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# Sentinel Asia System Operation WINDS / Regional Server and Concept of Sentinel Asia Step3 System

4<sup>th</sup> Joint Project Team Meeting for Sentinel Asia STEP-3  
(JPTM2017), Hanoi, Vietnam

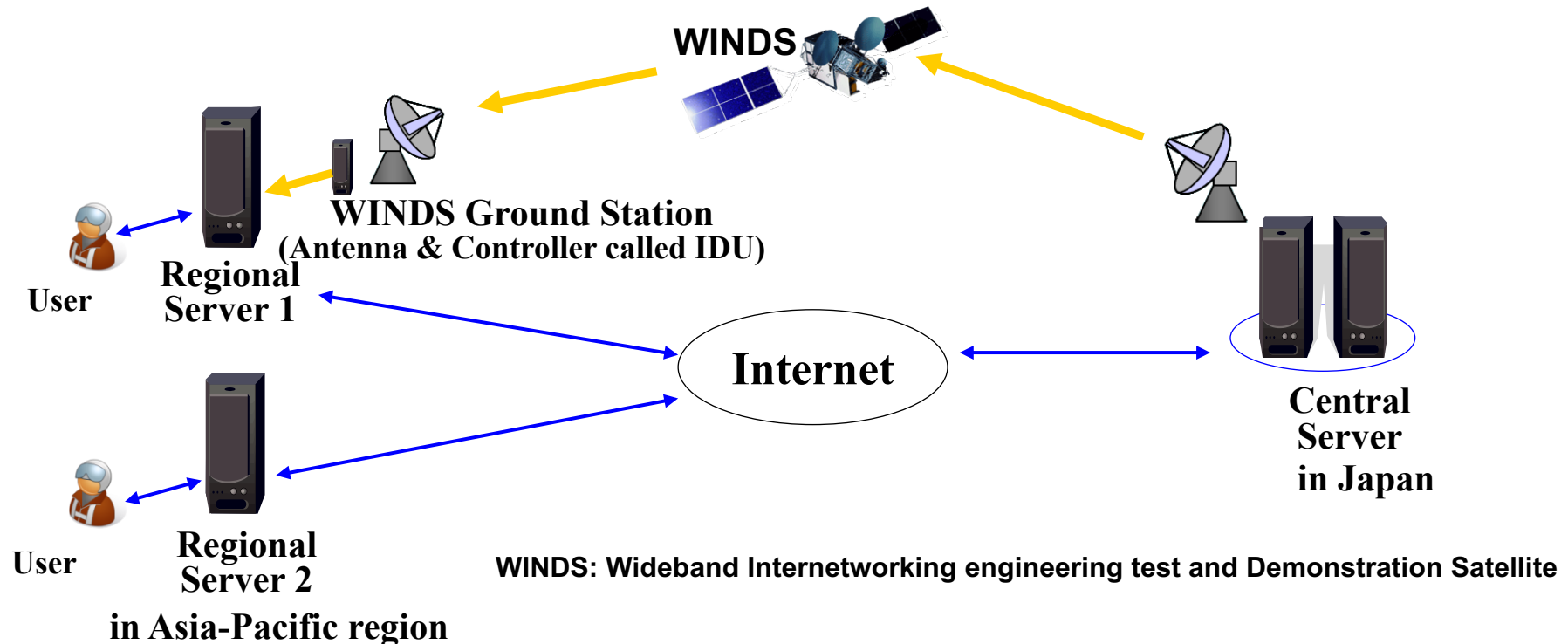
March 9, 2017

Shirou Kawakita  
Space Applications & Operations Center  
Japan Aerospace Exploration Agency

# Overview of Sentinel Asia System



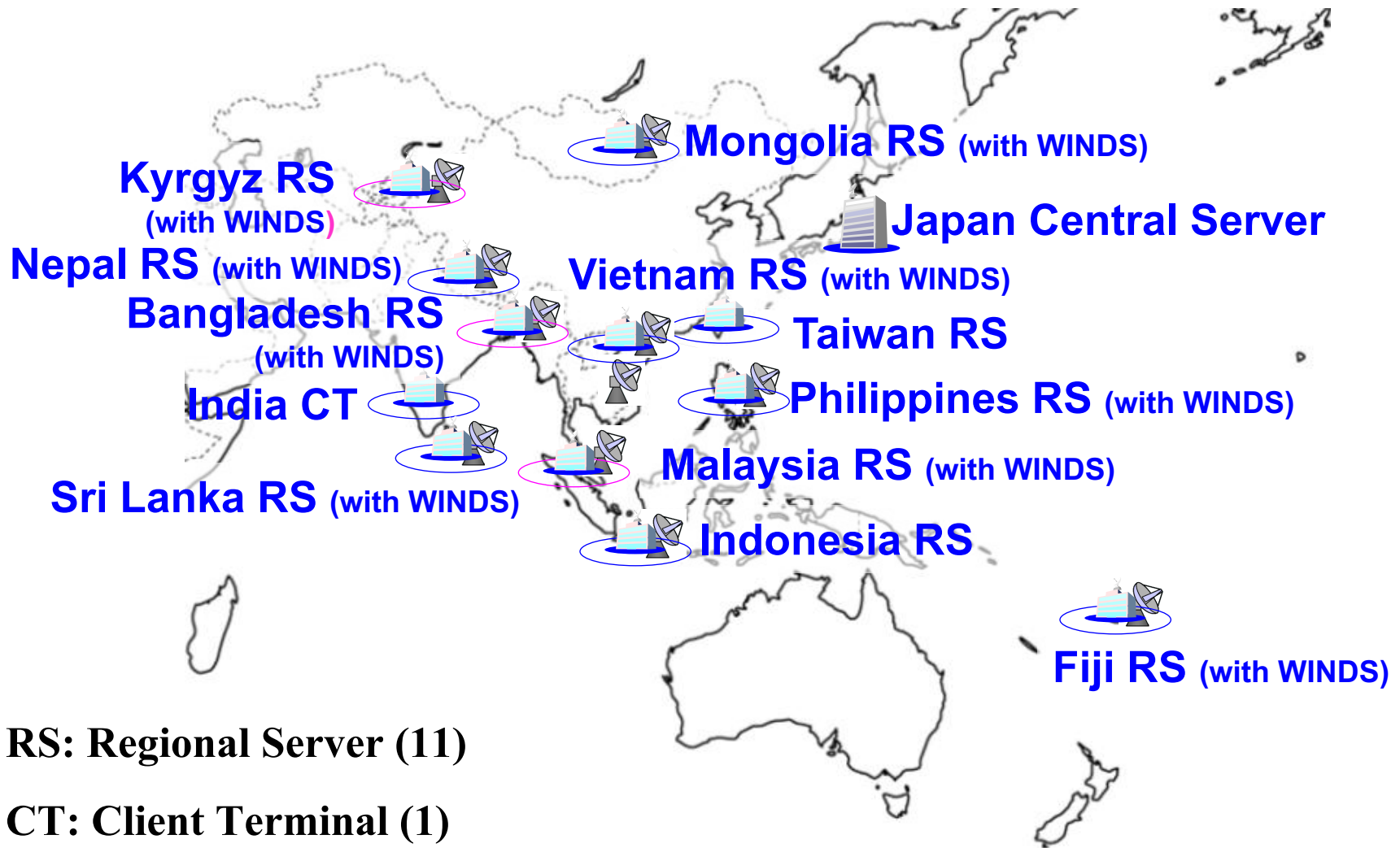
SA System was installed for sharing the information of disaster management in Asia-Pacific region. The controlled data by Central Server are transferred to each Regional Server so that RS can get the same data. It is necessary that data are physically near the user, to increase the data accessibility in the SA Step2 system.



# Data Transfer Way in Sentinel Asia System



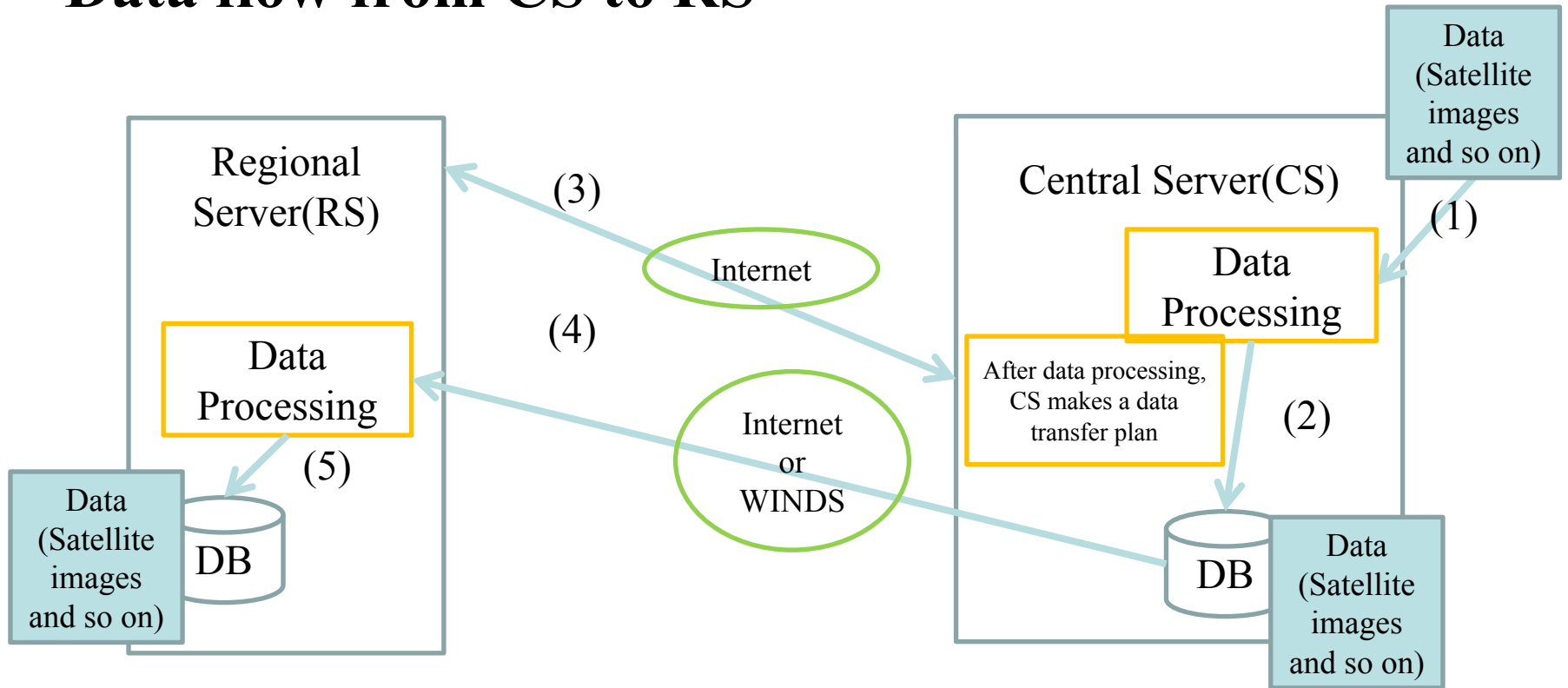
## Current location of Regional Server/WINDS



# Data Transfer Flow in Sentinel Asia System

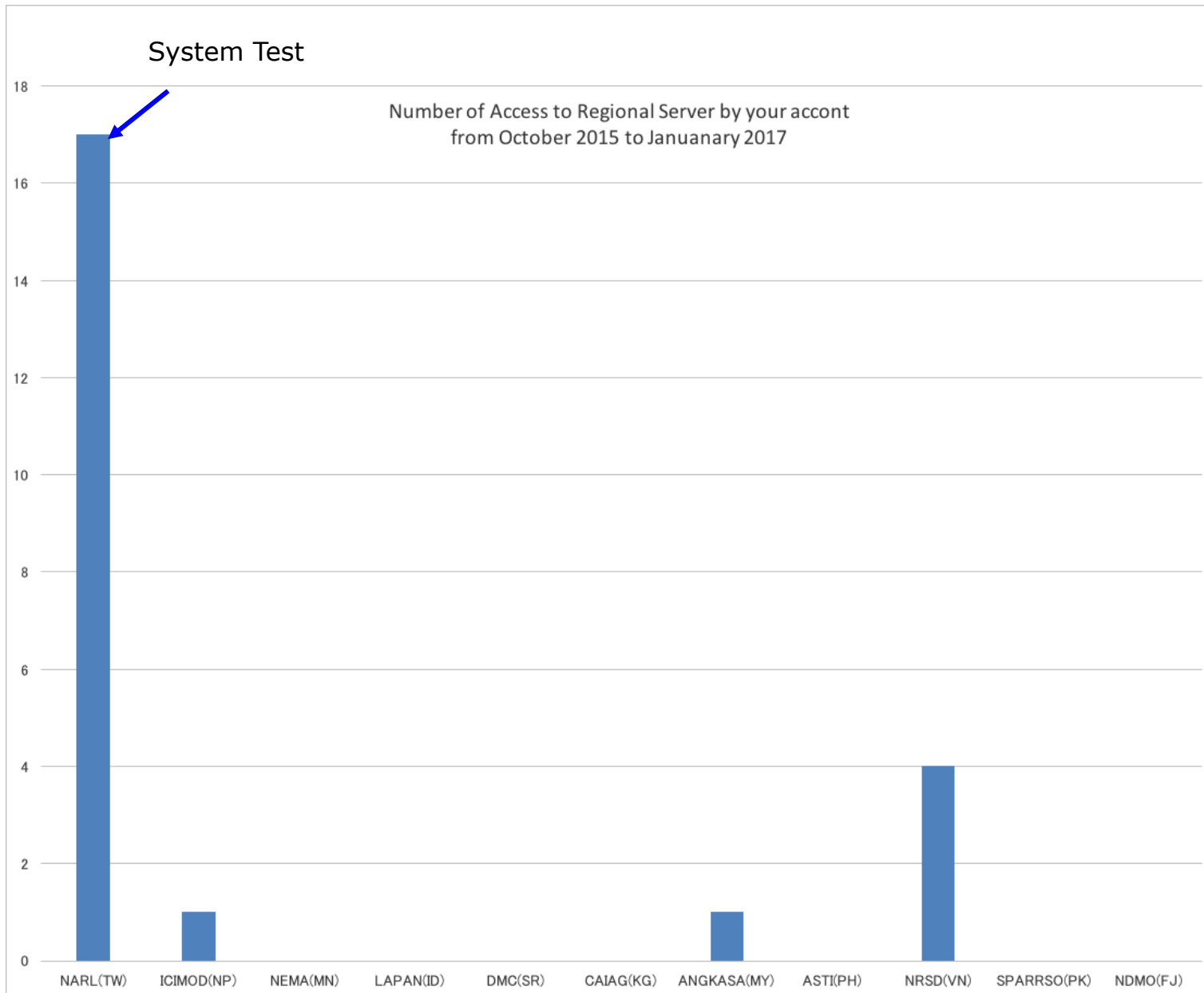


## Data flow from CS to RS

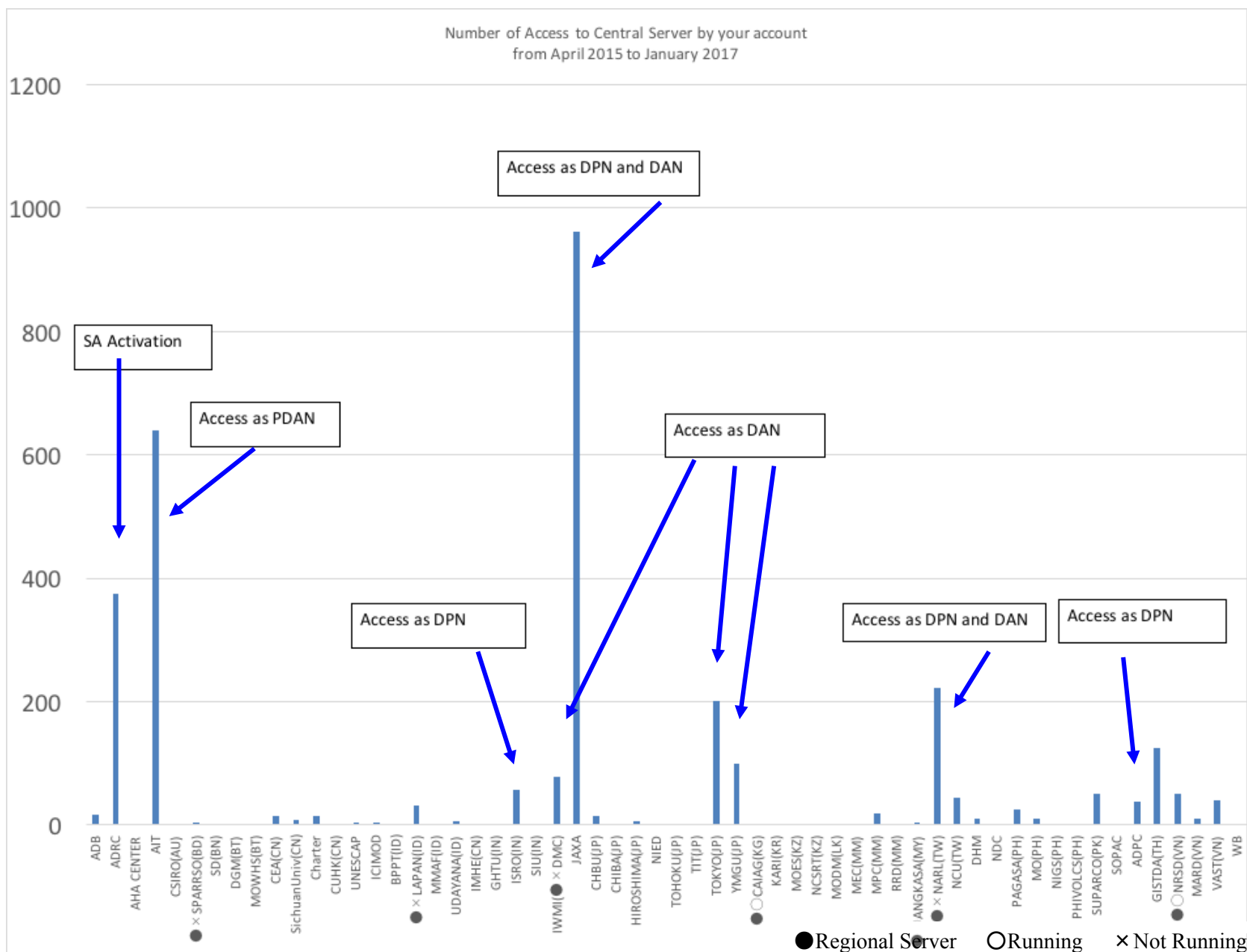


- (1) Upload Satellite Image.
- (2) Uploaded Satellite image is managed in CS's DB and transfer plan is scheduled.
- (3) RS asks CS a data transfer plan every 3 min.
- (4) CS transfers the data to RS via Internet or WINDS. (Internet is also used for a data control.)
- (5) Transferred data is managed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

# The number of access to Regional Server by users



# The number of access to Central Server by users



# Internet speed from central server to each regional server



Country	Organization	Internet Speed (Mbps)	Regional Server	WINDS Speed in usual operation (Mbps)	Transportation speed to regional server through cloud service (Mbps)
Thailand	GISTDA	-	N/A	Terminated	TEST not yet.
Philippines	ASTI	24.0	Running	6.5	60
Taiwan	NARL	12.0	Stopping	-	90
Mongolia	NEMA/NRSC	1.0	Running	6.5	TEST not yet.
Indonesia	LAPAN	0.3	Stopping	Terminated	TEST not yet.
Vietnam	NRSC	8.1	Running	6.5	27
Sri Lanka	DMC	0.4	Running	6.5 (Stopping)	1.4
	IWMI (DAN)	8.0	-	-	TEST not yet.
Nepal	ICIMOD	2.2	Running	6.5	TEST not yet.
Bangladesh	SPARRSO	3.0	Stopping	6.5	TEST not yet.
Fiji	NDMO/SOPAC	-	Stopping	6.5 (Stopping)	TEST not yet.
Kyrgyzstan	CAIAG	4.2	Running	6.5	7.5
Malaysia	ANGKAS	1.6	Running	6.5	2.2

## Issue

The orbit control of WINDS has stopped since May in 2016. An additional equipment for continuous communication is needed.

An unauthorized access was detected on one of the regional servers on May 2016. This requires us to update security system to solve the problem for continuous operation.

The SA step3 system requires a function to handle a large size of data observed by future satellites.

**Data provision service is needed to change.**

## Proposal

A cloud server is one of the candidates. It is available to provide the data to users with high speed.

(The letter, "Termination of the operation of the regional servers and the utilization of WINDS satellite", was sent to relating agencies.)



# Emergency Observation Flow

## International Disaster Charter

### Requesting Organization (RO)

ADRC members  
JPT members

Disaster Occurrence



Emergency Observation Request, Disaster Info  
Communication on status of disaster, observation, etc.



ADRC

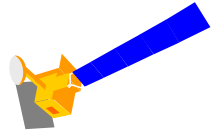
Escalation of Emergency Observation Request



Analyzed Products

Emergency Observation Request

Data Provider Node (DPN)



Feedback

Disaster Info  
Satellite Images & Disaster Info

Disaster Info



Sentinel Asia Step 2 System

<http://sentinel.tksc.jaxa.jp/>

Archive Images  
Images by Emergency Observation

Analyzable Data

Data Analysis Node (DAN)



Own Data

Support

Support

Disaster Management Agencies in Asia



JAXA (JPT Secretariat)



# Emergency Observation Flow

## International Disaster Charter

### Requesting Organization (RO)

ADRC members  
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Emergency Observation Request, Disaster Info

Communication on status of disaster, observation, etc.

Feedback

Disaster Info

Satellite Images & Disaster Info

### ADRC



### New Sentinel Asia Cloud System

- Semi automatically making a plan of emergency observation request
- Quick analysis of satellite imagery
- Transport the data to DANs.
- Provide the data and VAPs to users
- Archives of previous data

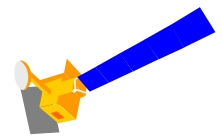


Escalation of Emergency Observation Request

Analyzed Products

Emergency Observation Request

### Data Provider Node (DPN)



Analyzable Data

Archive Images  
Images by Emergency Observation

### Data Analysis Node (DAN)



Own Data

Support

JAXA (JPT Secretariat)



Support

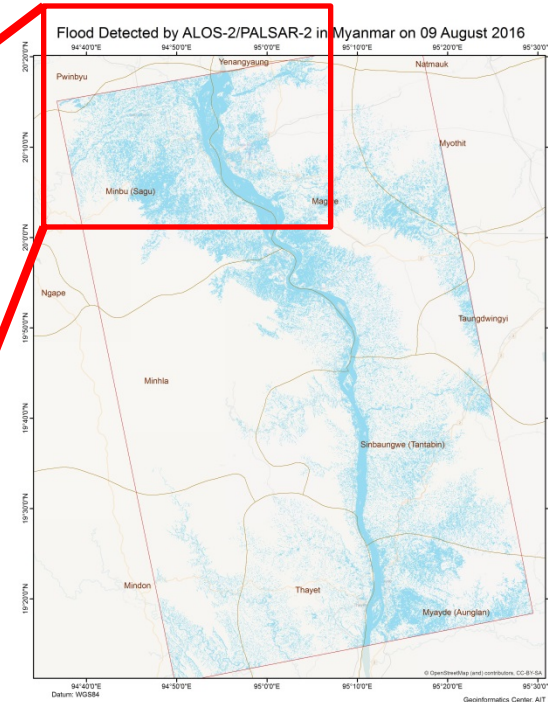
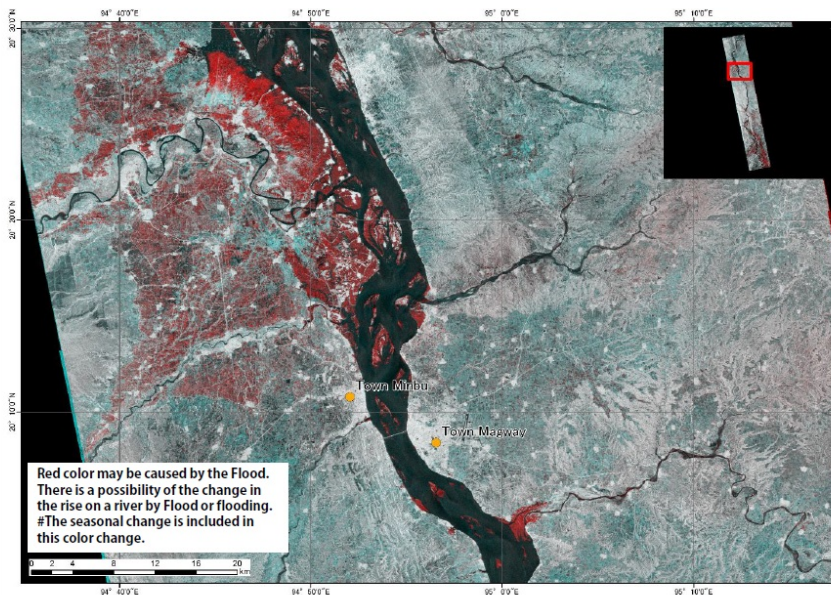
Disaster Management Agencies in Asia



# Quick Analysis of ALOS-2 Data

JAXA is able to produce the quick analysis data ( water standing, land slide) of ALOS-2 on the same day of observation day. It can automatically detect the affected area. This is still experimental attempt, but in the near future JAXA will be able to deliver the quick analysis data to the emergency observation requesters on the same day of observation.

R:G:B = 2016/7/12 : 2016/8/9 : 2016/8/9



Legend

- MMR\_ADMIN
- Flood water

Data source: ALOS © JAXA  
File name: 2016\_08\_09\_02  
Pixel image: 2016\_08\_09  
Map scale: 1:400,000  
Note: The map is not validated.

Description  
Myanmar has caused by floods in Monsoon rains along the Chindwin river and Ayyayawady river in Sagaing, Mandalay, Magway and Ayyayawady regions.

Quick Analysis Data

Flood in Myanmar last July

# SNS Services...

# Twitter account: @Sentinel\_Asia

ホーム モーメント

キーワード検索

アカウントをお持ちの場合 ログイン



ツイート 9  
フォロー 2  
フォロワー 20

フォローする

## Sentinel Asia

@Sentinel\_Asia

[sentinel.tksc.jaxa.jp](https://sentinel.tksc.jaxa.jp)

2016年12月に登録

画像/動画



ツイート ツイートと返信 メディア

Sentinel Asia @Sentinel\_Asia · 2月23日  
Satellite observation images for flood in Indonesia are posted on the Sentinel Asia website: [sentinel.tksc.jaxa.jp/sentinel2/thum...](https://sentinel.tksc.jaxa.jp/sentinel2/thum...)

Sentinel Asia @Sentinel\_Asia · 2月22日  
Sentinel Asia Emergency Observation was requested for the landslide in Bali, Indonesia.



### Indonesia disaster agency says 12 killed in Bali landslides

Twelve people including young children were killed in landslides on the tourist island of Bali that wiped out several homes, Indonesia's disaster ...  
[washingtonpost.com](https://www.washingtonpost.com)

## Twitterを使ってみよう

登録してあなただけのタイムラインを作りましょう

アカウント作成

## 世界中のトレンド

- #TheBachelor 61,725件のツイート
- União da Ilha 7,494件のツイート
- #WhenWeRise 20,536件のツイート
- 당신의 흉장 1,788件のツイート
- #LHHReunion 28,870件のツイート
- #VoicePremiere 34,298件のツイート
- #culturaverdadera 3,247件のツイート
- Liverpool 260,377件のツイート
- São Clemente 1,715件のツイート

- 1) **The orbit control of WINDS has stopped since May in 2016. And, an unauthorized access was detected on one of the regional servers on May 2016. They require us to update security system to solve the problem for continuous operation.**

**Therefore, we decided the termination of the operation of the regional servers and the utilization of WINDS satellite. The current data transfer service to the regional servers will be terminated in 2017.**

**JAXA continues to run the Central server until the new system starts. Users or DANs can download the data from the central server after the termination of the regional servers .**

- 2) **We would like to shift to the discussion on development of new system suitable for the SA Step 3. The system requires a function to handle a large size of data observed for future satellites (including ALOS-2, Advanced Optical Satellite, Advanced Rader Satellite, etc.) or and analyze the data automatically.**



# Data Transfer Way in Sentinel Asia System

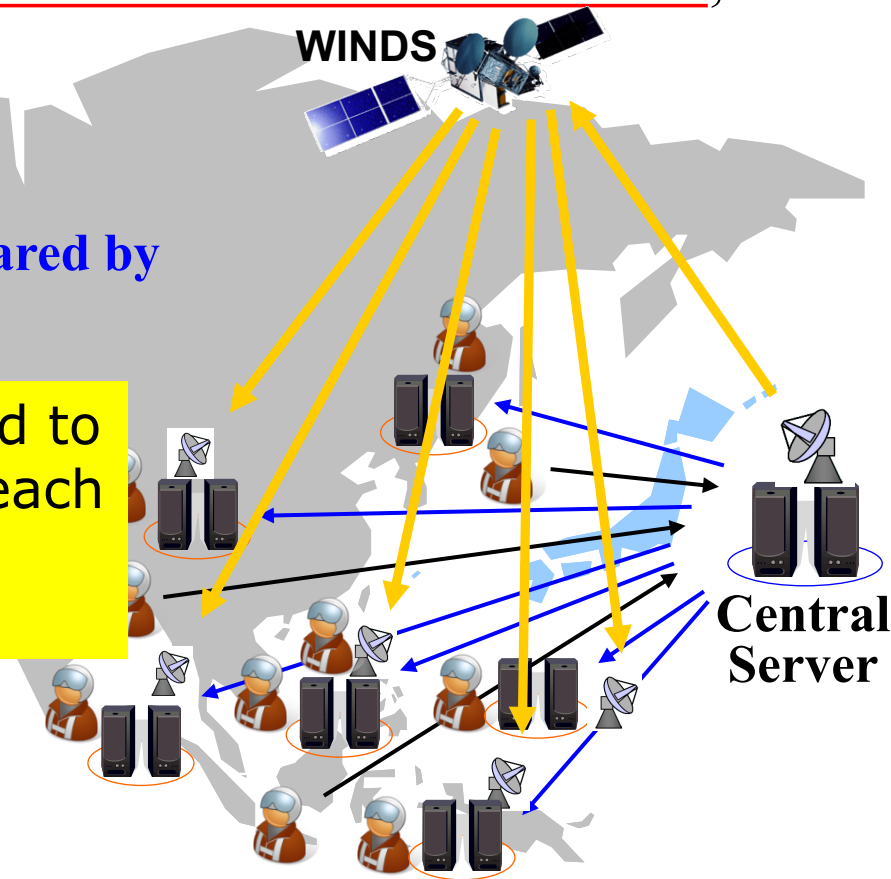
## Utilization of WINDS

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.



## 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.

