



**The 2<sup>nd</sup> Joint Project Team Meeting  
for Sentinel Asia STEP 3 (JPTM2014)  
19<sup>th</sup>-21<sup>th</sup> November, 2014, Yangon, Myanmar**

**Lao PDR Country Report**  
**The Success Story Using the Space Data**  
**and the Issues of Recovery Phase**

**Virany SENGTHANTH**  
**Remote Sensing Center (RSC)**  
**Natural Resources and Environment Institute (NREI)**  
**Ministry of Natural Resources and Environment (MoNRE)**

# Outline



Ketsana tropical storm-Flooded  
30 September 2009, Attapu



Tropical storm Nock-Ten brings  
more flooding , 2011.

1. Introduce to RSC;
2. Vision;
3. Organization Chart;
4. The success story of Sentinel Asia & others activities of RSC;
5. Expected /Discussion and
6. Future work plan of RSC 2014-2020.

# Introduce to RSC

- ▣ **Remote Sensing Center (RSC), Natural Resources and Environment Institute (NREI), under the Ministry of Natural Resources and Environment (MONRE).**
- ▣ **One of the main duties of RSC is to be the main coordinator and manager of the Natural Resources, Environment and Natural Disaster Research using RS and GIS at the national level.**

# Introduce to RSC

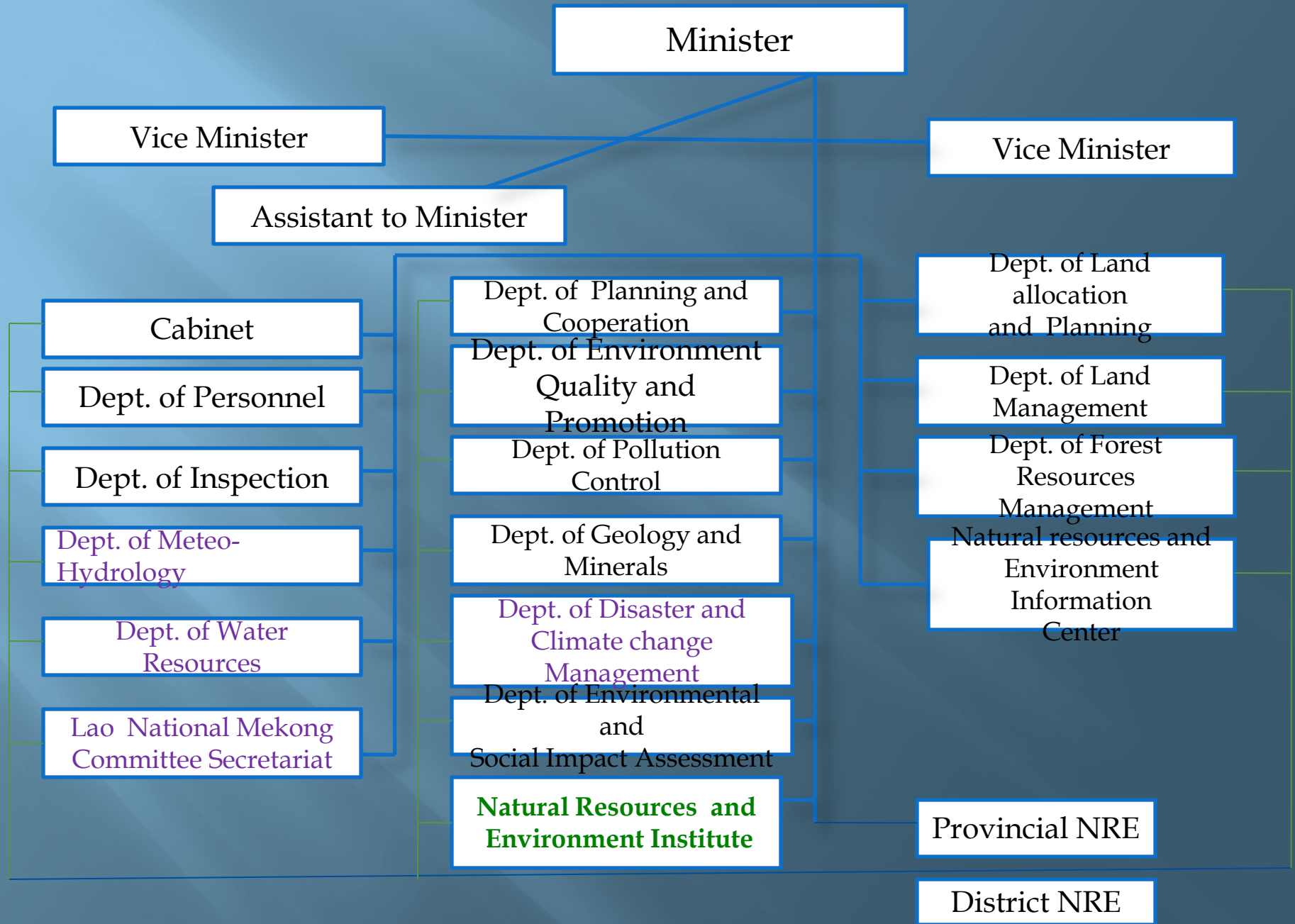
- ▣ It is coordinating with other relevant institutions such as Ministry of Science and Technology, the Department of Meteorology and Hydrology on warning in Lao PDR, Department of Disaster and Climate Change for the policies on Disaster and Climate Change, LNMC, Ministry of Agriculture and Forest on the forest policy and We are also responsible to the National Committee Members on GIS between National Geographic Department and line agency in Lao PDR.



# Vision

**To be a center of the national focal point on the applications of Remote Sensing and GIS in natural resources and environment as well as natural disaster research.**

# Organization Chart of MONRE



# Type of disaster in Laos

## ■ Natural Disaster:

- **Flood** ( river flood and flash flood)
- **Drought**
- Local Storm ,
- Hail
- Tropical Cyclone, Southwest Monsoon,
- Landslide
- Earthquake

## ❖ Man-made

- UXO
- Fire

**The main hazards in Lao PDR are flood and drought Both are dependent on the amount of rainfall.**

## Disaster from Food and Drought Period 15 years ago

No	Year	Types of Damage	Damage Cost ( US\$ )	Place of Damage
1	1999	Flood	7.450.000	Central
2	2000	Flood	12.500.000	Central and Southern
3	2001	<i>Flash flood</i>	8.000.000	Central and Southern
4	2002	<i>Large flood ,Flash flood and land- slight</i>	24.454.546	Northern, Central and Southern
5	2003	Drought	16.500.000	Northern and Central
6	2004	Flood	20.750.000	Southern
7	2005	<i>Flash flood and land- slight</i>	218.304.000	Central and Southern
8	2006	<i>Flood and Strong Wind</i>	3.207.968	Northern, Central and Southern
9	2007	<i>Flood and Drought</i>	997.960	Central
10	2008	<i>Large flood</i>	485.902.186	Northern and Central hern
11	2009	Flash flood		Southern part
12	2011	Flood		Northern and southern
13	2013	Large flood		Southern part



# Main Activities: What we have done?

- Emergency observation in case of major disasters;
- ALOS accepts observation request to JAXA/ADRC and AIT
- Wildfire monitoring by MODIS: Technology transfer from GIC/AIT
- Flood monitoring:
- Research/Training/Mini-project for utilization of satellite image for environment monitoring and disaster monitoring.

# Success story of Sentinel Asia in Laos

## Emergency Request:

1. The observation request User Name (UN) and Password (PW), by Sentinel Asia website and submit EOR completed form as well as request to the ADRC/JAXA;
2. Sharing information between line agency and research node such as AIT, JAXA, ADRC, etc;
3. Report to the Water Ministry of Natural Resources and Environment-MoNRE.

# Sentinel Asia/ Flood Monitoring

1. RSC, NREI, MoNRE Responsible for the National Working Group of the flood information in Lao PDR
2. Data sharing between line government agency and international organization
3. Monitor and Access the area of flood/real time/before / after





# Flooding Vientiane

11-15 August



11-15 Aug, 2008

Lat: 17° 53' 51" Long: 102° 36' 47.83"

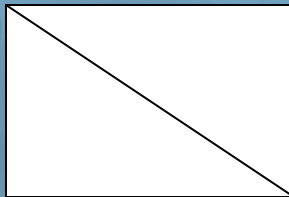


Nov 14, 2008, Bo-O, Vientiane

# SA Emergency Request Form

Lat: 18° 24"

Long: 103° 40"




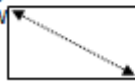
Lat: 18° 23"

Long: 103° 42"

## Flood in Saravanh Province, Lao PDR, 2013.

The heavy rain in Saravan province during 18-24 September, 2013 caused flood in to three district such as Vapi district, Khongsedone district and Saravan district around Xedone basin area.

About 187 villages and 10,683 household affected by flooded. (Vientiane May newspaper dated 06 November 2013)

SENTINEL ASIA EMERGENCY REQUEST FORM	
Call ID (To be filled by ADRC):	
Date and time of the call	
Date (dd/mm/yyyy, UTC)	
Time (UTC)	
Local time zone	
Name of the organization and caller	
Name	
Organization	Ministry of Natural Resources and Environment <input type="checkbox"/> ADRC member <input checked="" type="checkbox"/> JPT member
Phone	
Cellular Phone	
Fax	
E-mail	
Emergency type	
<input type="checkbox"/> Flood	<input type="checkbox"/> Landslide <input type="checkbox"/> Storm <input type="checkbox"/> Fires
<input type="checkbox"/> Volcano	<input type="checkbox"/> Earthquake <input type="checkbox"/> Ice hazard <input type="checkbox"/> Industrial danger
<input type="checkbox"/> Other :	
Approximate date and time of occurrence	
Date (dd/mm/yyyy, UTC)	
Time (UTC)	
Local time zone	
Area details	
Area Name / Country	
Coordinates of center point	
<input type="checkbox"/> Circular zone	 Latitude : ° ' " N/S Longitude : ° ' " E/W Radius : km
Coordinates of corners	
<input type="checkbox"/> Rectangular zone	Lat. : ° ' " N/S Lon. : ° ' " E/W  Lat. : ° ' " N/S Lon. : ° ' " E/W
Comments or special instructions	



# Flood Coordinate in Lao PDR, 2008

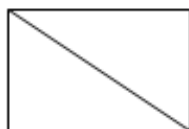
## Example

Flooded in Lao PDR August 11-15, 2008

### I. Bolikhamxay Province

#### 1. Pakxane district

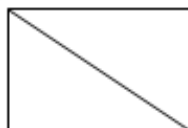
Lat: 18° 24"  
Long: 103° 40"



Lat: 18° 23"  
Long: 103° 42"

#### 2. Tha phabad

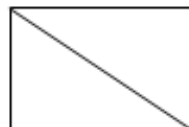
Lat: 18° 23 50  
Long: 103° 13 10



Lat: 18° 19 25"  
Long: 103° 15 00"

#### 3. Pakkading

Lat: 18° 20  
Long: 103° 59 10

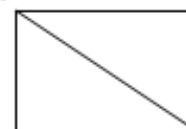


Lat: 18° 18 59"  
Long: 103° 59 40"

### II. Khammuan Province

#### 1. Hineboun district

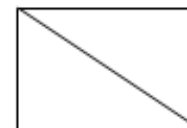
Lat: 17° 16 29"  
Long: 104° 35 10"



Lat: 17° 14 20"  
Long: 103° 37 30"

#### 2. Nhom malad district

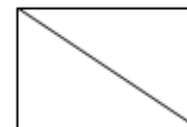
Lat: 17° 38 58"  
Long: 104° 55 30"



Lat: 17° 34 30"  
Long: 105° 00 00"

#### 3. Thakhek district

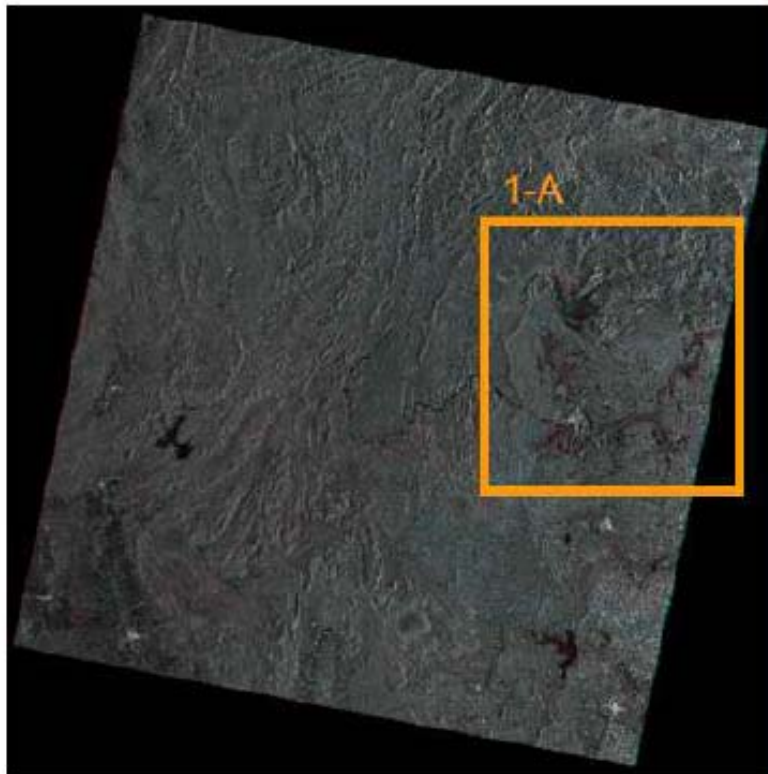
Lat: 17° 4 40"  
Long: 104° 47 59"



Lat: 17° 2 50"  
Long: 104° 49 10"

# Request Sentinel Asia in case emergency: Coordinate, Pictures, sharing data information...

## Flooded area detected from ALOS PALSAR ScanSAR

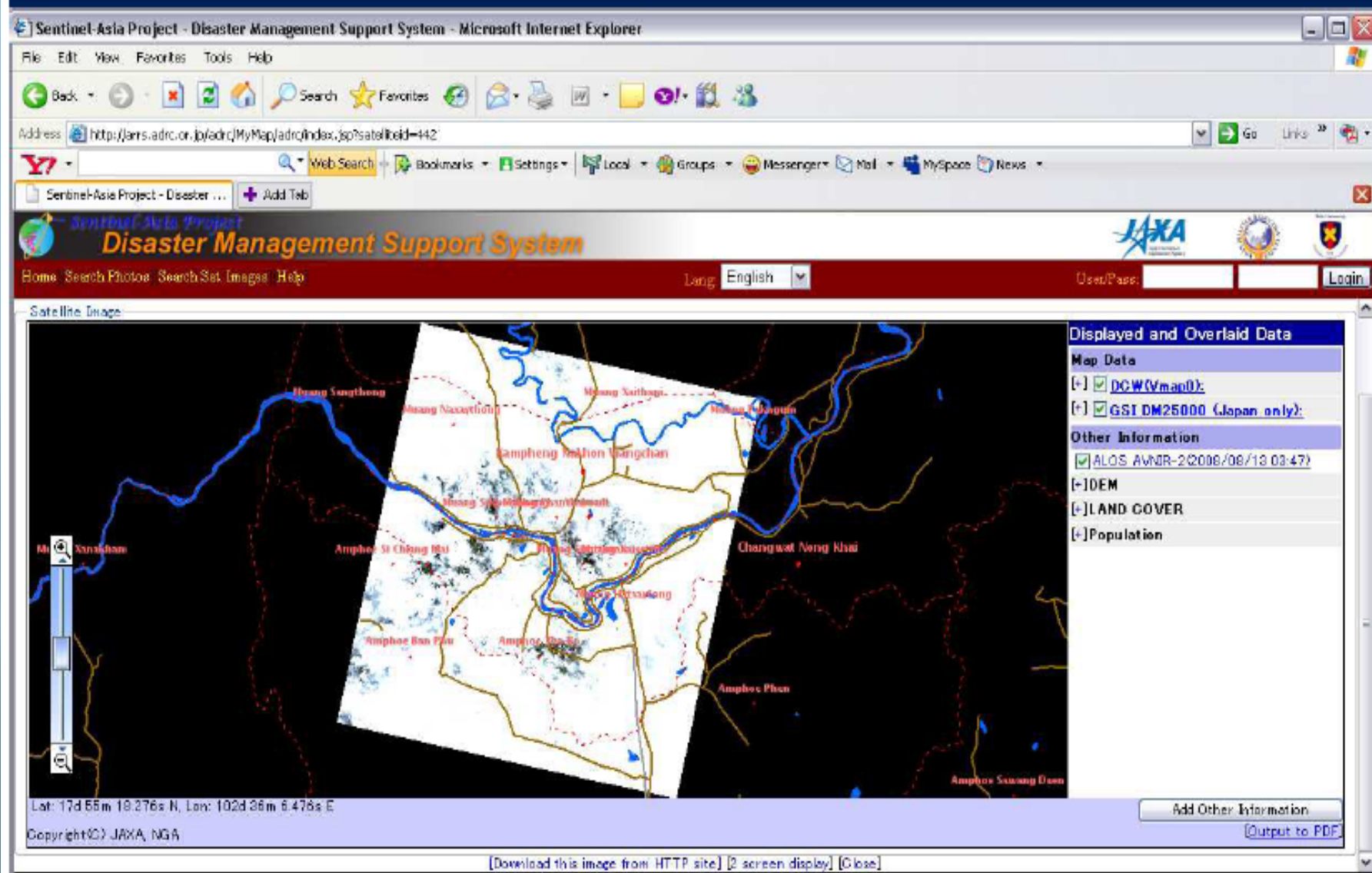


RGB color composite image of PALSAR ScanSAR  
R:G:B=2007/08/18:2008/08/20:2008/08/20  
(R:G:B=pre-post-post-disaster)



Enlarged view of area 1-A  
Flooded area can be estimated as red colored area.

## Access the Sentinel Asia through sharing data information





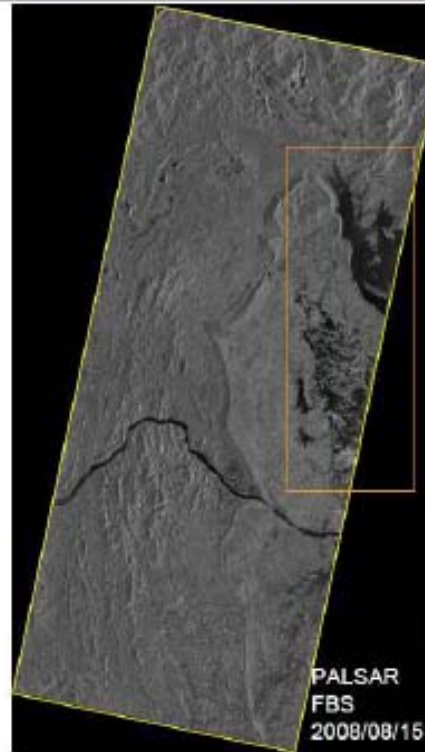
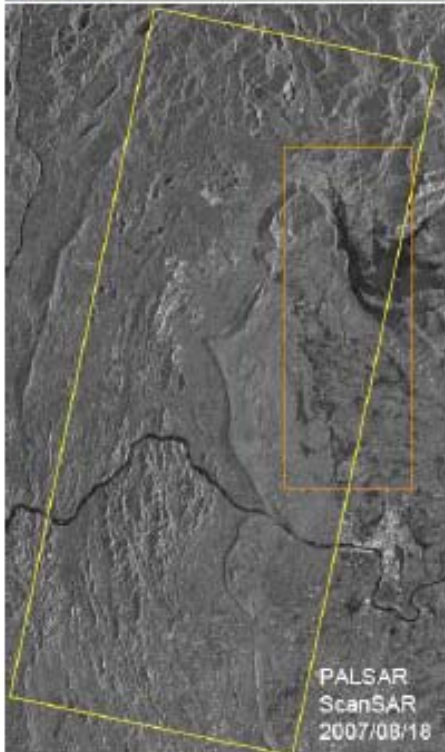
# RSC/JAXA/ADRC: Field survey on flood area in Vientiane Capital City and Vientiane Province



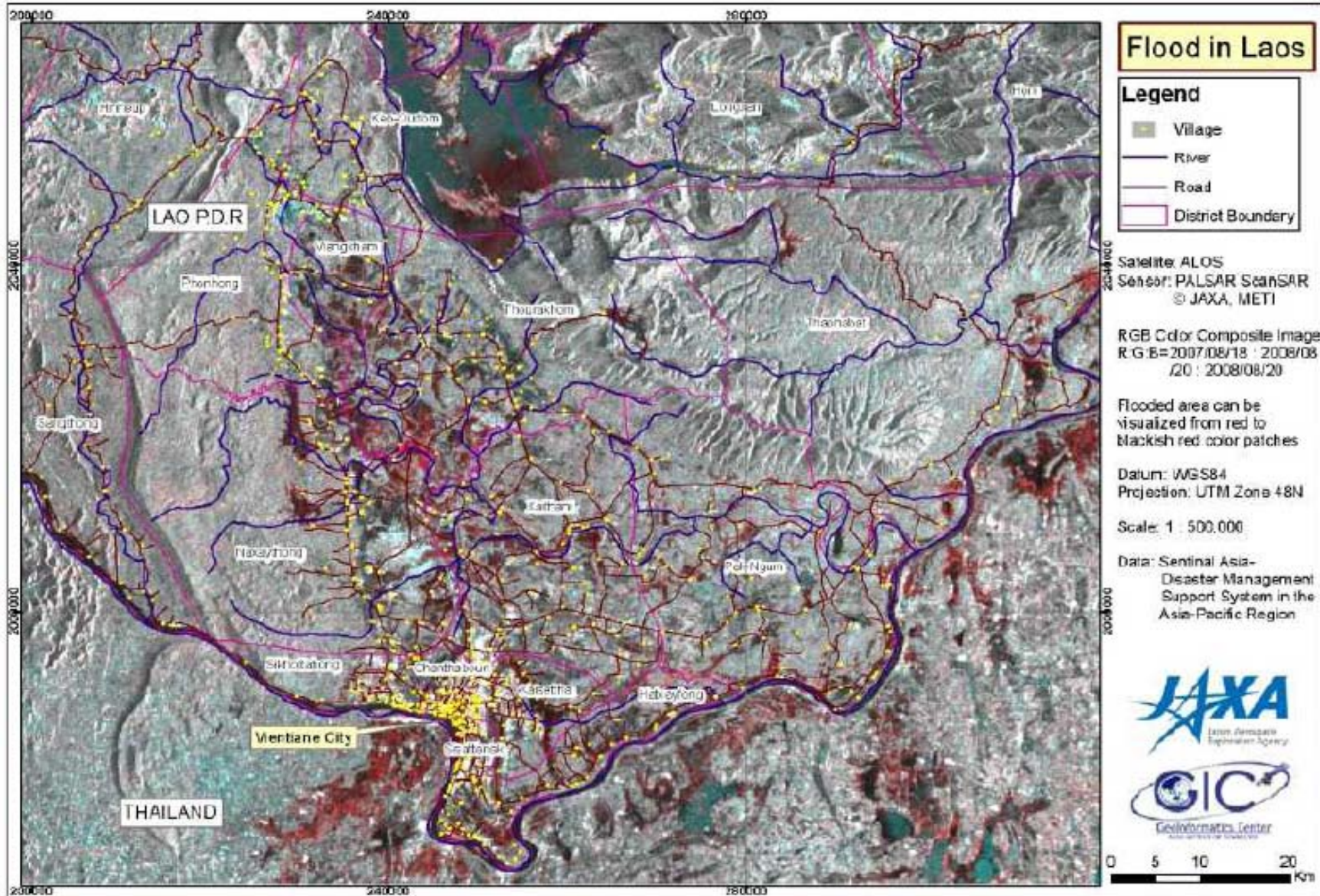
Nov 13, 2008



Field survey :  
ADRC/JAXA/RSC





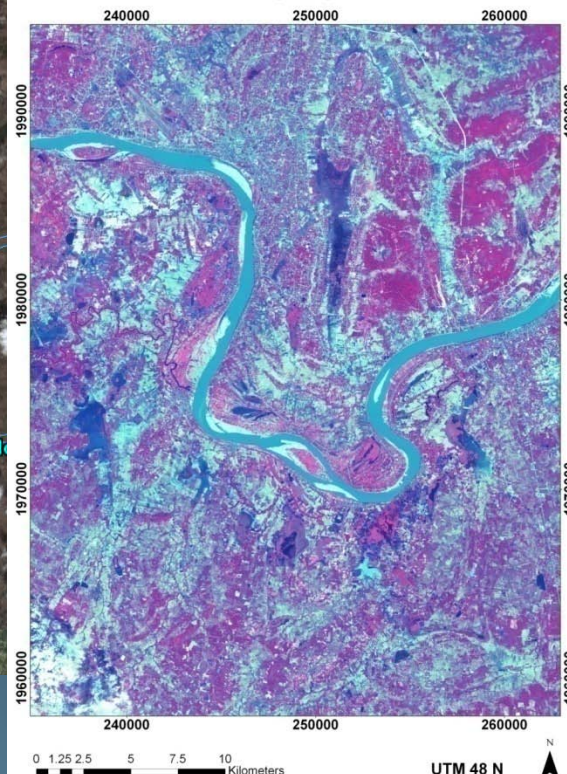




# •LAOS/GIC-AIT: FLOOD HAZARD MAPPING USING ALOS/PALSAR, 2009-2010



ALOS AVNIR2 (Dry Date, Dec 29, 2009)  
Parts of Haxaphone District, LaoPDR  
RGB:432



Hatsayphong  
District, Vientiane  
11-15 August 2008



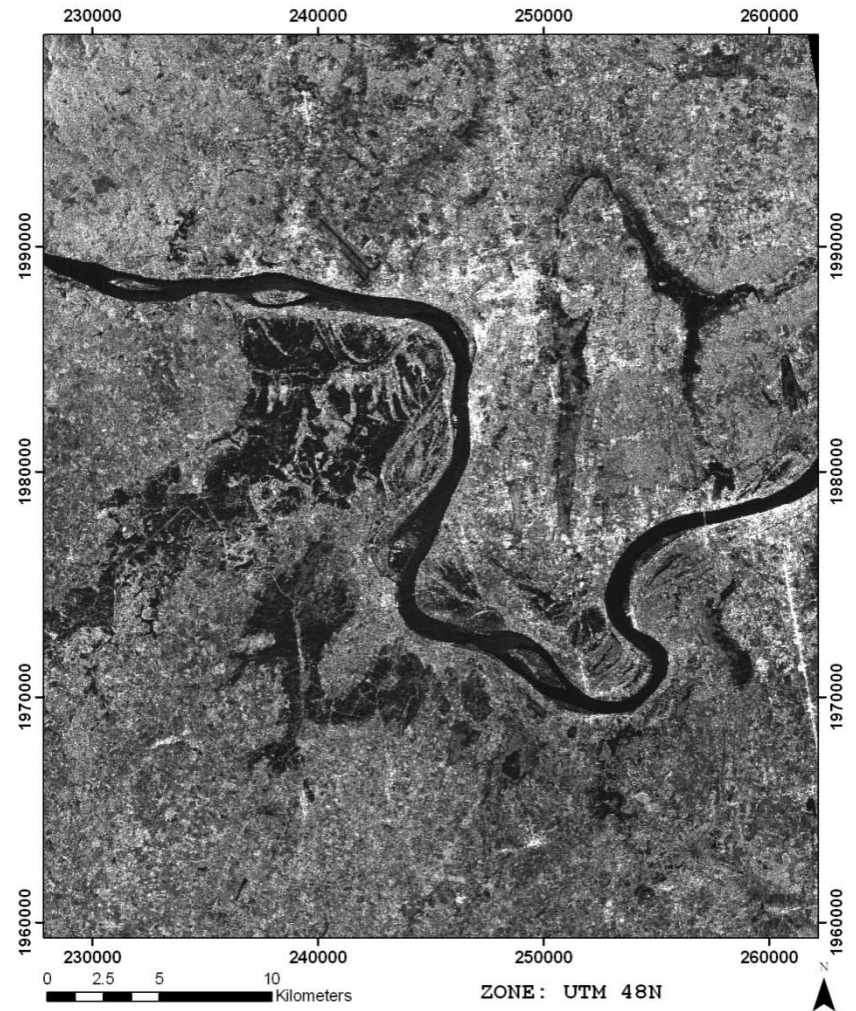


# Available satellite Images

**ALOS PALSAR (Wet Date, Sept 3, 2008)**  
**Parts of Hatsayphong District, Lao PDR**  
**Polarization: HH**



**ALOS PALSAR (Wet Date, Sept 3, 2008)**  
**Parts of Hatsayphong District, Lao PDR**  
**Polarization: HV**





# Field Survey on Ketsana Tropical Storm-Flooded in Attapu Province, Lao PDR , September 30, 2009.



City of Samakkheesay  
Attapu province



07 June 2010



# Flash Flood June 2011:Few days



**Flash Flood,  
Xiengkhouang Province  
26 June, 2011**



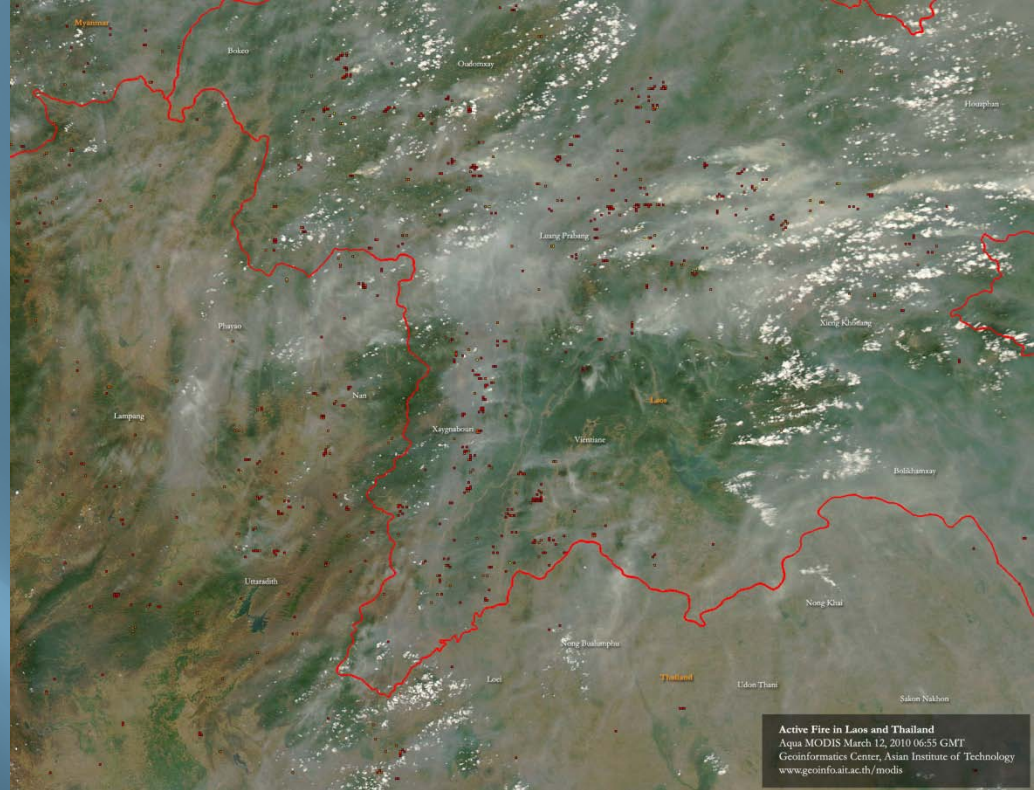
**Flash Flood,  
Xayabury Province  
26 June, 2011**



# Technical Transfer from GIC/AIT-RSC, 2009-2010

Overview of the MODIS Fire Information System for Laos

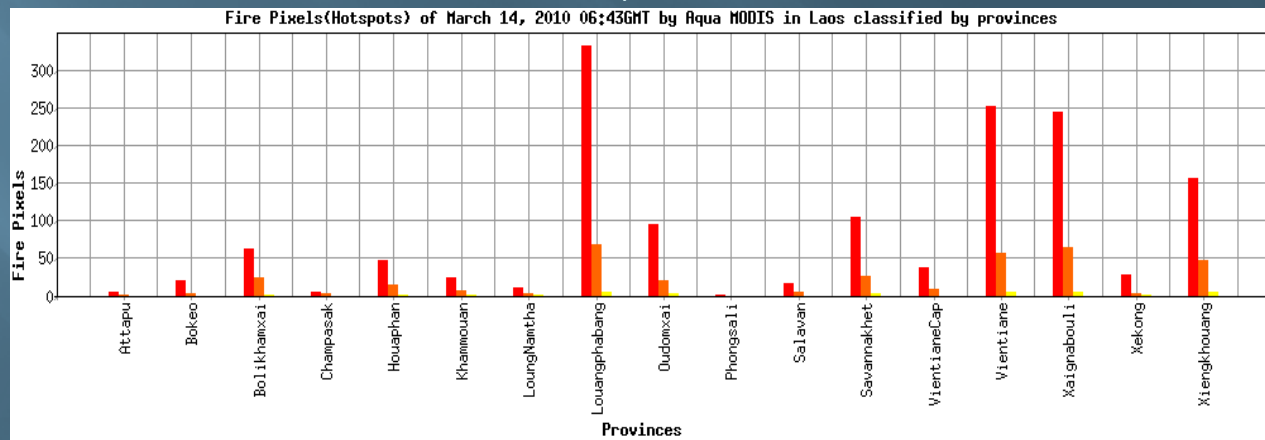
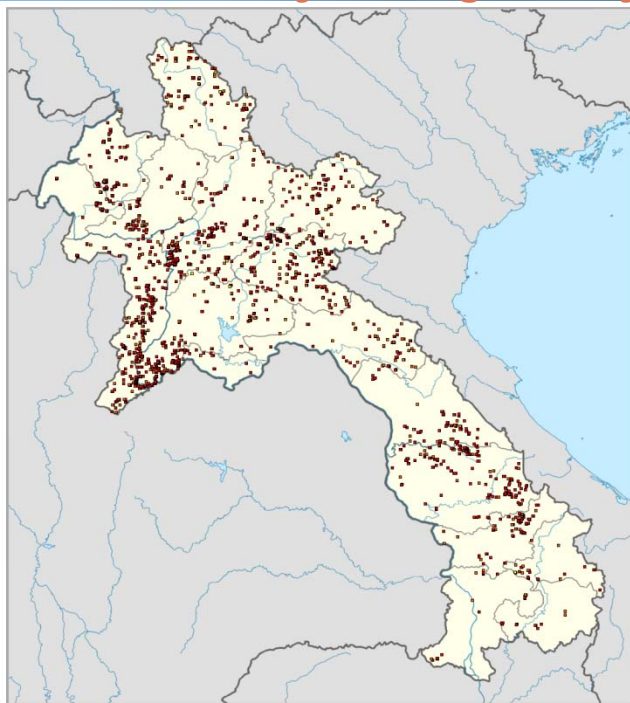
The AIT MODIS Fire Information System for Laos is a near real-time automatic system. The structure is very similar to the existing regional system. It consists of *Product Generation, Visualization, and Database and Statistical Analysis* systems. The system uses the output information, which generated and transferred by the regional system.



[http://www.geoinfo.ait.ac.th/mod14/index\\_lao0.php](http://www.geoinfo.ait.ac.th/mod14/index_lao0.php)

(Shut down now)

Wildfire Information, 14 March 2010





# Wildfire: Field survey and dissemination



Luangprabang, 23 Mrach, 2010



- AIT/RSC
- WERO
- Area-
- Village
- WREA,
- Minister
- Report
- Policy
- 



Discussion, 26 March 2010



Luangprabang, 23 Mrach, 2010



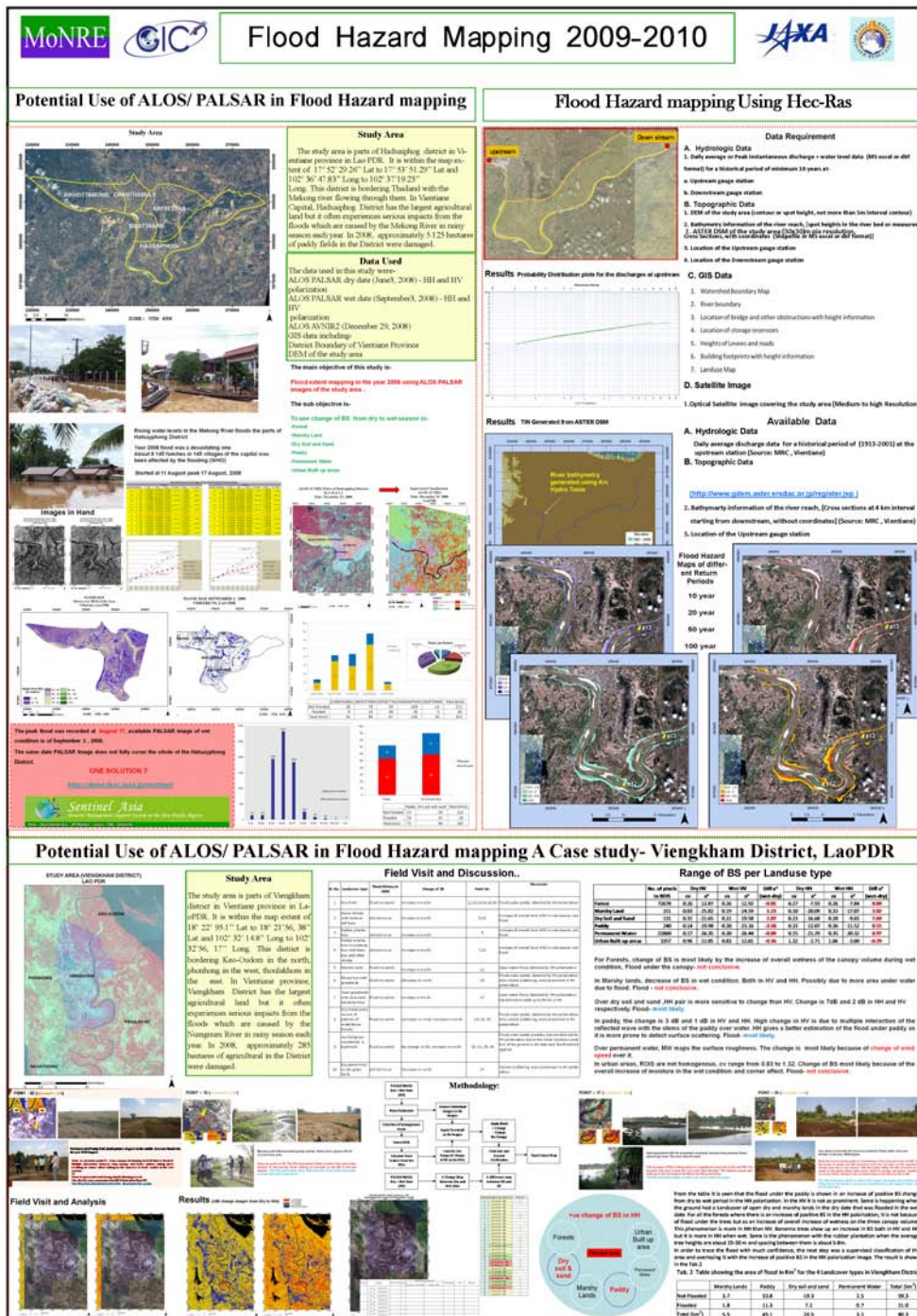
# **Sentinel Asia: Capacity Building**

**Lao PDR have successful Participated JAXA/Mini-Project/Research by following Topics :**

- 1. JAXA/AIT/Mini-project/Research on RS/GIS: Flood Risk Map Using RS&GIS Case Study of Champhone District, Savannakhet Province, Lao PDR, 2006-2007**
- 2. Flood Hazard Mapping using HEC-RAS, Remote Sensing and GIS, Case study of Se Champhone River in Savannakhet, Lao PDR. 2007-2008**
- 3. Flood Hazard Mapping of Nam Ngum River Lao PDR Using RS, GIS and HECRAS, 2008-2009 (M&H/NDMO);**
- 4. Flood Hazard mapping using ALOS/ PALSAR, Hatxayfong District in Vientiane Capital City, 2009-2010**
- 5. Drought Risk Mapping using Remote Sensing and GIS Case Study: Champhone District in Savannakhet Province, Lao PDR. 2010-2011.**

# Example

# JAXA/AIT/Mini-project/Research, Result, 2009-2010





# SENTINEL ASIA STEP 2



The 4th Sentinel Asia System Operation Training was held on 10-12 February 2009 in Vientiane

- Sponsor by JAXA
- Organized by RSC/WERI/WREA
- attended by 13 Asia Pacific countries including 6 ASEAN Member States namely Indonesia, Lao PDR, Malaysia, Philippines, Thailand and Viet Nam.



The 5th Sentinel Asia System Operation Training was held in Colombo, Sri Lanka in 22 – 26 February 2010.

The 6<sup>th</sup> SAS Operation Training was held in July, 2010, Bangkok, Thailand..

Lao PDR would like to participate the next SA training.

# Expectation and Discussion

1. There is limited of knowledge on RS , lack of satellite data information/real time disaster we need SA support Satellite image after disaster.
2. Lack of budget to go the field survey during real time disaster (Flood, drought and fire information);
3. Enhancement of National – provincial staff capacity building especially Remote Sensing and GIS for applying image processing to improve knowledge such as flood, drought, forest fire and land slide classification;.
4. Joint Project Research between SA Members/JAXA/ADRC/AIT: Flood, drought, wildfire monitoring and water and climate change by using satellite data;
5. Continue Participate next SA meeting;
6. RSC Will continue SA-STEP3/APRSAF.



# **RSC/NREI/MONRE: Future Work Plan 2014-2020**

## **On Natural Resources and Disaster Monitoring**

### **Using the space data.**

1. Emergency Request by using ER form;
2. Flood Risk Mapping of Lao PDR;
3. Drought Risk Mapping using Remote Sensing and GIS in Savannakhet Province, Lao PDR.
4. Research/Training/: (RS/GIS/GPS), on soil erosion in Saravan province and Luangnumtha province.
5. Land Cover and Land use map in Savannakhet , Champasack and Saravan Province.
6. Fire Monitoring in Lao PDR.
7. RSC, NREI, MoNRE would like to continue support Sentinel Asia STEP3 and promotion related to the utilization on space for disaster **reduction**.

A photograph of a flooded road in a rural area. The road is completely submerged in murky, brown water. On the left side of the road, there are several tall palm trees and other green vegetation. In the background, two utility poles with power lines are visible. The sky is overcast and grey. The text "Thank you very much For your kind attention !" is overlaid in the center of the image in a blue, sans-serif font with a white outline.

Thank you very much  
For your kind attention !