



Sentinel Asia System Operation WINDS / Regional Server

3rd Joint Project Team Meeting for Sentinel Asia STEP-3
(JPTM2016), Colombo, Sri Lanka

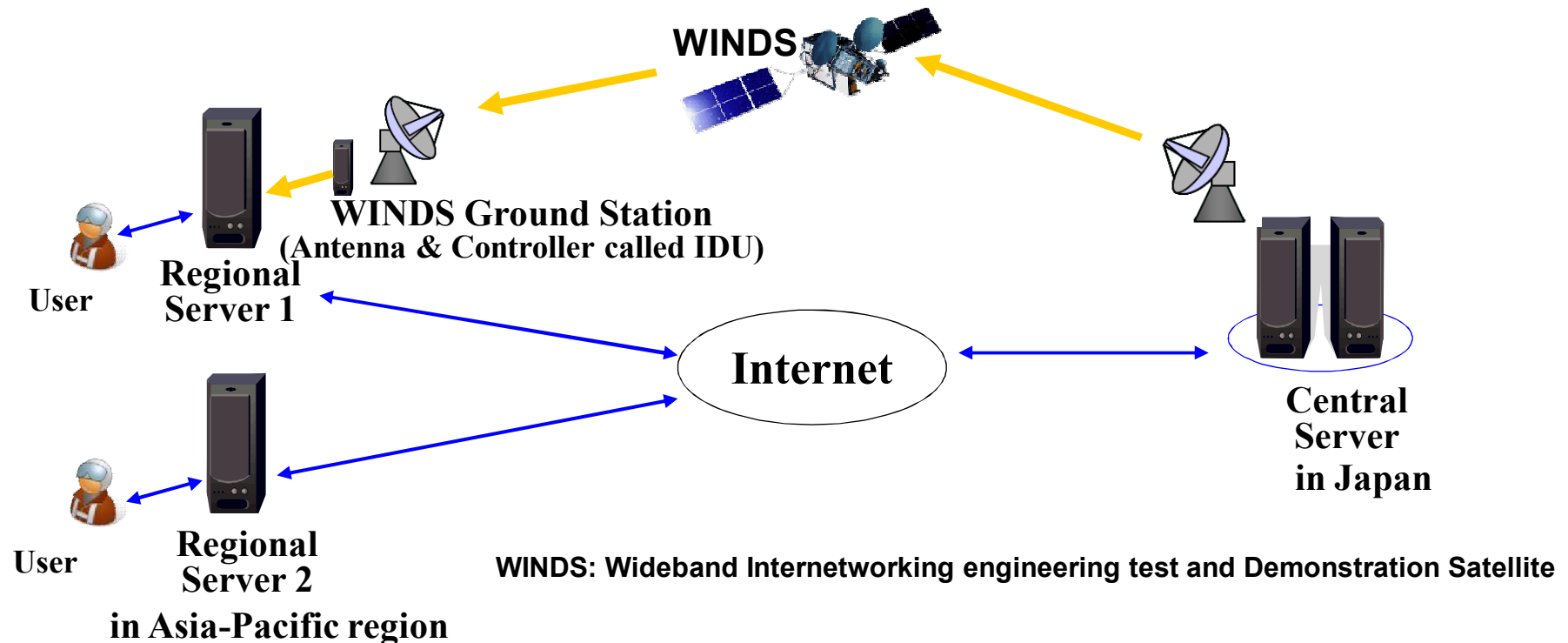
January 20, 2016

Yuji Takada
Space Applications & Operations Center
Japan Aerospace Exploration Agency

Overview of Sentinel Asia System



SA System was installed for sharing the information of disaster management in Asia-Pacific region. The controlled data by Central Server are transferred to each Regional Server so that RS can get the same data. It is necessary that data are physically near the user, to increase the data accessibility.



Data Transfer Way in Sentinel Asia System



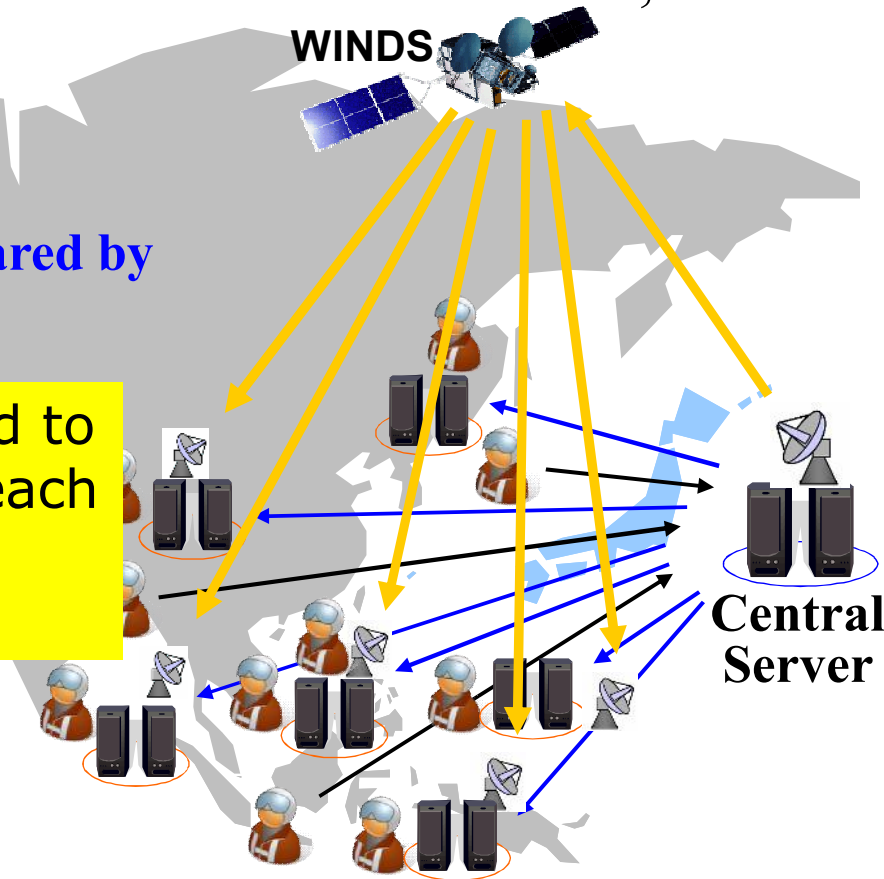
Utilization of WINDS

In order to solve narrow-band problem in Asia-Pacific region, 'Regional Server' can equip WINDS ground station and transfer data via WINDS. In case of board-band internet, data can be transferred via the internet.

WINDS high speed communication
~155Mbps[Max] (shared by users)



Currently restricted to 6.5Mbps max for each RS to share speed among users.

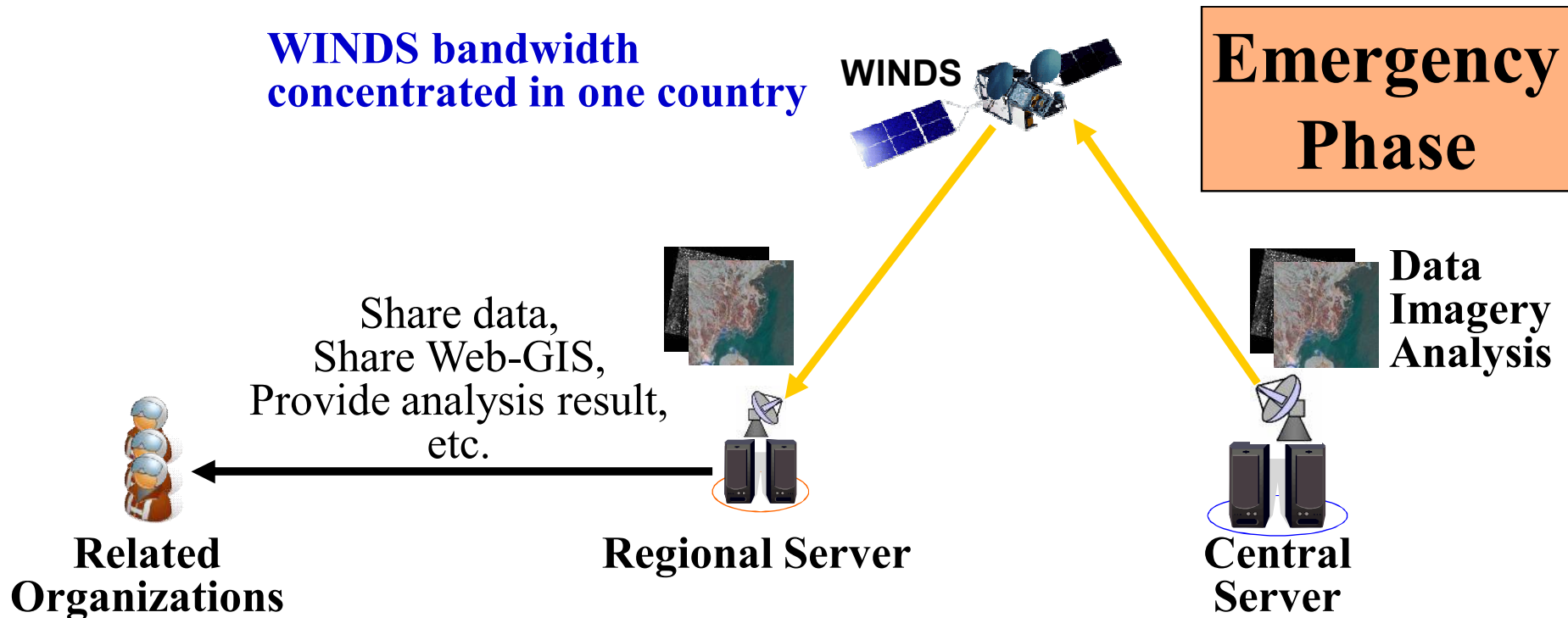


Data Transfer Way in Sentinel Asia System



Utilization of WINDS in Emergency

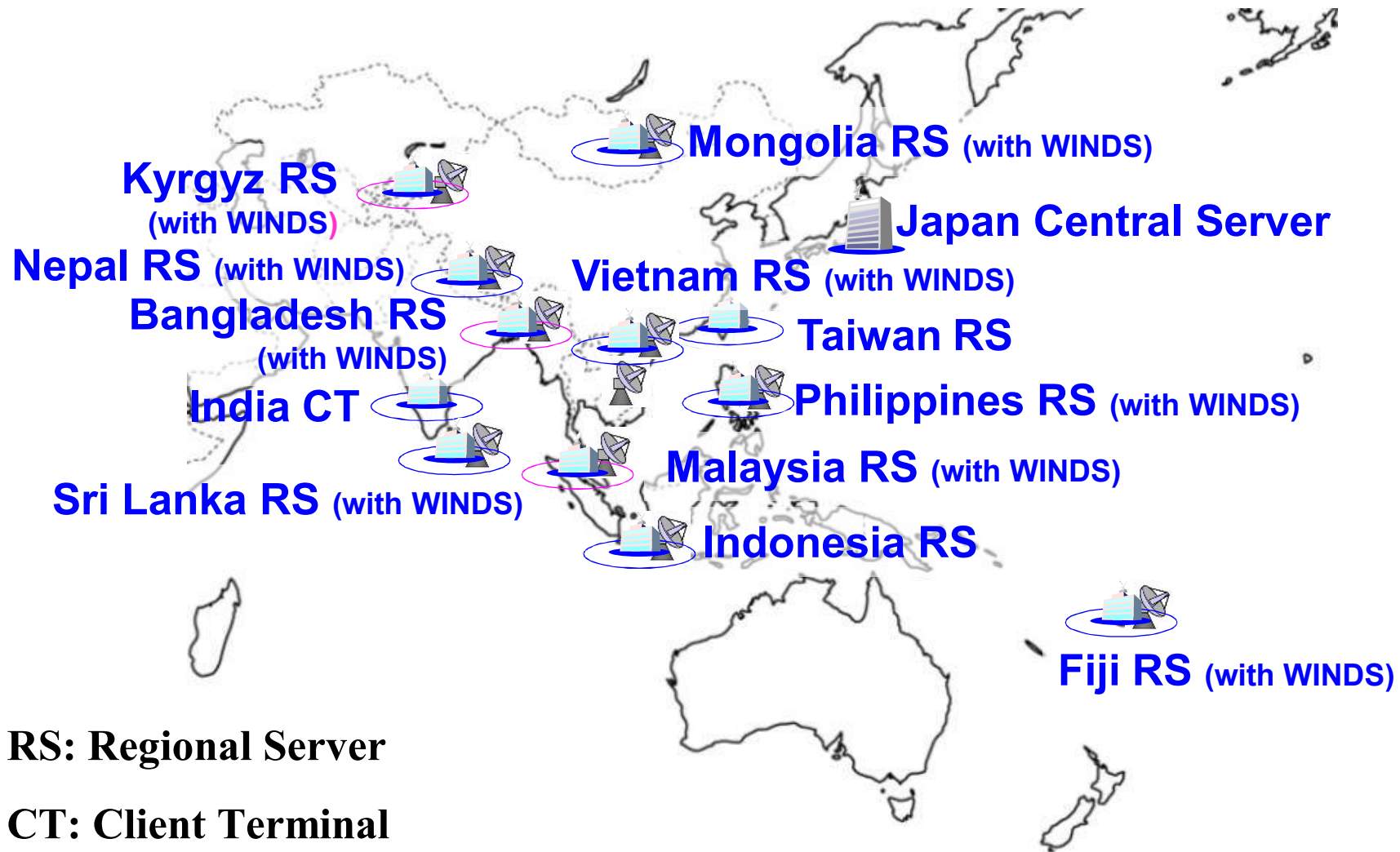
When disaster occurred and emergency observation was requested by users, Sentinel Asia will coordinate and assign the maximum WINDS resources (**155Mbps**). Then, the satellite data, imagery, the results of analysis, etc are transferred to users via WINDS.



Data Transfer Way in Sentinel Asia System



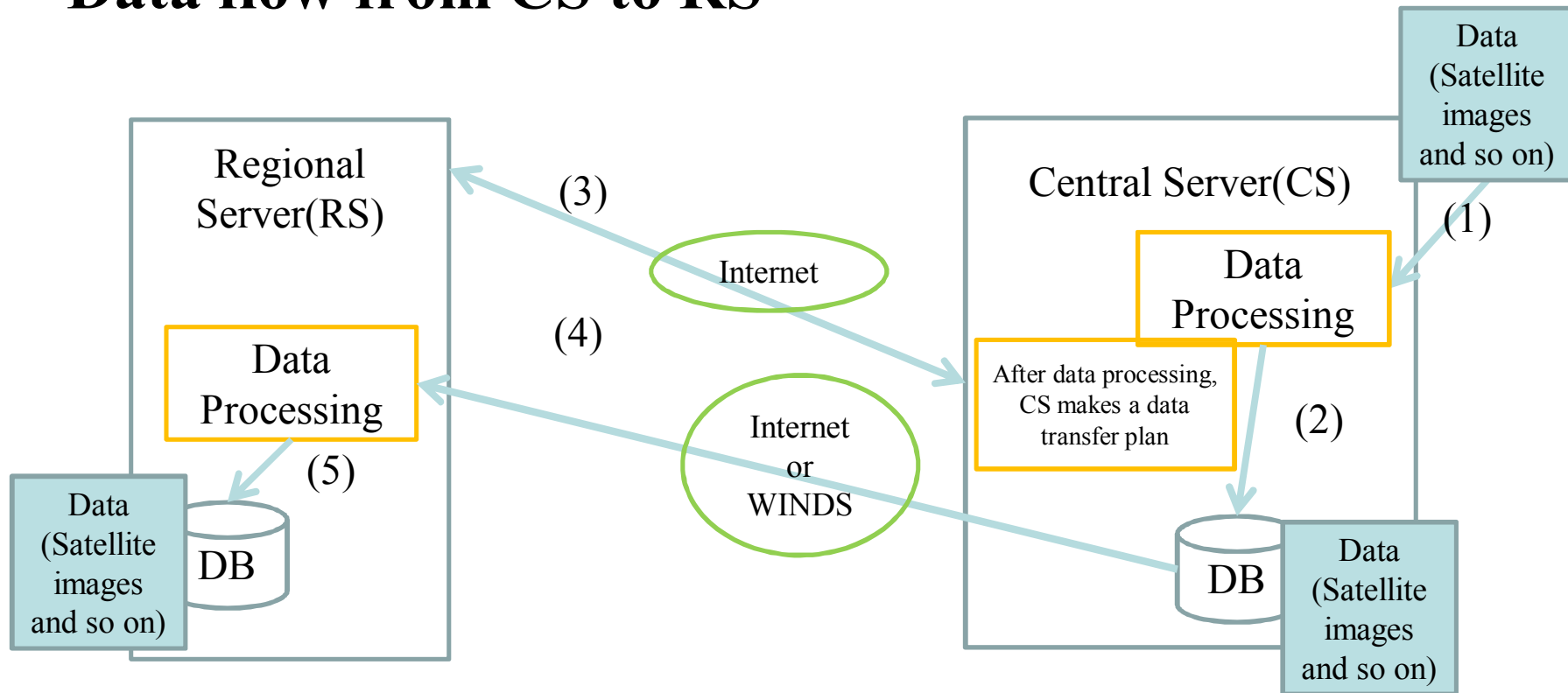
Current location of Regional Server/WINDS



Data Transfer Flow in Sentinel Asia System



Data flow from CS to RS

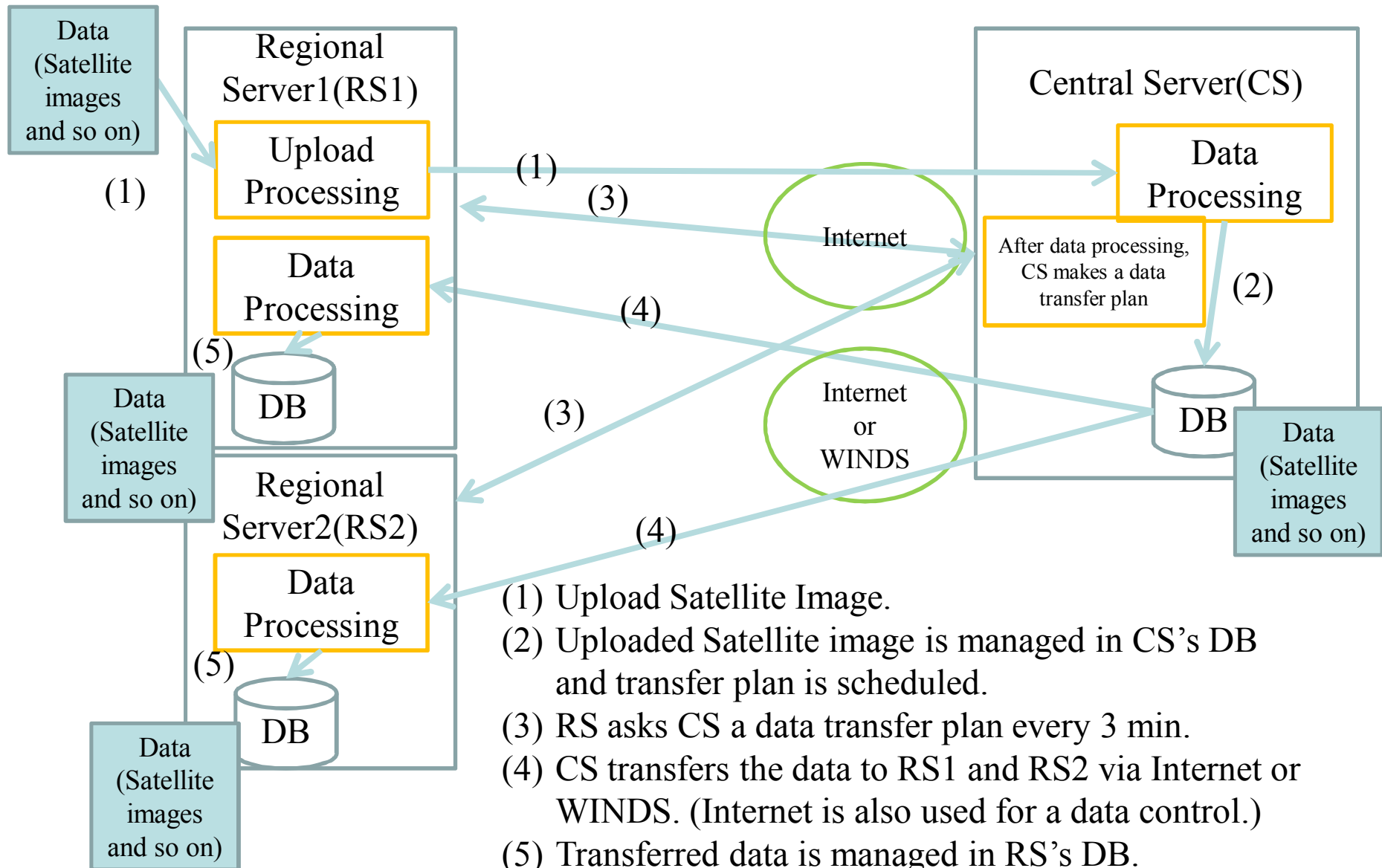


- (1) Upload Satellite Image.
- (2) Uploaded Satellite image is managed in CS's DB and transfer plan is scheduled.
- (3) RS asks CS a data transfer plan every 3 min.
- (4) CS transfers the data to RS via Internet or WINDS. (Internet is also used for a data control.)
- (5) Transferred data is managed in RS's DB.

Data Transfer Flow in Sentinel Asia System



Data flow from RS to RS via CS



Make the Most of ALOS-2 High Mobility



ALOS-2 has a higher mobility than ALOS.

■ ALOS-2 can observe the area near Japan within about **12 hrs.**(in case of ALOS, within 3 days), the area of Asia within about **24 hrs.** (in case of ALOS, about within 5 days.)

■ ALOS-2 data can be prepared within **1 hr.**(in case of ALOS, within 3 hrs.)

ALOS-2's data are higher resolution than ALOS's one. (Data size is getting bigger.)

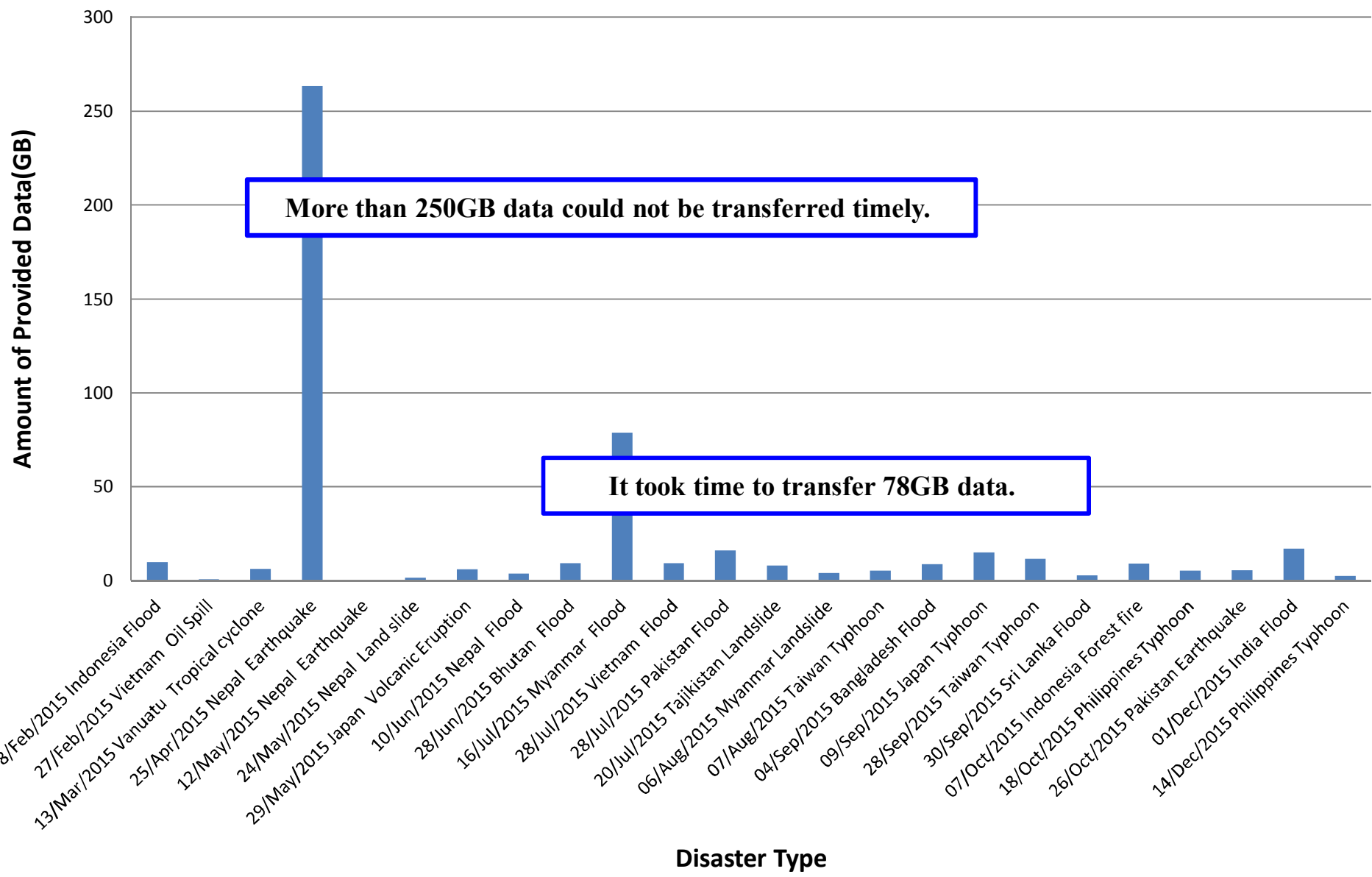
■ ALOS-2 data (L1.5 GeoTIFF) is about **3 GB.** ALOS data(L1.5 GeoTIFF) is about 107 MB.

JAXA as DPN should make the most of ALOS-2's high mobility for disaster management using Sentinel Asia System. But...

Results of transferred data in Sentinel Asia System



Amount of Provided all Data in 2015



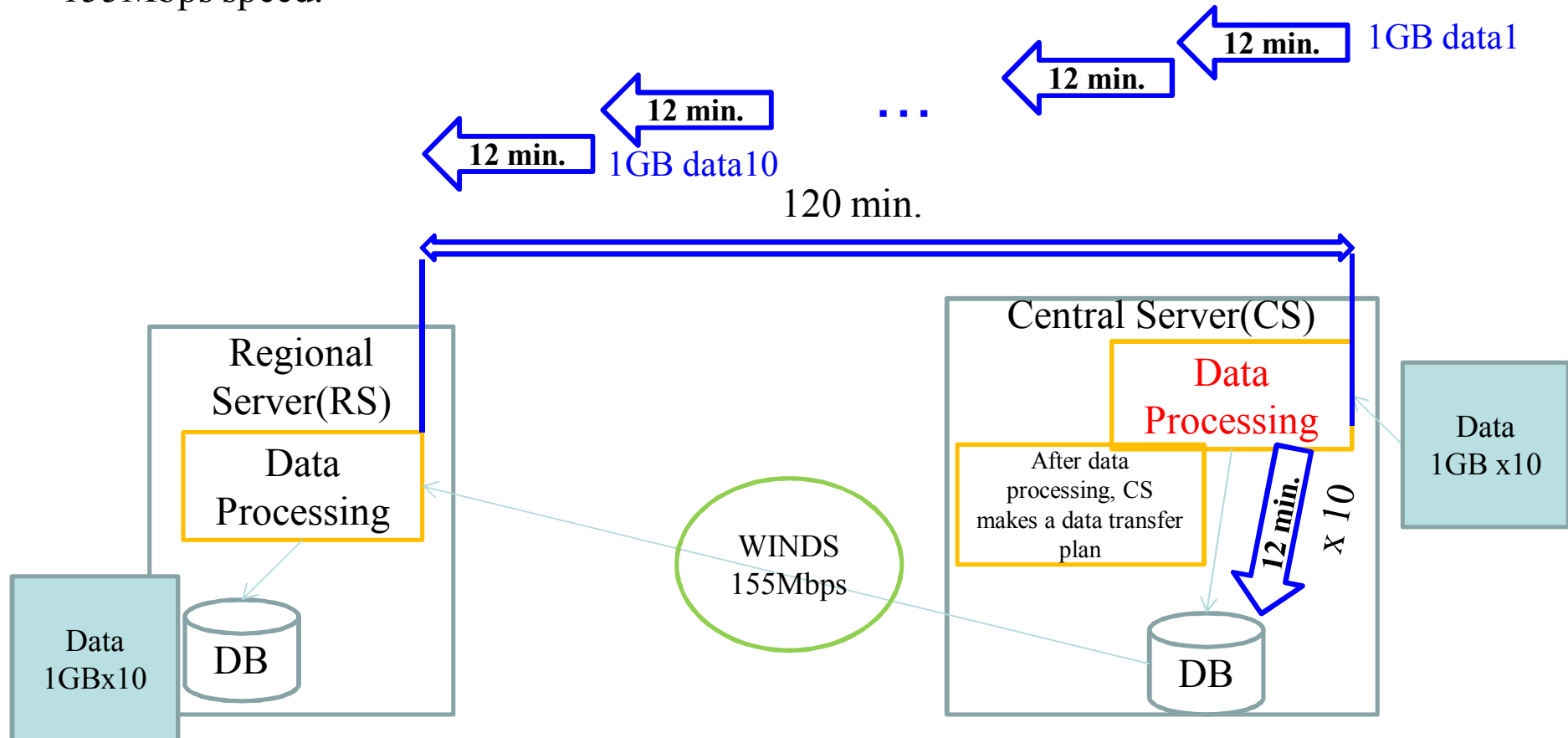
Speedup of Data Transfer

Current Problem(by our investigation)

It takes time at **Data Processing in Central Server.**

- Data Processing time : 12min for 1GB GeoTIFF data
(Less than 2GB data can be transferred in SA system.)

In case of total 10GB(1GBx10) data transfer, it takes about 120 min. using WINDS max. 155Mbps speed.



Speedup of Data Transfer



Improvement of Data Processing to shorten time

From the investigation, we are going to improve this Data Processing time to be less than 4 min by end of March, 2016.

In case of total 10GB(1GBx10) data transfer, it takes about less than 40 min. using WINDS 155Mbps speed.



This improvement makes us analyze data quickly and provide the disaster management agency with analyzed product timely.

This improvement will be more effective for bigger data transfer.

Use more Sentinel Asia System



Access Procedure to Regional Server

① Digest Authentication

ユーザ名とパスワードを入力してください

https://sentinel.tksc.jaxa.jp の "sentinel2" に対するユーザ名とパスワードを入力してください

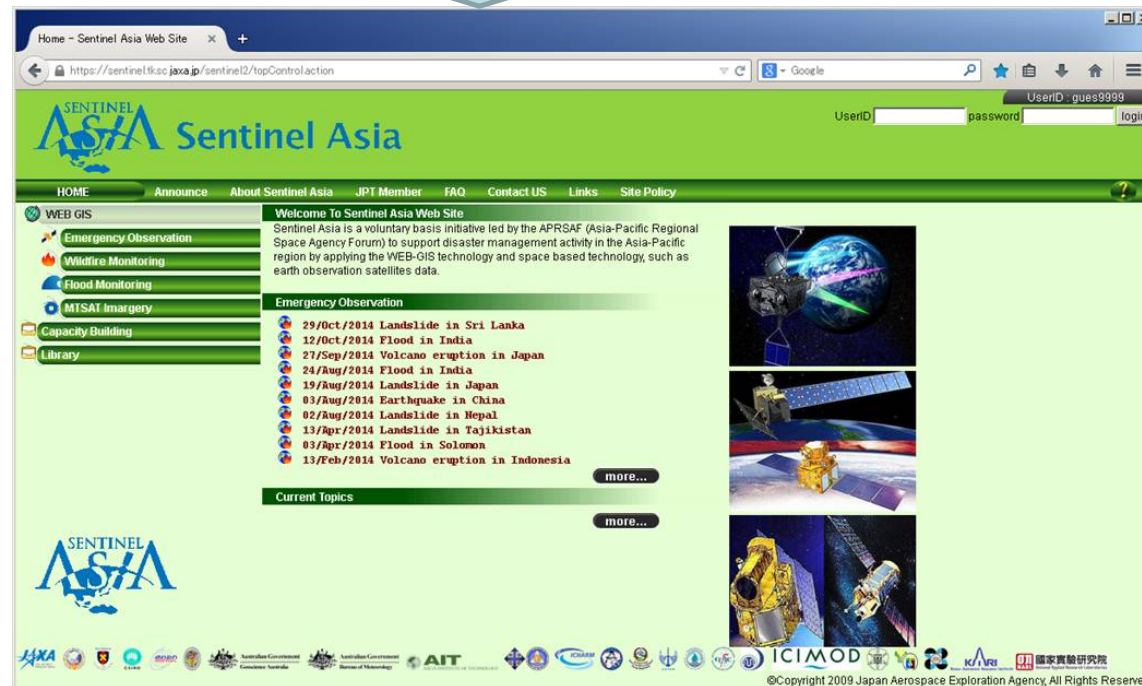
ユーザ名: sajpcs01

パスワード: ●●●●●●●●

OK キャンセル

② Login Web Site

Two access accounts are different.



Use more Sentinel Asia System (Data Download)



1. Login

Enter Your ID & Pass and Click 'login' button

完了

Use more Sentinel Asia System (Data Download)



D2. Click 'Emergency Observation' tab.

The screenshot shows the Sentinel Asia website interface. The 'Emergency Observation' link in the left sidebar is highlighted with a red box. A red circle with the text 'Click Here' is placed over this link. The main content area shows a list of emergency events under the heading 'Emergency Observation':

- 15/Jun/2010 Landslide in Bangladesh
- 14/May/2010 Flood in Sri Lanka
- 07/May/2010 Flood in Tajikistan
- 25/Apr/2010 Landslide in Taiwan
- 11/Apr/2010 Flood in Tajikistan
- 04/Apr/2010 Forest fire in Nepal
- 21/Mar/2010 Flood in Indonesia
- 13/Mar/2010 Flood in Kazakhstan
- 09/Mar/2010 Forest fire in Bhutan
- 23/Feb/2010 Landslide in Indonesia

Below this list is a 'Current Topics' section with two items:

- 10/Jun/2010 "International Symposium: Benefiting from Earth Observation - Bridging the Data Gap for Adaption to Climate Change in the Hindu Kush-Himalayan Region" will be held from 4th to 6th October 2010 in Kathmandu, Nepal [link...](#)
- 26/Apr/2010 "3rd Joint Project Team Meeting for Sentinel Asia Step2" will be held from 6th to 8th July 2010 in Manila,

The footer of the page contains logos for JAXA, Australian Government, AIT, ICNAMI, and other partners, along with the copyright notice: ©Copyright 2009 Japan Aerospace Exploration Agency, All Rights Reserved.

Use more Sentinel Asia System (Data Download)



D3. Find your requested Emergency Observation in list.

Emergency Obs. Request List

Country: ALL Disaster Type: ALL

Find Your EO

| Emergency Obs. ID | Occurrence Date | Country | Disaster Type | Product | WEB-GIS | Detail | Disaster Inf. | Status |
|-------------------|-----------------|-----------|------------------|---------|---------|----------------------|---------------|--------|
| ERBTDG000001 | 28/Jun/2015 | Bhutan | Flood | | | link | ADRC | Active |
| ERADRC000029 | 10/Jun/2015 | Nepal | Flood | | | link | ADRC | Active |
| ERADRC000028 | 29/May/2015 | Japan | Volcano eruption | | | link | ADRC | Active |
| ERADRC000027 | 24/May/2015 | Nepal | Landslide | | | link | ADRC | Active |
| ERADRC000026 | 12/May/2015 | Nepal | Earthquake | | | link | ADRC | Active |
| ERCNEA000003 | 25/Apr/2015 | Nepal | Earthquake | | | link | ADRC | Active |
| ERSECR000238 | 14/Mar/2015 | Vanuatu | Tropical cyclone | | | link | ADRC | Active |
| ERADRC000025 | 27/Feb/2015 | Vietnam | Others | | | link | ADRC | Active |
| ERADRC000024 | 09/Feb/2015 | Indonesia | Flood | | | link | ADRC | Active |
| ERMYSA000002 | 21/Dec/2014 | Malaysia | Flood | | | link | ADRC | Active |

©Copyright 2009 Japan Aerospace Exploration Agency, All Rights Reserved.

Use more Sentinel Asia System (Data Download)



D4. Go to Data List page

Emergency Obs. Request List

Country: ALL Disaster Type: ALL Search

| Emergency Obs. ID | Occurrence Date | Country | Disaster Type | Product | WEB-GIS | Detail | Disaster Inf. | Status |
|-------------------|-----------------|-----------|------------------|---------|---------|----------------------|---------------|--------|
| ERBTDG000001 | 28/Jun/2015 | Bhutan | Flood | | | link | ADRC | Active |
| ERADRC000029 | 10/Jun/2015 | Nepal | Flood | | | link | ADRC | Active |
| ERADRC000028 | 29/May/2015 | Japan | Volcano eruption | | | link | ADRC | Active |
| ERADRC000027 | 24/May/2015 | Nepal | Landslide | | | link | ADRC | Active |
| ERADRC000026 | 12/May/2015 | Nepal | Earthquake | | | link | ADRC | Active |
| ERCNEA000003 | 25/Apr/2015 | Nepal | Earthquake | | | link | ADRC | Active |
| ERSECR000238 | 14/Mar/2015 | Vanuatu | Tropical cyclone | | | link | ADRC | Active |
| ERADRC000025 | 27/Feb/2015 | Vietnam | Others | | | link | ADRC | Active |
| ERADRC000024 | 09/Feb/2015 | Indonesia | Flood | | | link | ADRC | Active |
| ERMYSA000002 | 21/Dec/2014 | Malaysia | Flood | | | link | ADRC | Active |

Go to Data List

©Copyright 2009 Japan Aerospace Exploration Agency, All Rights Reserved.

Use more Sentinel Asia System (Data Download)



D5. Data List page.

The screenshot shows the Sentinel Asia Data List page with several annotations:

- Click Disk Icon to Download Data:** A red box highlights a disk icon above a thumbnail, with a blue arrow pointing to it.
- Click Thumbnail for Quick Look:** A red box highlights a thumbnail, with a blue arrow pointing to it.
- Click File Icon to Check Meta Info:** A red box highlights a file icon above a thumbnail, with a blue arrow pointing to it.

The page displays a list of satellite data products, including:

- Emergency Observation Thumbnail - JPJXisis0001200911060027.jpg
- Emergency Observation Thumbnail - JPJXisis0001200911060021.jpg
- ALOS PSR/FBS, P... 15/11/2009 15:27
- ALOS PSR/FBS, P... 05/11/2009 15:26
- ALOS PSR/FBS, P... 05/11/2009 15:26
- ALOS PSR RGB F2... 05/11/2009 15:26
- ALOS PSR RGB F2... 05/11/2009 15:26
- ALOS PSR RGB F2... 05/11/2009 15:26

The page also includes a disaster information data view for a flood in Vietnam, with details such as:

- Disaster Information type: Product
- Format: JPEG
- Data ID: JPJXisis0001200911060029
- Emergency Obs. ID: ERV/VNM-03067-0211/2009-Vietnam-Flood
- Organization: JAXA/WMETUP
- Registration Date (UTC): 06/11/2009
- Title: ALOS PSR RGB F281, Nov 5, 2009 and Mar 3, 2009
- Date Date (UTC): Date: 05/11/2009 Time: 15:27
- Disaster situation: ALOS/PALSAR RGB Comp F280 between 20081105 and 20090303, Vietnam

©Copyright 2009 Japan Aerospace Exploration Agency, All Rights Reserved.

Use more Sentinel Asia System (Data Upload)



U2. Click 'Disaster Information Manage' tab.

The screenshot shows the Sentinel Asia website interface. The browser address bar displays the URL: <https://sentinel.tksc.jaxa.jp/sentinel2/topControl.jsp>. The page header includes the Sentinel Asia logo and the text "Sentinel Asia". The navigation menu includes: HOME, Announce, About Sentinel Asia, JPT Member, FAQ, Contact US, Links, and Site Policy. The main content area is divided into several sections:

- WEB GIS**: A sidebar menu with items like Emergency Observation, Wildfire Monitoring, Flood Monitoring, MTSAT Imagery, Capacity Building, Library, Emergency Obs. Request, Dealing Status, and **Disaster Information Manage** (highlighted with a red box and a red arrow pointing to it with the text "Click Here").
- Welcome To Sentinel Asia Web Site**: A introductory text stating that 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**: A list of recent disaster events, including:
 - 14/Dec/2015 Typhoon in Philippines
 - 01/Dec/2015 Flood in India
 - 26/Oct/2015 Earthquake in Pakistan
 - 18/Oct/2015 Typhoon in Philippines
 - 02/Jan/2015 Forest fire in Indonesia
 - 30/Sep/2015 Flood in Sri Lanka
 - 09/Sep/2015 Landslide in Myanmar
 - 06/Sep/2015 Landslide in Myanmar
 - 04/Sep/2015 Flood in Bangladesh
- Current Topics**: A section with a single topic: "21/Dec/2015 Changed the password of all user's. When you do not know the new password, please ask a secretariat. link...".
- Sidebar Images**: Three satellite images showing Earth from space, a satellite in orbit, and a satellite on the ground.

The footer contains logos of various partner organizations, including JAXA, CSIRO, Australian Government, AIT (Asian Institute of Technology), ICHARM, and others.

Use more Sentinel Asia System (Data Upload)



U3. Disaster information management screen appears

Disaster Information Management Screen

Disaster Information List

| Data ID | Information Type | Emergency Obs. ID | Organization | Title |
|--------------------------|------------------|-------------------|--------------|--|
| JPPXisis0001201512160018 | ALOS(Jpeg) | ERADRC000041 | JAXAMETI(JP) | ALOS-2 PALSAR-2,P29,F3350,HHVHH,D 36.2,Dec. 16, 2015 |
| JPPXisis0001201512160017 | ALOS(GeoTiff) | ERADRC000041 | JAXAMETI(JP) | ALOS-2 PALSAR-2,P29,F3350,HHVHH,D 36.2,Dec. 16, 2015 |
| JPPXisis0001201512160016 | ALOS(Jpeg) | ERADRC000041 | JAXAMETI(JP) | ALOS-2 PALSAR-2,P29,F3350,HV,D 36.2,Dec. 16, 2015 |
| JPPXisis0001201512160015 | ALOS(GeoTiff) | ERADRC000041 | JAXAMETI(JP) | ALOS-2 PALSAR-2,P29,F3350,HV,D 36.2,Dec. 16, 2015 |

① Set Emergency Obs. ID and Click Search

② Searched Results are shown.

Register

©Copyright 2009 Japan Aerospace Exploration Agency, All Rights Reserved.

Use more Sentinel Asia System (Data Upload)



U3. Enter Information for Data

The screenshot shows the Sentinel Asia web application interface. The browser address bar indicates the URL: <https://sentinel.tksc.jaxa.jp/sentinel2/iccDsInformation.jsp#>. The page title is "Disaster Information - Sentinel Asia". The user is logged in as "User ID: jpx0002".

The main content area displays a "Disaster Information List" table with the following data:

| Data ID | Information Type | Emergency Obs. ID | Organization | Title |
|------------------------|------------------|-------------------|--------------|---|
| JPJXis0001201512160018 | ALOS(Jpeg) | ERADRC000041 | JAXAMETI(JP) | ALOS-2 PALSAR-2,P29,F3350,HHHVHH,D 36.2,Dec. 16, 2015 |
| JPJXis0001201512160017 | ALOS(GeoTiff) | ERADRC000041 | JAXAMETI(JP) | ALOS-2 PALSAR-2,P29,F3350,HHHVHH,D 36.2,Dec. 16, 2015 |
| JPJXis0001201512160016 | ALOS(Jpeg) | ERADRC000041 | JAXAMETI(JP) | ALOS-2 PALSAR-2,P29,F3350,HV,D 36.2,Dec. 16, 2015 |
| JPJXis0001201512160015 | ALOS(GeoTiff) | ERADRC000041 | JAXAMETI(JP) | ALOS-2 PALSAR-2,P29,F3350,HV,D 36.2,Dec. 16, 2015 |

The "Disaster Information Type" section is highlighted with a red box. It contains the following fields:

- Information Type: ALOS(GeoTiff)
- Type: Satellite Image
- Format: Geo-TIFF

The "Common Information" section is also highlighted with a red box. It contains the following fields:

- Data ID: (empty)
- Emergency Obs. ID: ERADRC000041 - 14/12/2015 - Philippines - Typhoon
- User ID: jpx0002
- Organization: JAXAMETI(JP)
- Registration Date (UTC): 16/Dec/2015
- Title: ALOS-2 PALSAR-2,P29,F3350,HHHVHH,D 36.2,Dec. 16, 2015
- Data Date (UTC): Date: 16/12/2015, Time: 04:05
- Summary: ALOS-2 PALSAR-2,P29,F3350,HHHVHH,D 36.2,Dec. 16, 2015

The "Data Information" section is also highlighted with a red box. It contains the following fields:

- File Upload: 参照... ファイルが選択されていません。
- Upper-Left(deg): (12.407710, 124.27011)
- Upper-Right(deg): (12.407710, 125.00323)
- Lower-Left(deg): (11.663801, 124.27011)
- Lower-Right(deg): (11.663801, 125.00323)
- Pixel: 12911
- Line: 13111

The "Access Role" section is also highlighted with a red box. It contains the following fields:

- Access Role: ALL_ROLE, NONE_ROLE, AZERBAIJAN_ROLE, ARMENIA_ROLE
- Add >> REGIONALSVR_ROLE, DAN_ROLE, JAXA_ROLE
- << Del

The "Register" button is located at the bottom of the form.

A red callout bubble points to the "File Upload" field with the text: "Enter Information for Data and set the Upload File".

Use more Sentinel Asia System (Data Upload)



U4. Data Upload

Disaster Information List

| Data ID | Information Type | Emergency Obs. ID | Organization | Title |
|--------------------------|------------------|-------------------|---------------|---|
| JPJXisis0001201512160018 | ALOS(Jpeg) | ERADRC000041 | JAXA/METI(JP) | ALOS-2 PALSAR-2,P29,F3350,HHHVHH,D 36.2,Dec. 16, 2015 |
| JPJXisis0001201512160017 | ALOS(GeoTiff) | ERADRC000041 | JAXA | |
| JPJXisis0001201512160016 | ALOS(Jpeg) | ERADRC000041 | JAXA | |
| JPJXisis0001201512160015 | ALOS(GeoTiff) | ERADRC000041 | JAXA | |

Emergency Obs. ID: ERADRC000041
Information Type: ALOS(TIFF) Type: Satellite Image
Data ID: ERADRC000041
Emergency Obs. ID: ERADRC000041
User ID: jpjx0002
Registration Date (UTC): 16/Dec/2015
Title: ALOS-2 PALSAR-2,P29,F3350,HHHVHH,D 36.2,Dec. 16,
Data Date (UTC): Date 16/12/2015 Time 04:05
Summary: ALOS-2 PALSAR-2,P29,F3350,HHHVHH,D 36.2,Dec. 16,
Data Information
File Upload: ファイルが選択されていません。
Upper-Left(deg): (12.407710, 124.27011) Upper-Right(deg): (12.407710, 125.00323)
Lower-Left(deg): (11.663801, 124.27011) Lower-Right(deg): (11.663801, 125.00323)
Access Role: ALL_ROLE NONE_ROLE REGIONALSVR_ROLE DAN_ROLE JAXA_ROLE
Register

① Click Register

② Upload status is shown

Caution: Do you process registration? Register

99%: The server waits for upload. 63730969/63730969 Upload...

100%: It was finished normally. 63730969/63730969 Close

Conclusion



- 1) Sentinel Asia System is improved to meet ALOS-2 high mobility and the quick response required for disaster management, and provides the disaster management agency with data quickly.**
- 2) Use more Sentinel Asia System for sharing the information of disaster management.**

Regional Server



- **Philippines:** <http://sentiph1.asti.dost.gov.ph/>
- **Taiwan:** <http://sentiasia.nspo.org.tw/>
- **Mongolia:** <http://drisa.disasterinfo.mn>
- **Nepal:** <http://118.91.160.244/>
- **Vietnam:** <http://113.190.248.6/>
- **Fiji:** <http://124.108.31.199>
- **Indonesia:** <http://103.16.223.200/>
- **Kyrgyz:** <http://winds.caiag.kg/>
- **Bangladesh:** <http://123.49.36.42/>
- **Sri Lanka:** <http://220.247.200.164/>
- **Malaysia:** <http://175.28.12.70/>

Back up Power Point

Data Download and Upload Procedure



3.B. Web GIS Site.

The screenshot shows the Sentinel Asia Web GIS interface in Mozilla Firefox. The browser address bar displays the URL: http://sentinel.ksc.jaxa.jp/sentinel2/webGISControl.action?requestId=ERVNMN000007&subsetName=Emergency+Observation&requestId_date=125. The page title is "WEB-GIS - Sentinel Asia Web Site - Mozilla Firefox".

The main content area is titled "Emergency Observation" and features a grid of four satellite images. Each image has a red box with a label:

- Post-Disaster**: A grayscale satellite image showing the terrain after a disaster.
- Pre-Disaster with DCW**: A grayscale satellite image showing the terrain before the disaster, overlaid with a Digital Cloud Water (DCW) map.
- Value-added**: A satellite image with a color overlay, likely representing a derived data product.
- Rainfall & Cloud**: A false-color image showing rainfall intensity (yellow/red) and cloud cover (blue).

The interface includes a left sidebar with various controls:

- Emergency Observation**: Includes a date range selector (Nov 5, 2009 and Mar 3, 2009), a scale selector (100), and an opacity slider.
- GSMap**: Includes a calendar for November 2009, a time selector (00:00:00), and a type selector (Hourly Precipitation(Geo-)).
- Legend**: A color scale for "Hourly Global Rainfall" in mm, ranging from 0.1 to 25.

At the bottom of the page, there is a copyright notice: "©Copyright 2009 Japan Aerospace Exploration Agency, All Rights Reserved." and the text "完了" (Completed) in the bottom left corner.

Use more Sentinel Asia System



- ALOS-2 Emergency Observation can be performed twice a day (around 12pm and 0am JST)
- observation request until one and half hour before command uplink
- Products will be submitted in a few hours (Quick disaster map in 2 hrs)

