Operation and Application of Sentinel Asia for Emergency Observation

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Asian Disaster Reduction Center (ADRC)
Third JPT Meeting, 13 March 2007, Singapore
CONTENTS

• Activities of Asian Disaster Reduction Center (ADRC)
• Current Status of Emergency Observation of Sentinel Asia
• Approach and Procedures for Emergency Observation
Trends of Natural Disasters in the World

### Number of Disasters (1973-2005)

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Reported Natural Disasters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1973</td>
<td>0</td>
</tr>
<tr>
<td>1974</td>
<td>10</td>
</tr>
<tr>
<td>1975</td>
<td>20</td>
</tr>
<tr>
<td>1976</td>
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<td>1977</td>
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<td>1987</td>
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<td>1992</td>
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<td>1993</td>
<td>200</td>
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<td>1994</td>
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<td>2001</td>
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<td>2002</td>
<td>290</td>
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<tr>
<td>2003</td>
<td>300</td>
</tr>
<tr>
<td>2004</td>
<td>310</td>
</tr>
<tr>
<td>2005</td>
<td>320</td>
</tr>
</tbody>
</table>

### Data Source:
Center for Research on the Epidemiology of Disasters (CRED), Belgium
Disasters of ADRC Member Countries

Number of Disasters (Death more than 20)

Death Toll by Disaster Type

- Wave / Surge: 33.0%
- Volcano: 0.1%
- Wild fire: 0.1%
- Extreme temp: 2.5%
- Slide: 1.6%
- Flood: 12.0%
- Earthquake: 21.7%
- Wind storm: 28.5%
- Drought: 0.5%
Outline of ADRC

- Established in 1998
- Being a regional organization to facilitate multinational cooperation for disaster reduction in the Asian region
- Having 25 member countries, 5 advisor countries and an observer organization
- Operated based on the stipulations adopted at the 5th Member Committee in January 2003
ADRC Member Countries

Member Countries (25, as of Nov. 2006)

Advisor Countries

- Australia
- Switzerland
- New Zealand
- France
- U.S.A
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 Trainings Course, 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.
**Framework of Sentinel Asia**

**Space Community**
- APRSAF*
  - Content
  - Satellite Image
  - Promotion of Utilization
  - Capacity Building

**International Community**
- UN / ESCAP
- UN / OOSA
- ASEAN
- AIT etc.
  - International Cooperation

**Sentinel Asia**

**Digital Earth / Web-GIS Community**
- Digital Asia
  - Information Sharing Platform
    - Web-GIS
    - Data / Meta Data Management
  - Content
    - Digital Map
    - Social / Economic Data
    - Satellite Image

**Disaster Reduction Community**
- ADRC**
  - Member Countries
    - Content
      - Disaster Information
    - Utilization (User)

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* Asian-Pacific Regional Space Agency Forum

**Joint Project Team (JPT)**
Join Project Team consists of total 51 organizations including 44 agencies from 18 countries and 7 international organizations as of July 2006.
Main Activities of Sentinel Asia

- Emergency observation in case of large scale disasters by ALOS for ADRC and JPT members
- Wildfire monitoring by MODIS
- Flood monitoring by TRMM and AMSER-E
- Capacity-building for utilization of space technology for disaster management

Accept emergency observation from October 24, 2006
### Features of ALOS (Advanced Land Observing Satellite)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Launch</strong></td>
<td>Jan 24, 2006</td>
</tr>
<tr>
<td><strong>Orbit</strong></td>
<td>Sun Synchronous</td>
</tr>
<tr>
<td><strong>Altitude</strong></td>
<td>691.65km</td>
</tr>
<tr>
<td><strong>Repeat Cycle</strong></td>
<td>46 days</td>
</tr>
<tr>
<td><strong>(Sub-Cycle)</strong></td>
<td>(2 days)</td>
</tr>
<tr>
<td><strong>Sensors:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>PRISM</strong></td>
<td>Panchromatic Remote-sensing Instrument for Stereo Mapping, Resolution: 2.5m</td>
</tr>
<tr>
<td><strong>AVNIR-2</strong></td>
<td>Advanced Visible and Near Infrared Radiometer type 2, Resolution: 10m</td>
</tr>
<tr>
<td><strong>PALSAR</strong></td>
<td>Phased Array type L-band Synthetic Aperture Radar, Resolution: 10m</td>
</tr>
</tbody>
</table>
Operation Flow of ALOS Emergency Observation and the Roles of the Concerned Organizations

JAXA (Bangkok)
- Training, Follow-up, etc
- Before & After Emergency

ADRC counterparts and JPT members

ADRC
- Disaster Information
- Acquisition
- Under Emergency

Images
- Remote-Sensing
- Observation planning

JAXA (HQ)
- Request
- Disaster Observation
- Images
- Max. 3 days needed from Req. to Obs.

Check the email at least once/day

Max. 1 day needed for processing

Report

CB
Information Flow Circle

Request

ADRC, JPT Members

Feed-back

Site photos, etc.

Disaster Information

Sentinel Asia

ARCHIVE

ALOS Images & Disaster information

ALOS Images

Archived Images, if need

ADRC, JPT Members

Disaster-related Organizations, Communities, Individuals

Sentinel Asia

ALOS Images

Archived Images, if need

ADRC, JPT Members

Disaster Information

Sentinel Asia

ARCHIVE

ALOS Images & Disaster information

ALOS Images

Archived Images, if need

Disaster-related Organizations, Communities, Individuals

Sentinel Asia

ARCHIVE

ALOS Images & Disaster information

ALOS Images

Archived Images, if need

ADRC, JPT Members

Disaster Information

Sentinel Asia

ARCHIVE

ALOS Images & Disaster information

ALOS Images

Archived Images, if need

Disaster-related Organizations, Communities, Individuals

Sentinel Asia

ARCHIVE

ALOS Images & Disaster information

ALOS Images

Archived Images, if need

Disaster-related Organizations, Communities, Individuals
Current Status of Emergency Observation (1)

- ADRC counterpart organizations and J PT members are eligible to request for the emergency observation (ID and PW required)
- Apply to any kind of large-scale natural disasters
- The image is provided free-of-charge
Current Status of Emergency Observation (2)

- Voluntary and best-efforts based system: request may not be accepted and the image may not be as clear as required due to weather conditions.

- It may take time from request to data dissemination due to the position of the satellite.

Receive anytime → Process in working hours except telephone.
Criteria for Acceptance of Emergency Observation

1. Disaster Scale
2. Urgency
3. Necessity and Effectiveness of Space Image
4. Availability of the Satellite
A Example of Emergency Observation
(West Sumatera Earthquake, Indonesia, March 6, 2007)

Earthquake occurred at 10:49, 3/6 (local time)
Request by email

Request received at 14:45, 3/6 (Japan time)
Confirming the location
Visited USGS & news websites
Called BAKORNAS (10 people died)
Referring to Jogjakarta earthquake (M6.3)
Forward the request to JAXA at 15:24, 3/6
To Lapan: Image available, 19:08, 3/7
To Lapan and BAKORNAS: Download available, around 23:10, 3/7

Collecting disaster information
Technical availability of ALOS
Observation planning
Decision of observation (ADRC: 20:48, Lapan: 21:30, 3/6)
Observation around 13:10, 3/7
Data dissemination from 18:04 to 21:20, 3/7

Emergency Observation Request
Login with Username and Password

INPUT YOUR
• Username
• Password
Three Ways to make Request

Request through website if
(A) the disaster has already appeared in the disaster list
(B) The disaster hasn’t been identified in the disaster list

Request by e-mail, fax or telephone
### Request When the Disaster Was Already Identified (1)

<table>
<thead>
<tr>
<th>GLIDE Number</th>
<th>Event</th>
<th>Duration</th>
<th>Country</th>
<th>Comment</th>
<th># of Satellite Images</th>
<th># of Photos</th>
<th>Provided by</th>
</tr>
</thead>
<tbody>
<tr>
<td>DE-2007-010012-IBN</td>
<td>Landslides</td>
<td>2007/03/06</td>
<td>Indonesia</td>
<td>At least 40 people have been killed and scores more are missing in landslides on the Indonesian island of Flores, officials have said</td>
<td>8</td>
<td>0</td>
<td>ADRC</td>
</tr>
<tr>
<td>LS-2007-010012-IBN</td>
<td>Landslides</td>
<td>2007/02/03</td>
<td>Indonesia</td>
<td>On February 2007, landslides triggered by torrential rain hit two places on Indonesia’s main Java island over the weekend, leaving eight people dead and six missing</td>
<td>0</td>
<td>0</td>
<td>ADRC</td>
</tr>
<tr>
<td>LS-2007-010012-IBN</td>
<td>Floods</td>
<td>2007/02/15</td>
<td>Indonesia</td>
<td>Flooding in Indonesia’s capital, Jakarta, has killed five people and forced about 100,000 to leave their homes</td>
<td>0</td>
<td>0</td>
<td>ADRC</td>
</tr>
<tr>
<td>FL-2007-010012-IBN</td>
<td>Floods</td>
<td>2007/01/14</td>
<td>Malaysia</td>
<td>Malaysian health officials are on alert for outbreaks of disease as a second wave of floods hits southern areas, forcing more than 80,000 people to flee their homes and seek shelter at crowded relief centres</td>
<td>0</td>
<td>0</td>
<td>ADRC</td>
</tr>
<tr>
<td>FL-2007-010012-IBN</td>
<td>Floods</td>
<td>2007/01/13</td>
<td>Sri Lanka</td>
<td>On 13 January 2007, around 80,000 people have been displaced in Sri Lanka by flooding caused by torrential monsoon rains, while the death toll from landslides a day earlier rose to 122.</td>
<td>0</td>
<td>0</td>
<td>ADRC</td>
</tr>
</tbody>
</table>
Request When the Disaster Was Already Identified (2)
Request When the Disaster Was Already Identified (3)

[Image of a computer screen with a Disaster Management Support System interface. The screen shows a form for entering disaster data, including fields for GLIDE Number, Event (type of disaster), Observation Span, Region/Country (location of occurrence), User name, E-mail, Organization, and Comments or special instructions. There is a map showing a specific location and a button labeled "Submit Request."}

CLICK and SUBMIT
Request When the Disaster Hasn’t Been Identified (1)

B. Request through website - If the disaster is NOT identified in the list.
   - Click the link below: [Request New Observation]
   - Then complete the content of your observation request.

C. Request by e-mail, fax, or telephone.
   - Please fill out the request form and send it by e-mail or fax. In other way, call to us.

   Download request form:
   - Microsoft Word format [65KB]
   - Acrobat PDF format [21KB]

   Contact point:
   - ADRC
     - Name: Asian Disaster Reduction Center (ADRC)
     - E-mail: srequest@adrc.or.jp
     - Tel: +81-78-262-5540
     - Fax: +81-78-262-5546
**Request When the Disaster Hasn’t Been Identified (2)**

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**Sentinel Asia Project - Disaster Management Support System - Microsoft Internet Explorer**

**Disaster Management Support System**

*Home* | *Search Images* | *Search Observation Requests* | *Request New Observation* | *Help*

---

### Request New Observation

**GLIDE Number**

DO NOT USE THIS FORM unless you can identify disaster or GLIDE number.

If you can, go to top page and click “GLIDE Number”, then click “Request More Observation”.

**Event (type of disaster):**

Select from the dropdown.

**Observation Span:**

1 week(s) from the beginning of observation.

* These values depend on the selected event above.

**Region/Country (location of occurrence):**

Select from the dropdown.

**Organization:**

ADRC

* This value depends on your logged-in account.

**Additional Information on the disaster:**

Provide disaster information here.

**Additional Instructions (shipping instructions):**

Provide additional instructions here.

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**Operation mode: **

- Scroll
- Select Area

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*How to request observation*

- Download request form [MS-Word (.DOC)]

---

**CLICK and SUBMIT**

---

**Provide disaster information here**
Request When the Disaster Hasn’t Been Identified (1)

B. Request through website - If the disaster is NOT identified in the list.
   Click the link below.
   [Request New Observation]

   Then select the extent of your observation request and submit it.

C. Request by e-mail, fax, or telephone.
   Please fill out the request form and send it by e-mail or fax. In other way, call us.

   Download request form:
   - Microsoft Word format (60kb)
   - Adobe PDF format (21kb)

   Contact point:
   - ADRC
     - Name: Asian Disaster Reduction Center (ADRC)
     - E-mail: samrequest@adrc.or.jp
     - Tel: +81-78-262-5540
     - Fax: +81-78-262-5546
Emergency Observation Request through E-mail, Fax or Telephone

sarequest@adrc.or.jp

+81-78-262-5546

+81-78-262-5540
(Collect call is accepted)
**Request Form**

Please let us know:

- **Information of your organization**
- **Type of disaster and occurrence time**
- **Location of observation (Lat/Lon. and name)**
- **Information of damage, casualties, etc.**

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**SENTINEL ASIA EMERGENCY REQUEST FORM**

<table>
<thead>
<tr>
<th>Field</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call ID (To be filled by ADRC)</td>
<td>Date and time of the call</td>
</tr>
<tr>
<td>Date (dd/mm/yyyy, UTC)</td>
<td>Local time zone</td>
</tr>
<tr>
<td>Time (UTC)</td>
<td>Name of the organization and caller</td>
</tr>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Organization</td>
<td></td>
</tr>
<tr>
<td>□ ADRC member</td>
<td>□ JFT member</td>
</tr>
<tr>
<td>Phone</td>
<td></td>
</tr>
<tr>
<td>Cellular Phone</td>
<td></td>
</tr>
<tr>
<td>Fax</td>
<td></td>
</tr>
<tr>
<td>E-mail</td>
<td></td>
</tr>
<tr>
<td>Emergency type</td>
<td></td>
</tr>
<tr>
<td>□ Flood</td>
<td>□ Landslide</td>
</tr>
<tr>
<td>□ Storm</td>
<td>□ Fire</td>
</tr>
<tr>
<td>□ Volcano</td>
<td>□ Earthquake</td>
</tr>
<tr>
<td>□ Ice hazard</td>
<td>□ Industrial danger</td>
</tr>
<tr>
<td>□ Other:</td>
<td></td>
</tr>
<tr>
<td>Date (dd/mm/yyyy, UTC)</td>
<td>Approximate date and time of occurrence</td>
</tr>
<tr>
<td>Time (UTC)</td>
<td></td>
</tr>
<tr>
<td>Local time zone</td>
<td></td>
</tr>
<tr>
<td>Area details</td>
<td></td>
</tr>
<tr>
<td>Area Name / Country</td>
<td></td>
</tr>
<tr>
<td>Coordinates of center point</td>
<td>Latitude : ° °' °&quot; N/S</td>
</tr>
<tr>
<td>Circles zone</td>
<td>Longitude : ° °' °&quot; E/W</td>
</tr>
<tr>
<td></td>
<td>Radius : km</td>
</tr>
<tr>
<td>Rectangular area</td>
<td>Coordinates of corners</td>
</tr>
<tr>
<td></td>
<td>Lon. : ° °' °&quot; E/W</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Comments or special instructions</td>
</tr>
</tbody>
</table>

ADRC member / JFT member:
Fill the form and fax it to ADRC, +81 78 362 5546
And send it as a backup via E-mail to adrcrequests@adrc.or.jp
1. What was the specific way of data usage? (e.g. After oil spill occurred from a tanker at night, we used the data as information to determine whether it would be necessary to fly a helicopter to the site the next morning.)

2. Did you find the data helpful? Please fill in the reason as well.
   a. Yes. It helped much. ( )
   b. Yes. It helped on some level. ( )
   c. It served just as a reference. ( )
   d. No. It didn’t help much. ( )
   e. No. It didn’t help at all. ( )

3. Were you satisfied with the time between observation request and the first contact receipt? Please fill in your requests.
   a. Yes. b. No. ( )

4. Were you satisfied with the time between observation request and the data provision? Please fill in your requests.
   a. Yes. b. No. ( )

5. Were you satisfied with the contents of the data? Please fill in your requests.
   a. Yes. b. No. ( )

6. Which department used the data finally? (Please fill in only if it differs from the observation request department.) ( )

7. Did you conduct the data processing? (If “yes”, please fill in the details of the process.)
   a. No. b. Yes. ( )

8. Please make checks in the appropriate boxes below.
   □ We wanted not only images but also more detailed interpretations.
   □ As for the provided images, we prefer more efforts such as effective use of color.
   □ The contact point for the observation request was unclear.
   □ Other ( )

9. Please fill in any other comments or requests. ( )

Thank you for your cooperation.
Emergency Observation Activities
(from October 24, 2006 - )

- December 3 and 5, 2006, Mudslide by AVNIR-2, Philippines
- Jan. 31 and Feb. 5, 2007, Flood by PALSAR, Indonesia
- March 7, 2007, Earthquake by AVNIR-2, Indonesia
SUMMARY

- Sentinel-Asia is an internet-based Web-GIS platform providing disaster information in the Asia-Pacific region under cooperation among APRSAF, ADRC, Digital Asia and international organizations based on best-efforts and voluntary initiatives.

- Accepts emergency disaster observation by ALOS after a large-scale disaster.

- Its function could be further extended for disaster management especially when it is combined with the detail local GIS, social and economic information.
THANK YOU VERY MUCH