive images
10	2007/7/24	Committee of Emergency Situations, Tajikistan	Earthquake (Landslide, 7/21)	Yes	2007/7/26 2007/7/27	AVNIR-2 PALSAR	
11	2007/7/26	National Institute of Aeronautics and Space (LAPAN), Indonesia	Flood, Landslide (7/23)	Yes	2007/7/30	PALSAR	Schedule Observation
12	2007/7/31	Ministry of Food and Disaster Management, Bangladesh	Flood (7/31)	Yes	2007/8/4	PALSAR	Schedule Observation
13			Flood (8/6, Vietnam)		2007/8/5	PALSAR	International Charter Activated

Challenges Faced

(1) The internet environment of the most intended countries are not fast enough to make use of the Web-GIS function of Sentinel Asia. More than 1MBPS is desirable



2) Damage information is not clearly indicated in the satellite imagery alone so that it needs to equip with remote sensing analysis to easily identify the disaster damage.

Improvement for Internet Access

(1) *Text-only (including PDF) web page*
Short comings: not available for the Web-GIS function



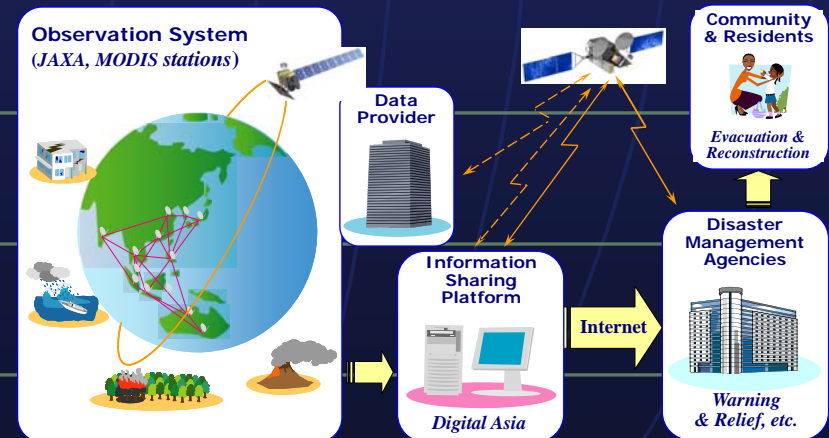
The screenshot shows a web browser displaying the Sentinel Asia Disaster Management Support System. The page title is "Satellite Image Products". Below the title is a table with the following data:

Date	Country	Event	Images	Information
2007/02/03	Indonesia	Flood	JAVASAR1C04R JAVASAR1C04R	ASDC
2006/12/01	Philippines	Multitude	JAVASAR1C04R JAVASAR1C04R	ASDC
2006/10/08	Thailand	Flood	JAVASAR1C04R	ASDC
2006/10/01	Vietnam	Typhoon	JAVASAR1C04R	ASDC
2006/07/19	Japan	Torrential Rain and Flood	JAVASAR1C04R JAVASAR1C04R	ASDC
2006/07/17	Indonesia	Earthquake and Tsunami	JAVASAR1C04R CRS2(04R)	ASDC
2006/05/27	Indonesia	Earthquake	JAVASAR1C04R	ASDC
2006/05/23	Thailand	Flash Floods and Multitude	JAVASAR1C04R	ASDC
2006/05/11	Indonesia	Volcano Eruption	JAVASAR1C04R CRS2(04R)	ASDC
2006/02/17	Philippines	Multitude	JAVASAR1C04R	ASDC

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(2) *Improvement of global and local internet environment*
Short comings: it may take time depending on each country

(3) *Combination with communication satellite WINDS in the next step*
Short comings: the satellite is an experiment satellite and could not be used at all times



Provide Value Added Information for Disaster Risk Reduction

(1) Associating additional data

Satellite image alone sometimes could not give sufficient information for the diverse needs of disaster risk reduction.

The combination of satellite information with GIS data, such as digital map, topographic data, elevation data, population distribution, etc. could be the solution.

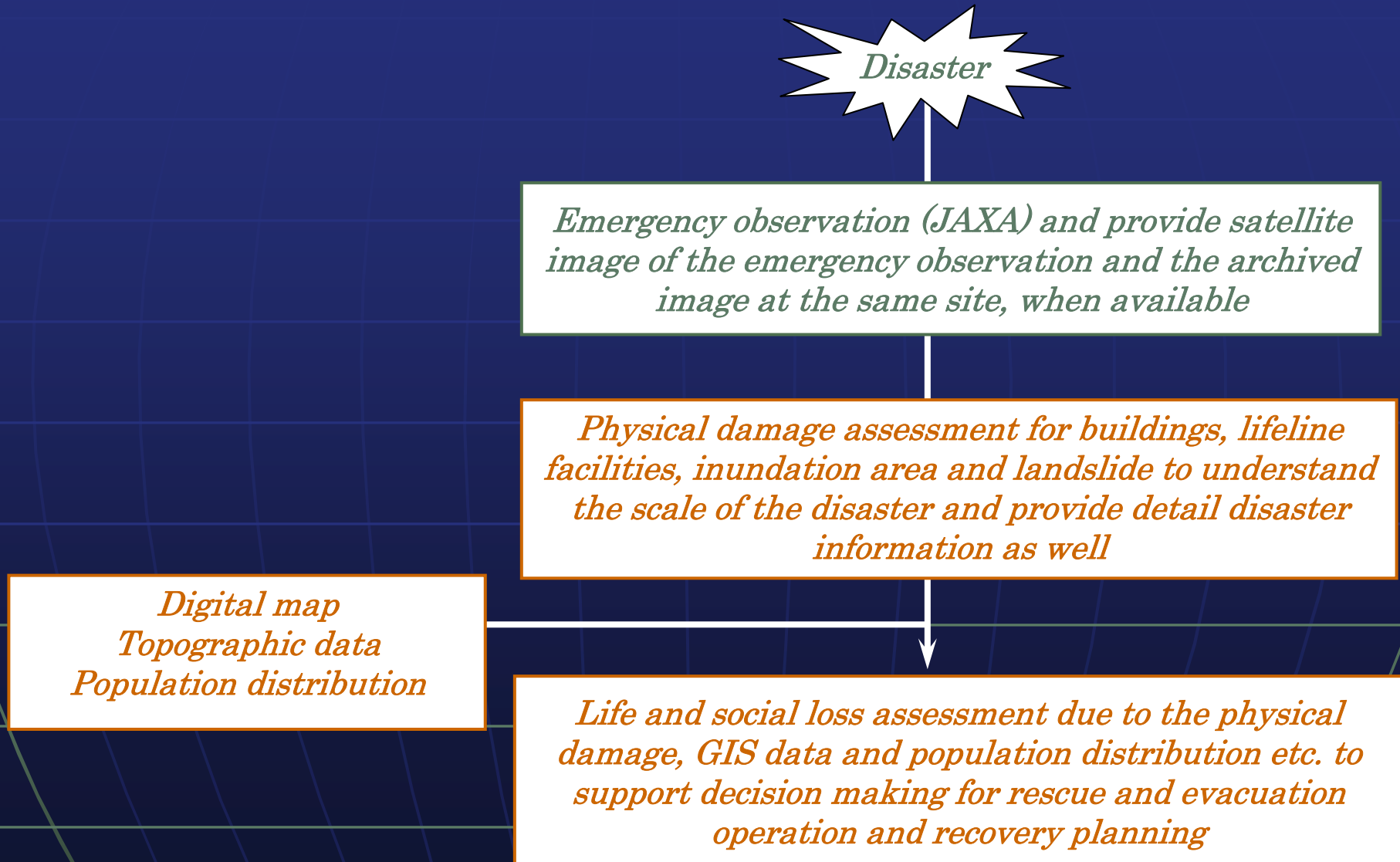
(2) Applying damage assessment by satellite images

A natural event causes firstly the damages of infrastructures, buildings and lifeline facilities or Inundation, landslide, and then lead to the damages of life, social and economic losses. A damage assessment information after a large scale disaster would be very important for rescue and evacuation activities as well as recovery planning.

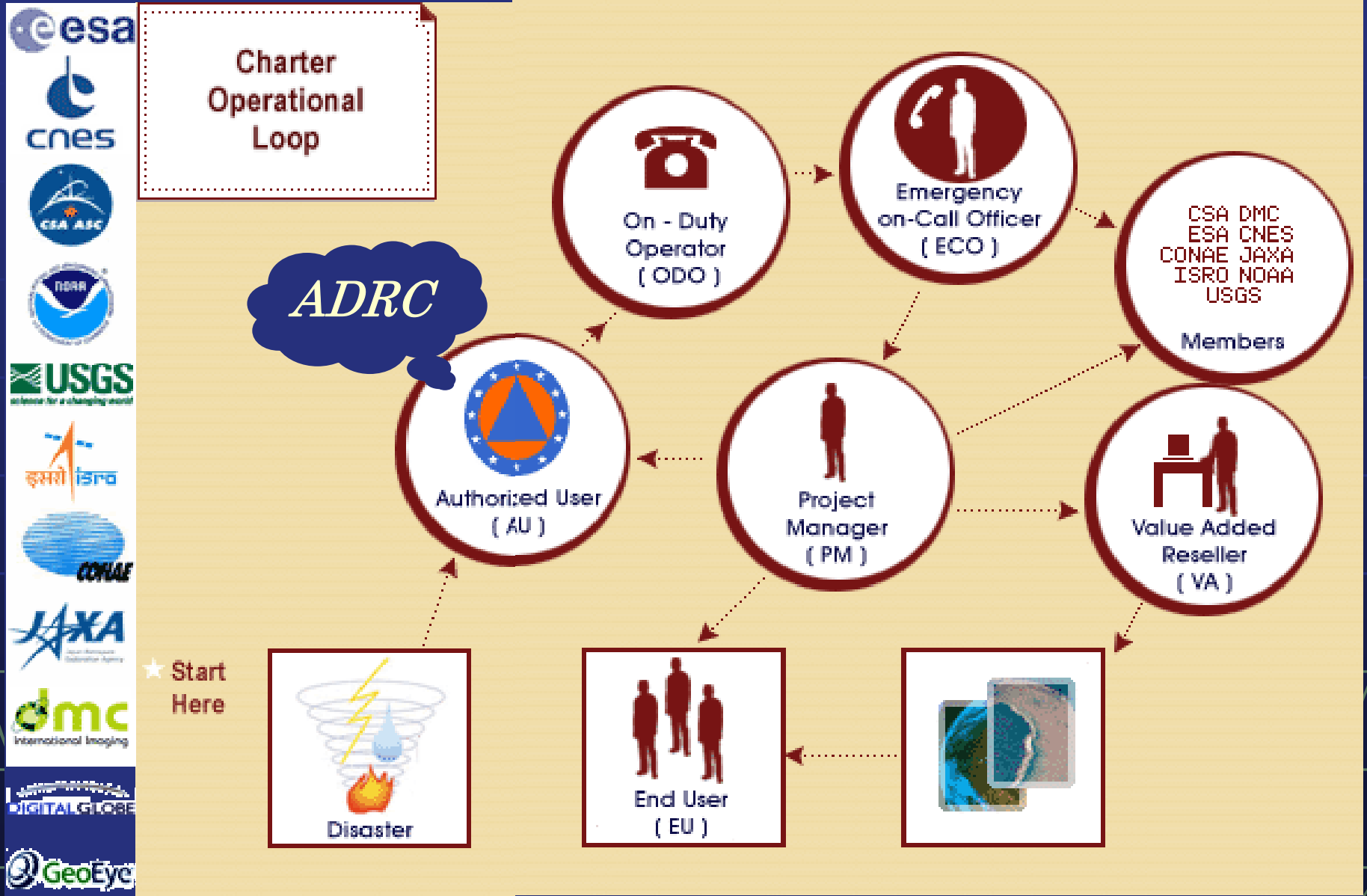
(3) Easy understand and rapid dissemination

The damage information provided should be easily understood by the people without the technical background of satellite imagery and disseminated as soon as possible after the disaster.

Flow chart for new development for satellite technology application to disaster risk reduction



Cooperation with Charter in the Future



Summary

- *Satellite imagery can provide the information on the disaster affected area which has no access.*
- *Sentinel-Asia is an internet-based Web-GIS platform providing integrated disaster information, wildfire and flood monitoring and emergency observation after a large-scale disaster for both ADRC member countries and JPT participants*
- *ADRC is engaged in Sentinel Asia project and serves as the gateway of emergency observation. ADRC is planning to provide value-added information for emergency response as well as disaster risk reduction and will make an effort to cooperate with international charter .*

