



Ministry of Natural resources and Environment  
**National Remote Sensing DEpartment**



**NATIONAL REMOTE SENSING DEPARTMENT (NRSD)  
AND THE COOPERATION WITH SENTINEL ASIA FOR  
DISASTER MANAGEMENT**

**By: Dr. Chu Hai Tung**

**Bangkok- 2013**

# CONTENTS



1. Brief introduction to the NRSD
2. VNREDSat-1 satellite
3. Cooperation with Sentinel Asia for Natural Disaster Management

# HISTORY DEVELOPMENT OF NRSD



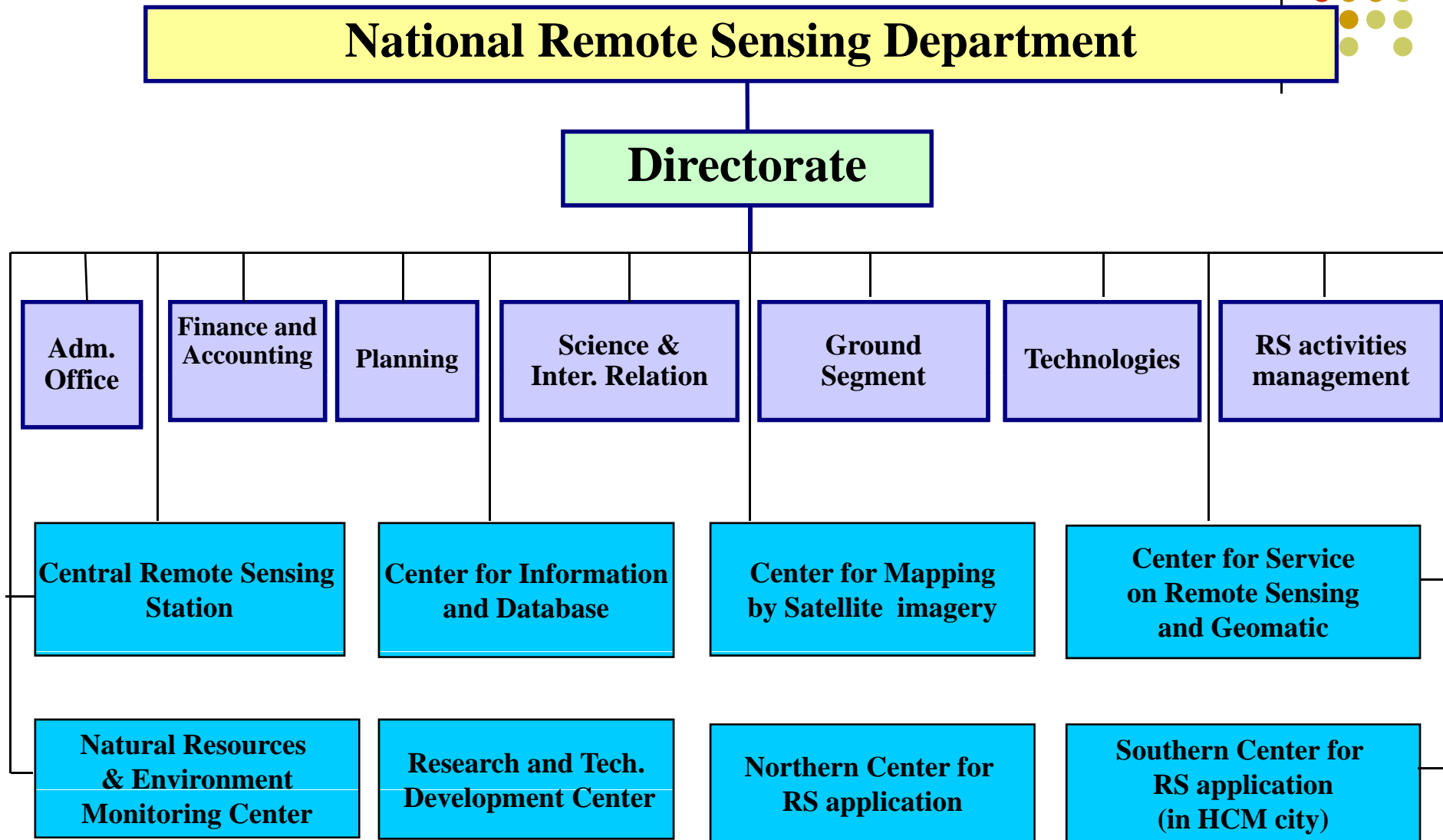
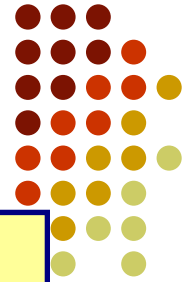
- 1980 – Remote Sensing Centre (RSC) belongs to State Department of Geodesy and Cartography;
- 1994 – RSC belonged to General Department Of Land Administration (GDLA);
- 2002 – RSC belonged to Ministry of Natural Resources and Environment (MONRE);
- 2008 – RSC was upgraded to National Remote Sensing Centre of Ministry of Natural Resources and Environment (NRSC).
- **From 1<sup>st</sup> August, 2013 it become a National Remote Sensing Department (NRSD) who is responsible for Governmental administration of Remote Sensing activities in Vietnam**

# Several main tasks and functions

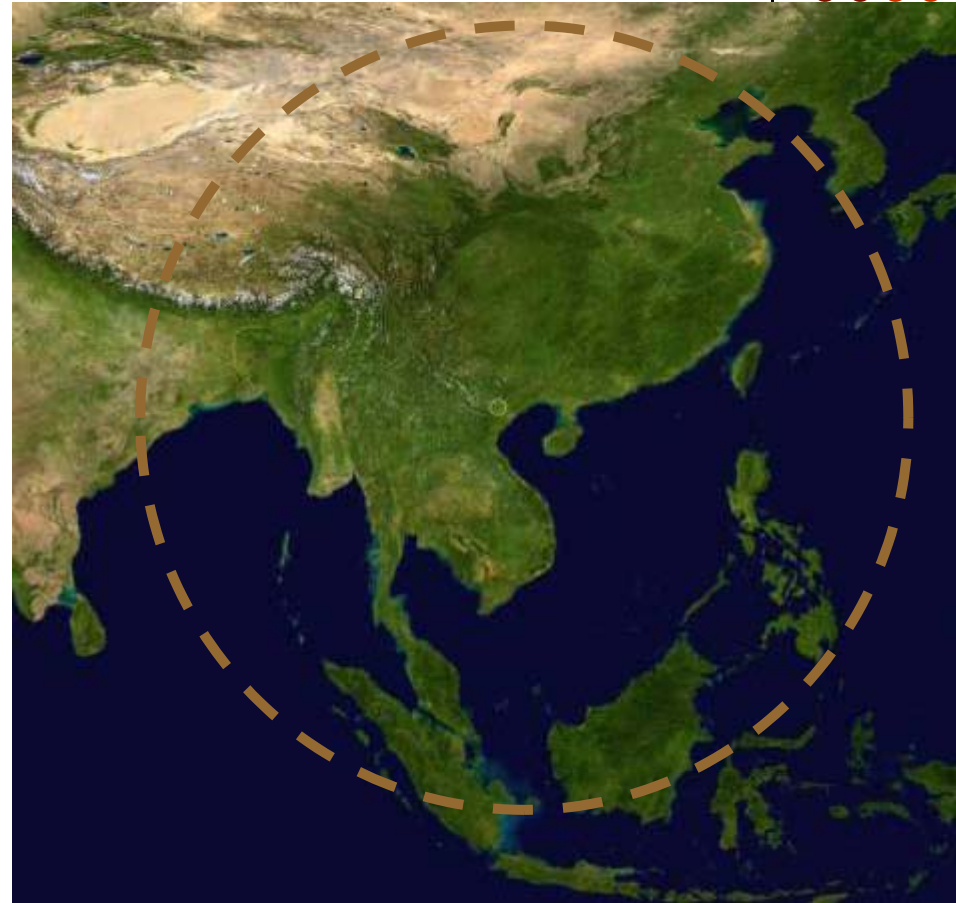


- Managing and planning for remote sensing ground station network; managing, developing and updating national remote sensing database and use & exploitation of the National remote sensing data;
- Monitoring, checking and promoting application of Remote sensing technologies in the whole country.
- Managing, developing, and exploitation of remote sensing infrastructure (equipments in satellites, ground stations, for archiving, processing and data transmission network).
- Surveying and monitoring based on Remote Sensing technologies to regularly report to the Minister on uses and exploitation of natural resources, environment pollution, climate change and natural disasters.
- Applying remote sensing and geomatic technologies for surveying, mapping; collecting, analyzing and processing spatial information data for governmental administrative purposes and social needs.
- .....

# Organization flowchart of NRSD

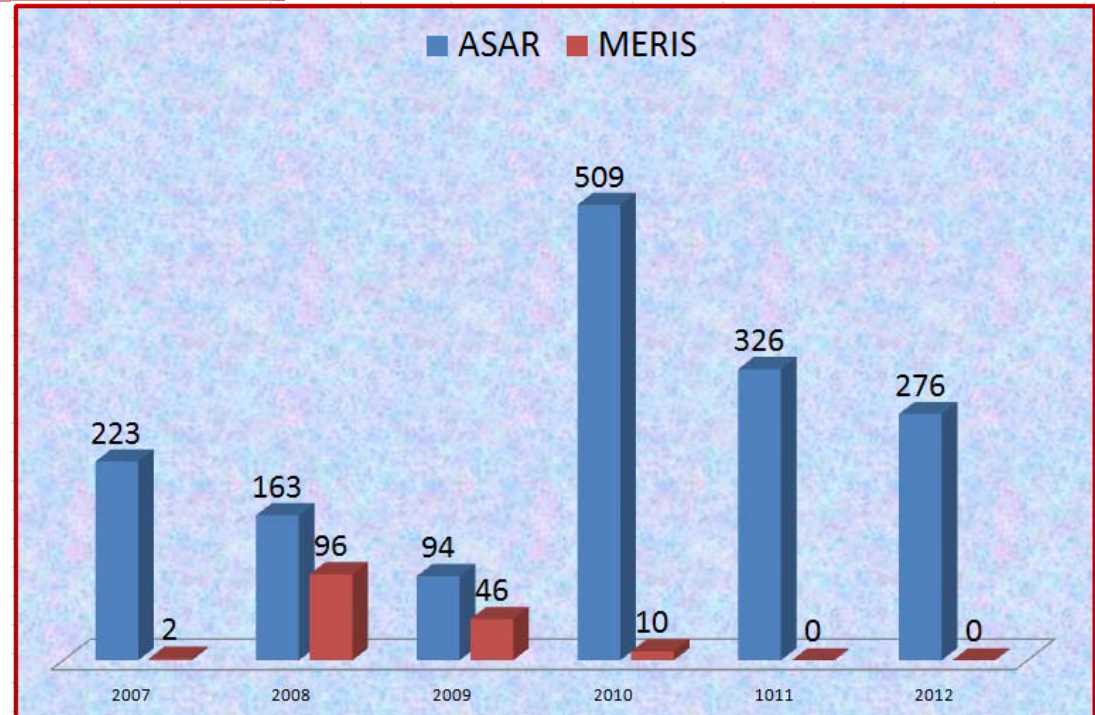
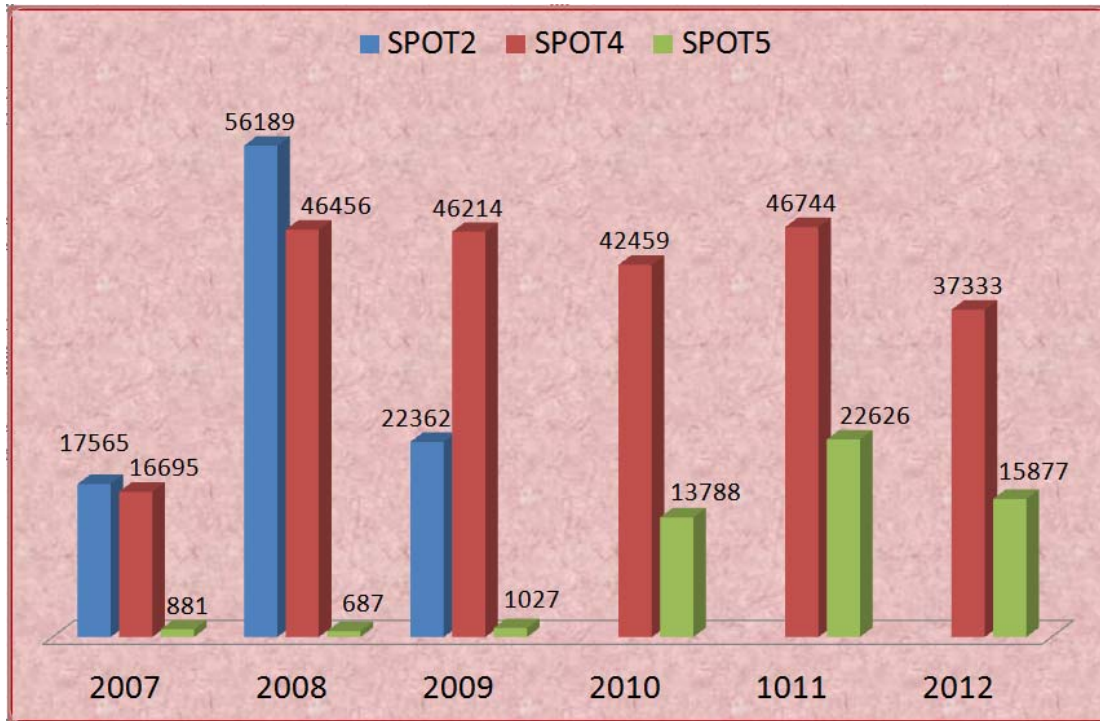


# Vietnam Ground Station (VNGS)

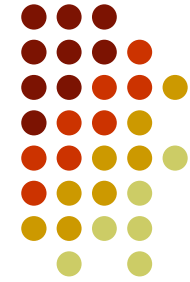


- Located at Hanoi
- In operation since 2007;
- Data received: SPOT2, SPOT4, SPOT5, ENVISAT /ASAR and ENVISAT/MERIS, **VNREDSat-1.**

# SATELITE IMAGE RECEPTION



# Capabilities



- Operating the VNGS for acquisition of SPOT 5 and VNREDSat-1 images;
- Producing various image products at different processing level.
- Updating map of multi-scales from 1:10 000 to 1:200 000;
- Applying Remote Sensing for land inventory;
- Applying Remote Sensing in forest inventory;
- Applying Remote Sensing for disaster mitigation including landslide, flooding, forest fires ...;
- Applying Remote sensing for environmental protection including coastal monitoring, oil-spill detection...;
- Thematic mapping based on Remote Sensing and GIS



# VNREDSat-1

(Vietnam Natural Resources, Environment and Disaster monitoring Satellite)



- The development of the VNREDSat-1 satellite is based on cooperation between Vietnam Academy of Science and Technology (VAST) as the project owner and the French EADS Astrium (Prime contractor).
- The Small Satellite Project Management Unit (belong to VAST) is responsible to implement the VNREDSat-1 project and operate the Satellite.
- The financial budget is from French ODA

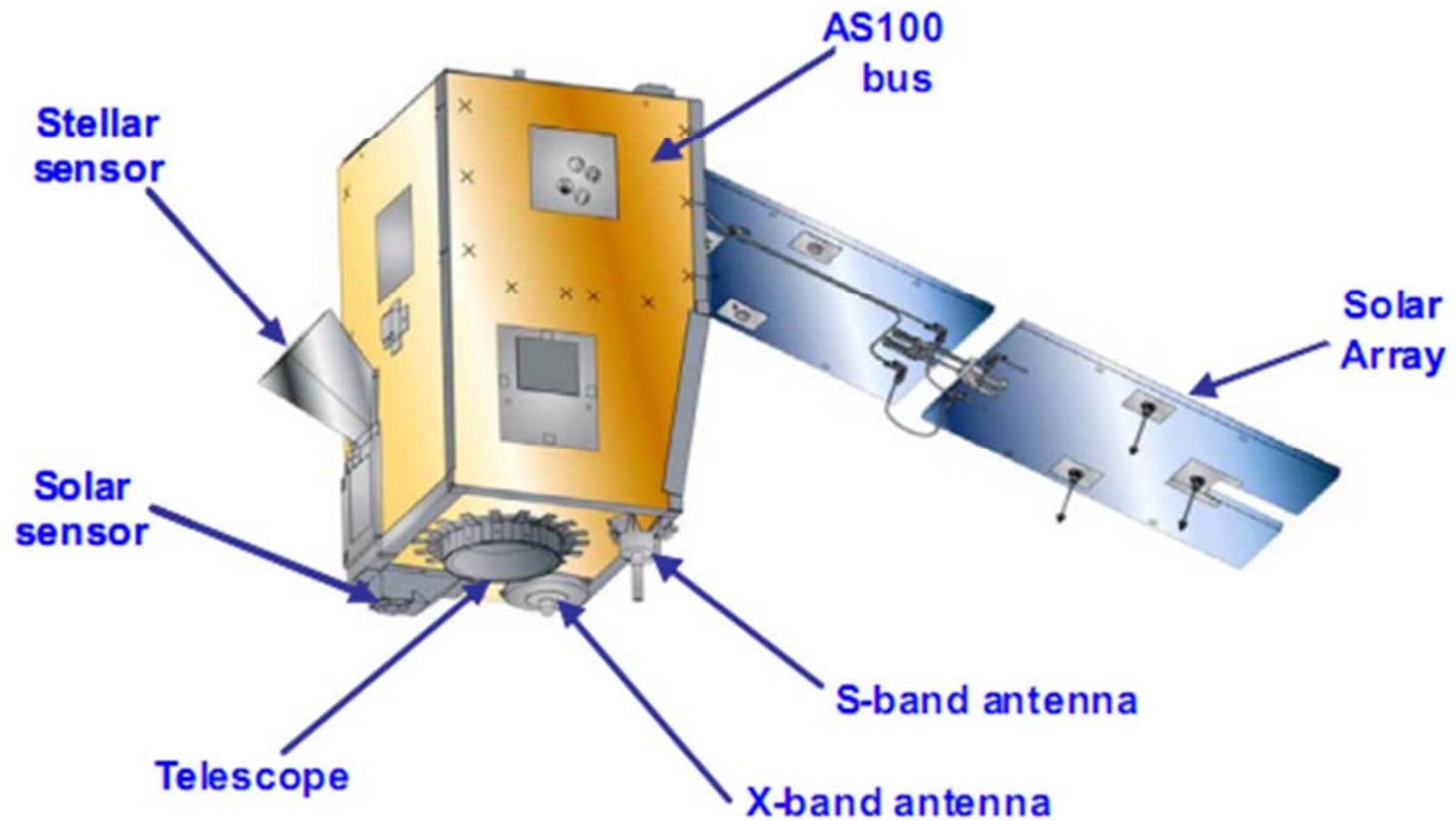
# VNREDSAT-1 satellite

## Technical specification



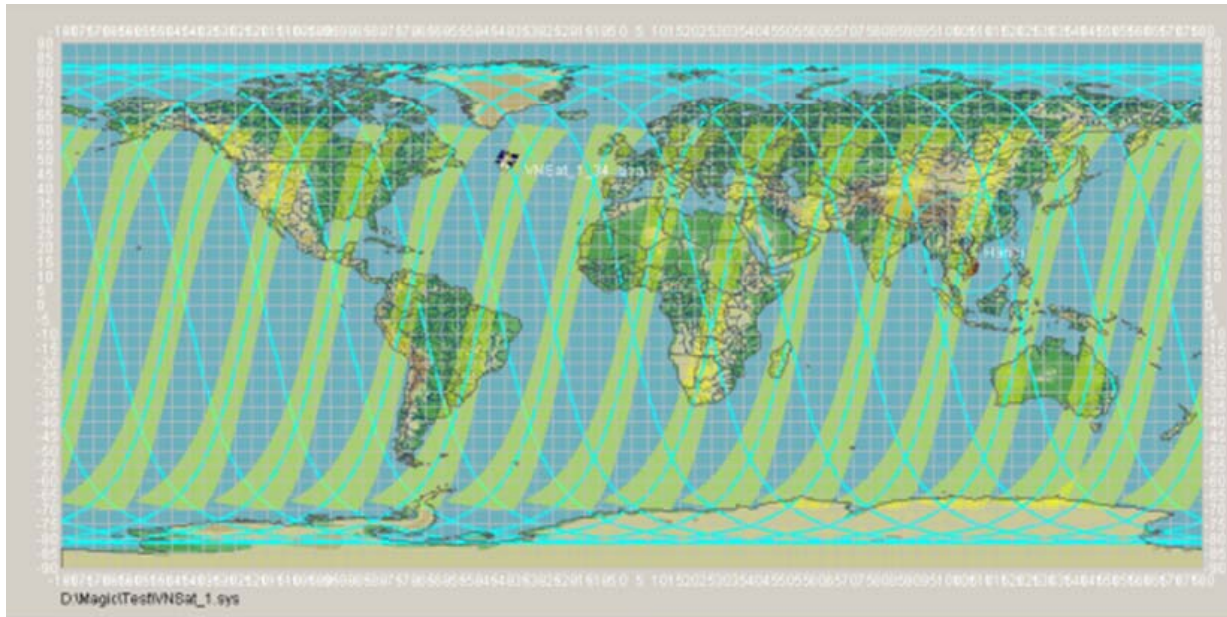
- The 1<sup>st</sup> optical earth-observation satellite of Vietnam
- Mission: Earth observation in PAN and 4 MS bands (Blue, Green, Red, near Infrared)
- Revisit time: **3 days**
- Orbit characteristics: **SSO, 680 km** altitude
- Local time of ascending node : **10:30 PM**
- Spatial resolution: **2.5m** (PAN) and **10m** (MS)
- Platform: **600 mm x 570 mm x 500 mm**
- Total mass: **~130kg**
- Life-time: **5 years (guaranteed)**

# VNREDSat-1 overview

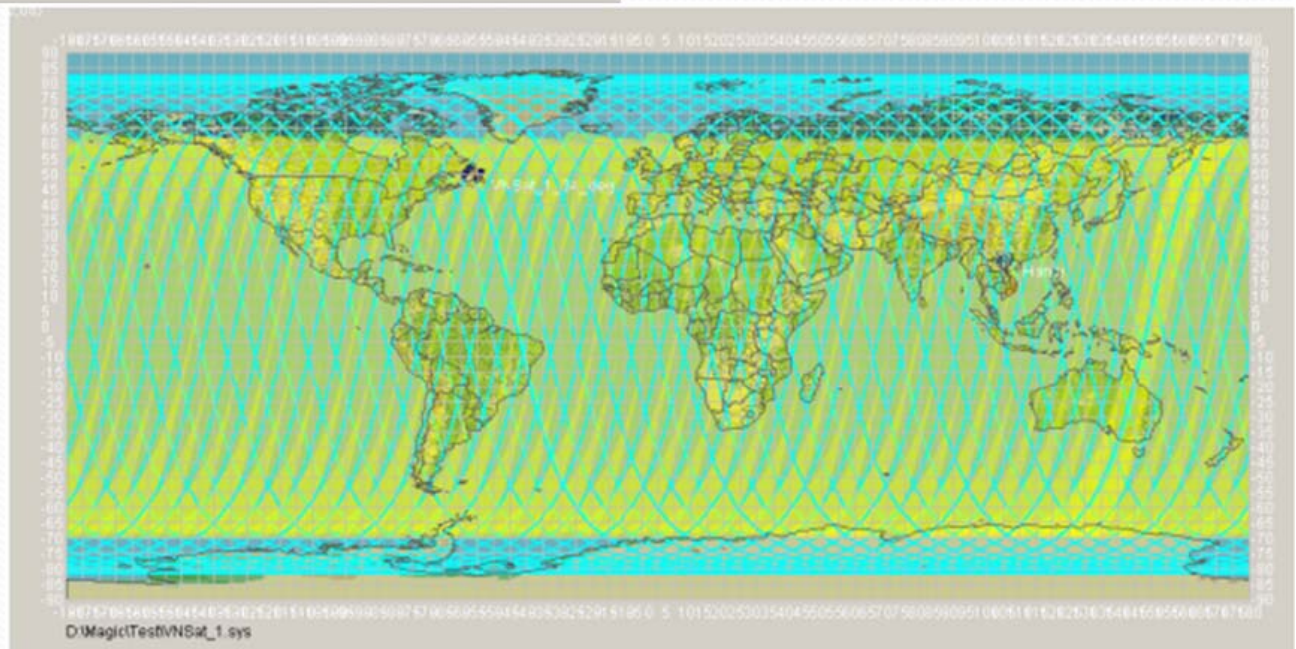




VNREDSat-1 access corridors over 1 day



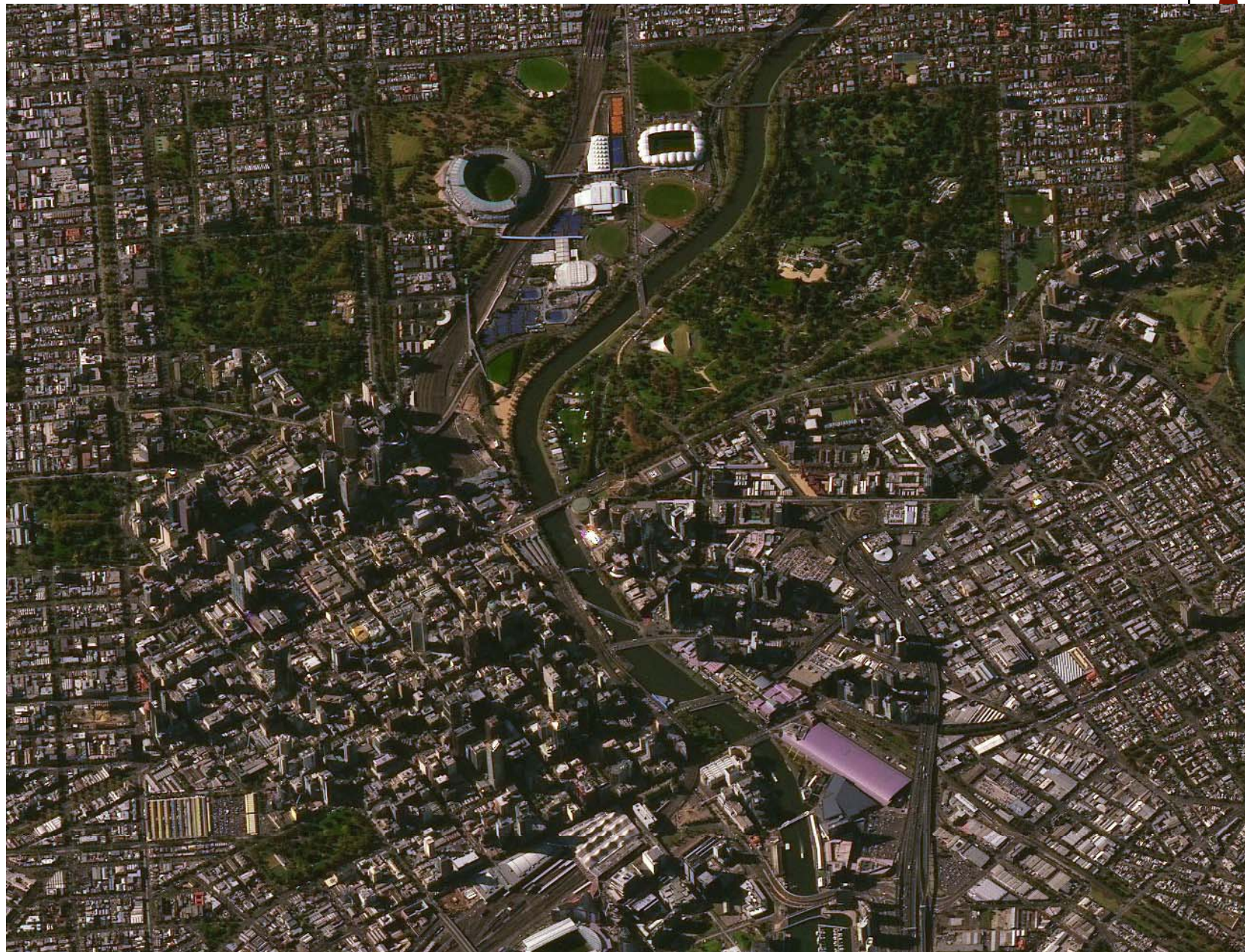
VNREDSat-1 access corridors over 3 day:  
Whole world coverage



# The first image taken from the VNREDSat-1 satellite over Hanoi area



# A VNREDSat-1 image over Melbourne, Australia



# Roles of VAST and MONRE in operating and exploiting the VNREDSat-1 system



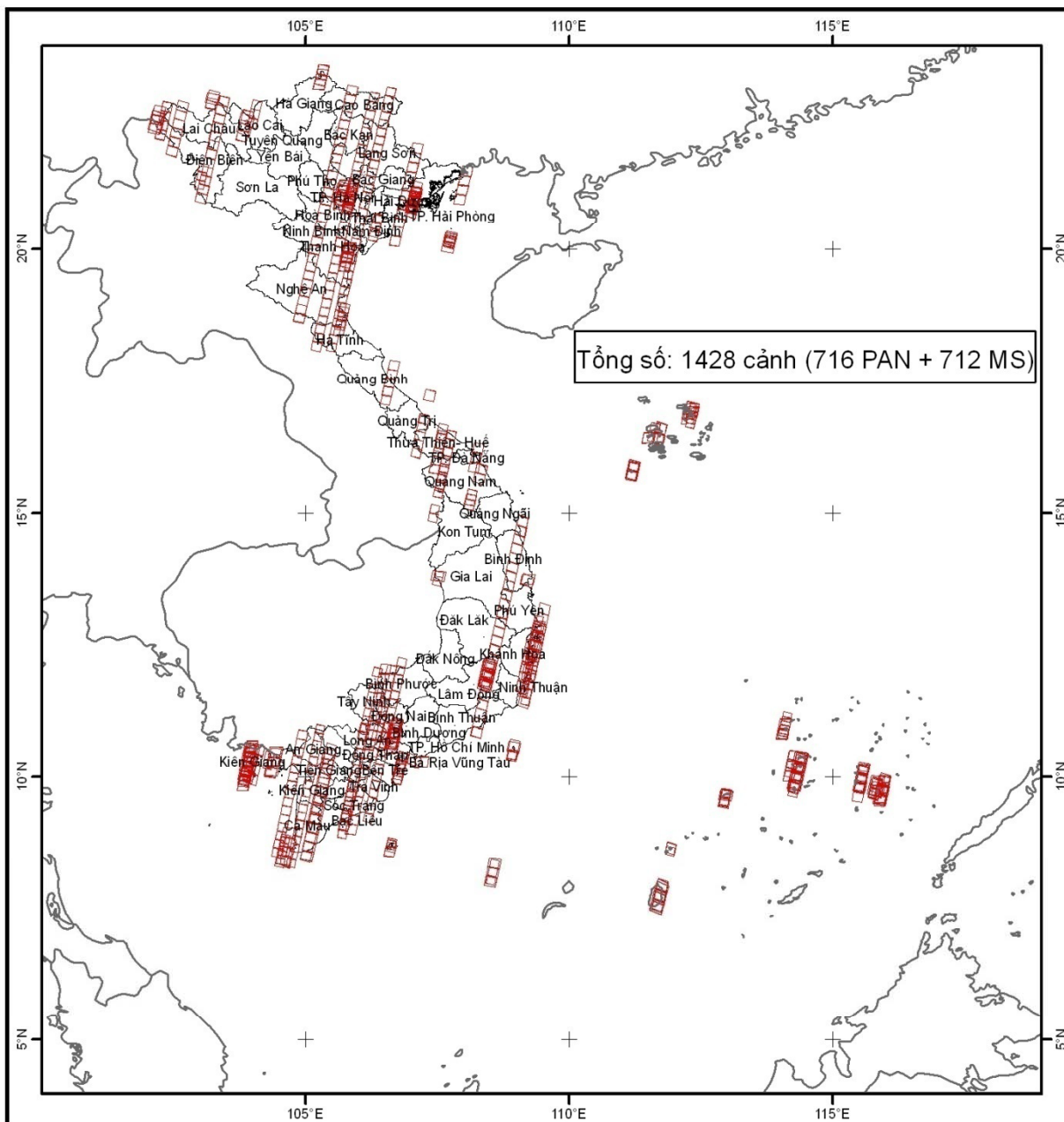
## VAST

- ❖ Operating the VNREDSat-1 satellite.
- ❖ Planning and acquiring satellite imagery based on the requirements (normal and emergency) and send them to VNGS station.

## MONRE

- Operating the VNGS to images taken by VNREDSat-1 satellite.
- Produce various image products and distribute to end users.
- Collecting order from the normal users and send it to VAST to plan image acquisitions.
- Generate National remote sensing Databases.

**SƠ ĐỒ ẢNH VỆ TINH VNREDSAT-1 TRONG VIỆT NAM**  
(từ ngày 09.05.2013 đến 03.10.2013)



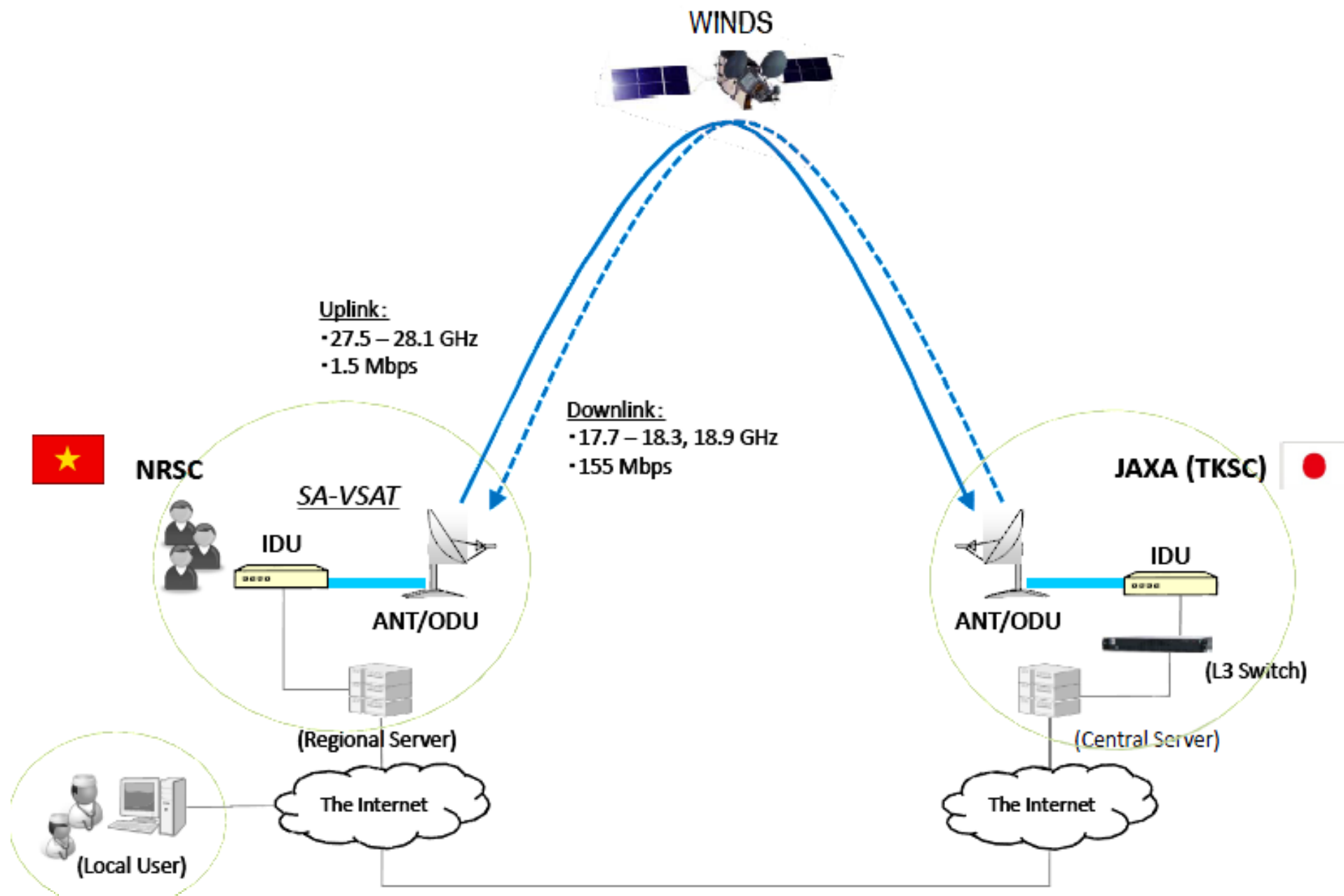
**VNREDSat-1 images  
acquired at the VNGS  
from 09/05/2013 -  
03/10/2013**



# Cooperation with Sentinel Asia for Disaster management



- Data Analysis Node
- Application node
- Training node
- Uses of supplied SAR images for flood monitoring
- Participation in APRSAF meeting





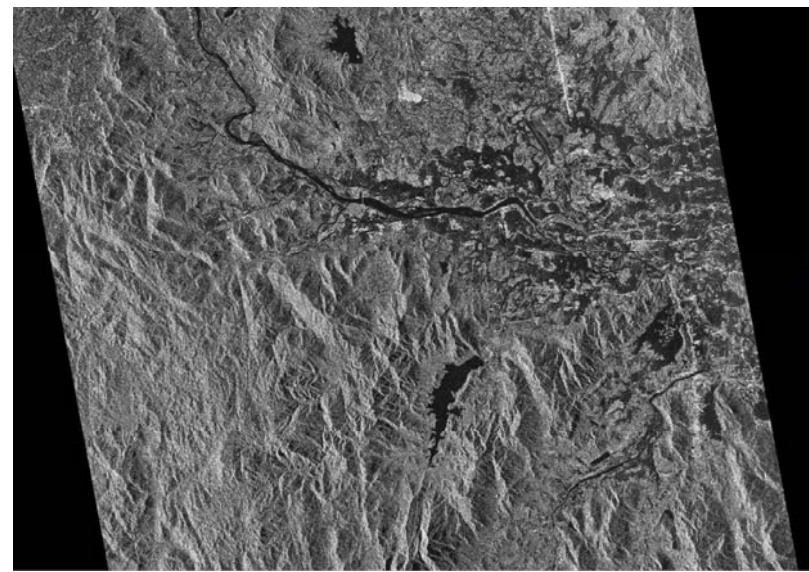
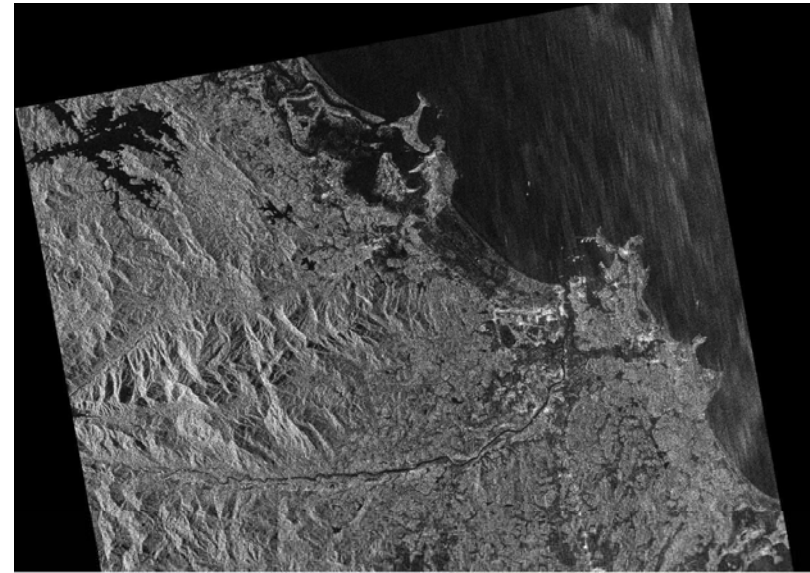
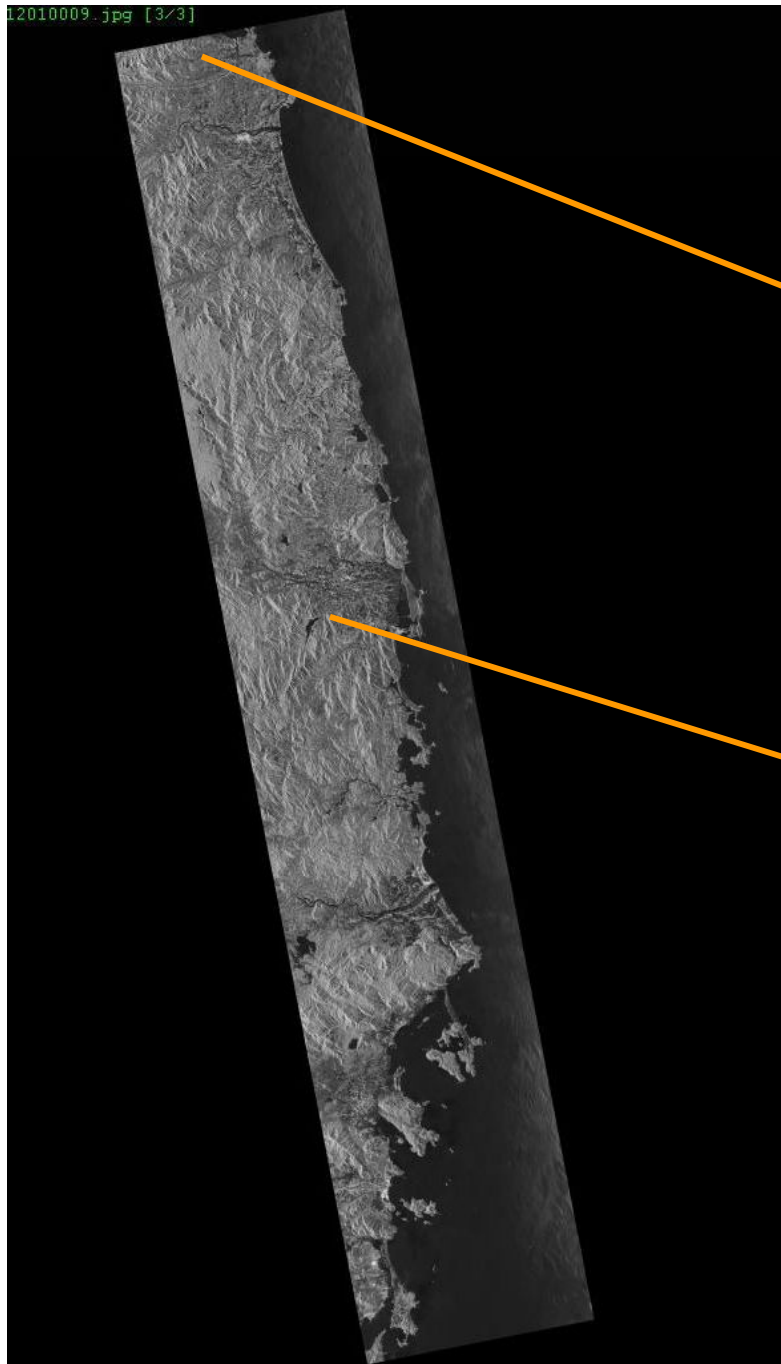


# Data delivered



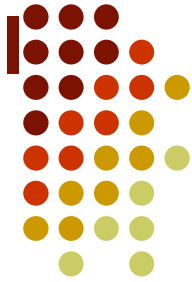
Two phases for data delivered to the WINDS systems:

- **In usual cases:** MTSAT data, Hotspot data and Rainfall data.
- **In emergency cases:**  
satellite data, satellite imagery, analysis results

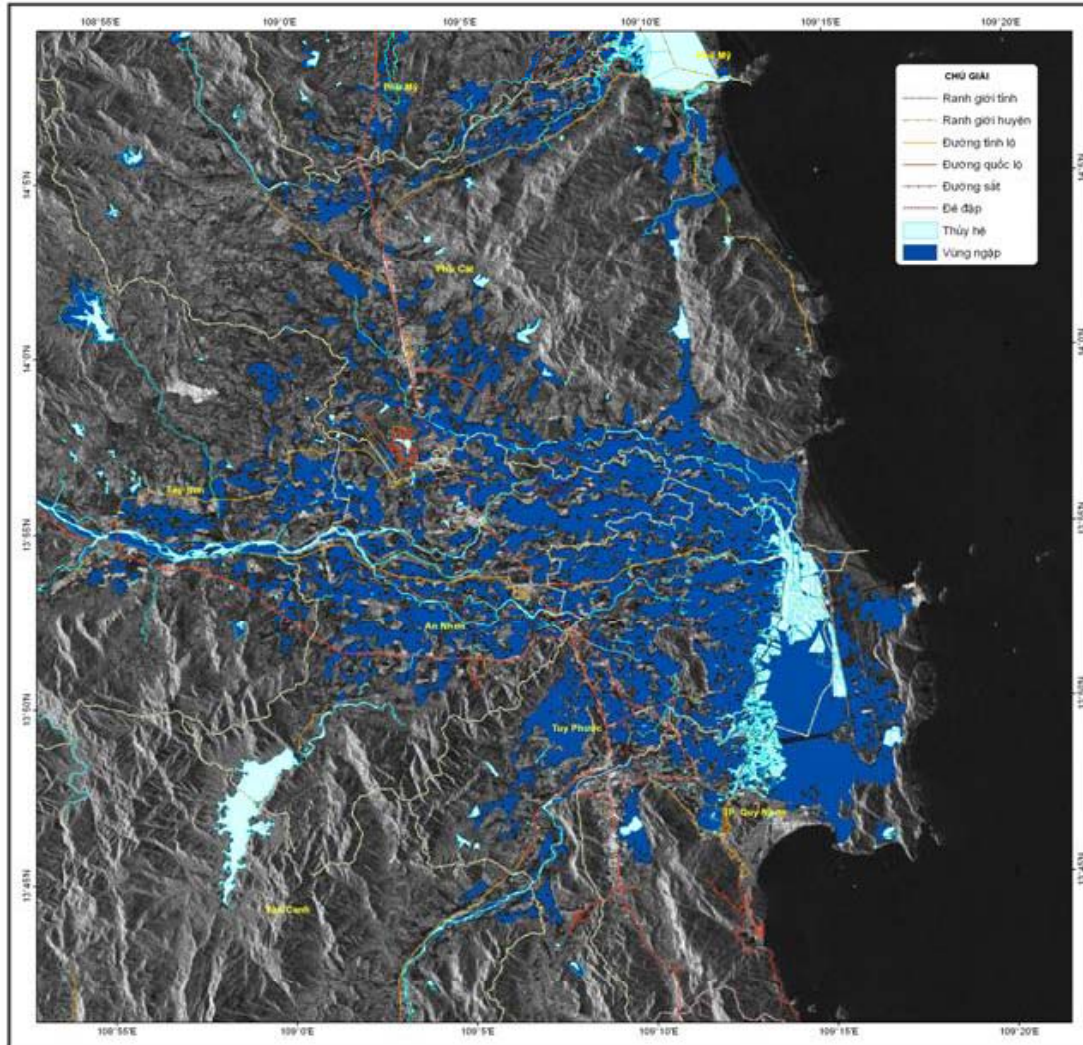


**Some images transferred via WINDS at NRSD**

# Uses of satellite images provided by Sentinel Asia for flood monitoring



BẢN ĐỒ HIỆN TRẠNG NGẬP LỤT KHU VỰC TỈNH BÌNH ĐỊNH NGÀY 05/11/2009



Binh Dinh Flood  
rapid map  
generated from  
ALOS/ PALSAR  
by NRSD  
(dated 05/11/2009)

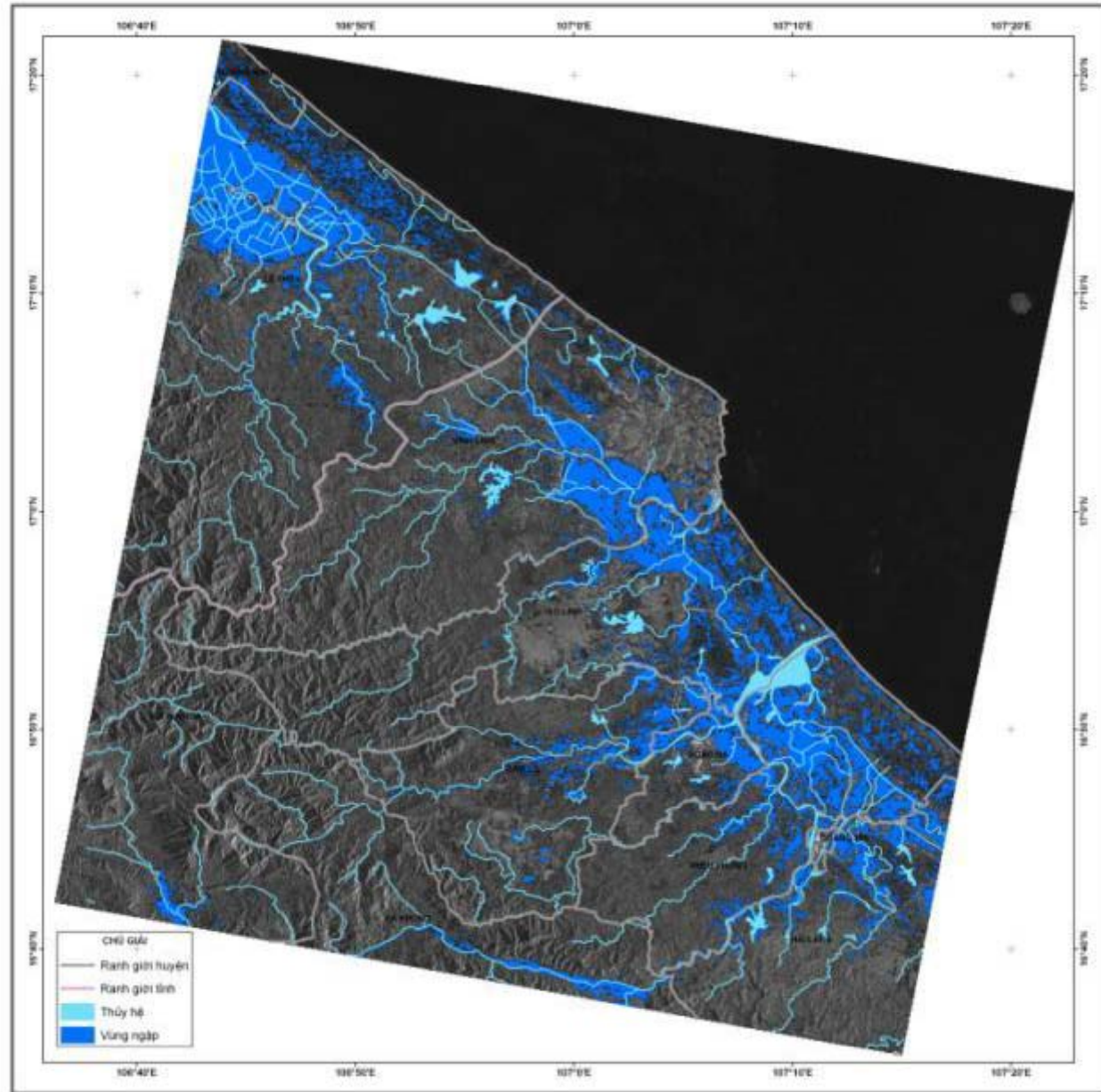
Bản đồ được thành lập từ ảnh vệ tinh ALOS-PALSAR thu ngày 05/11/2009

TỶ LỆ 1: 100.000



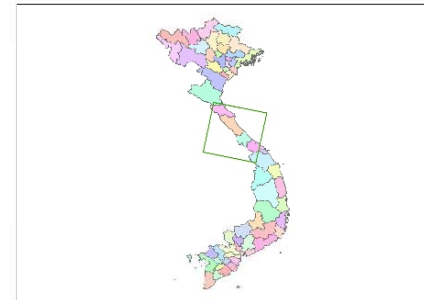
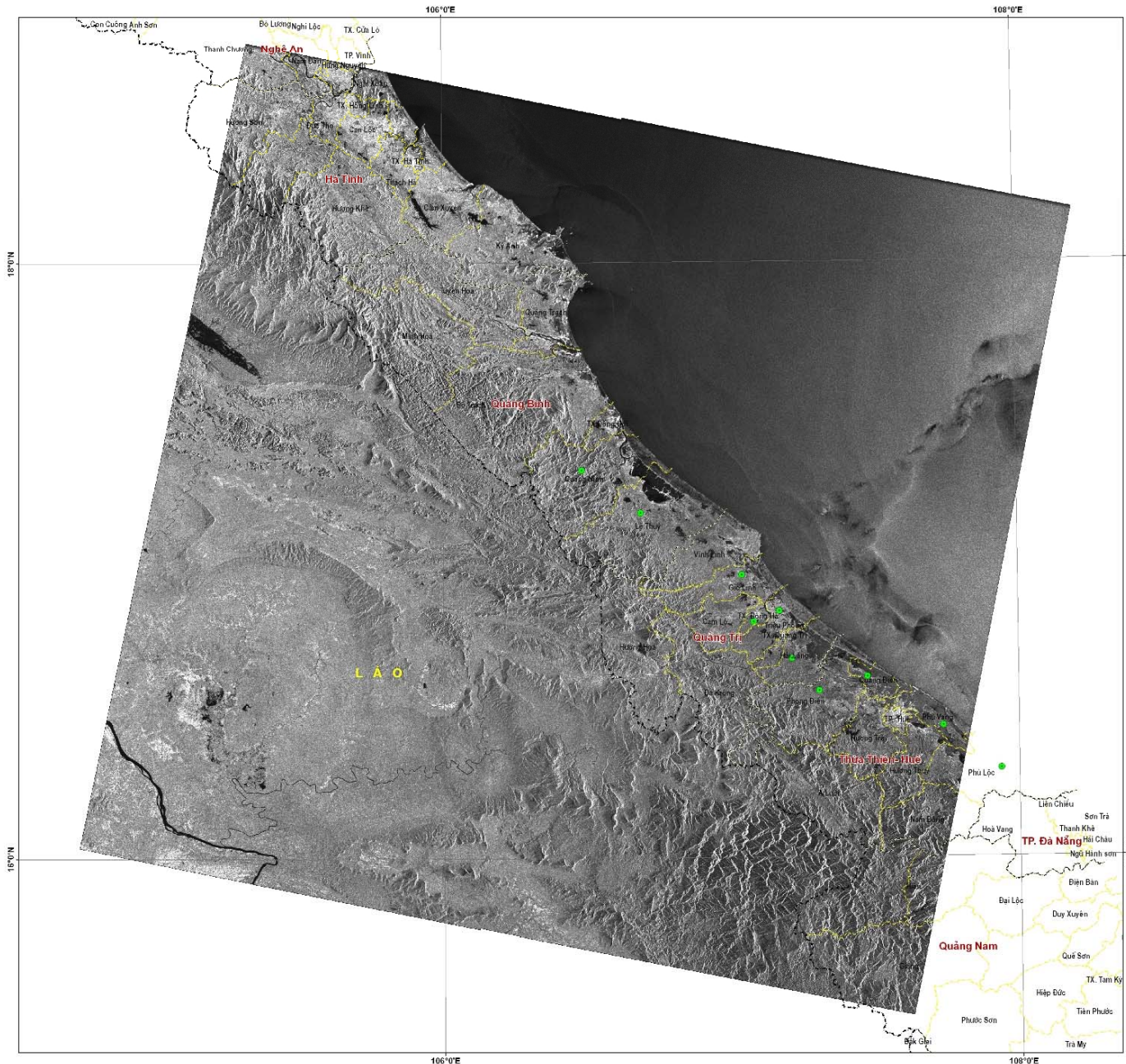
Trung tâm Viễn thám Quốc gia - Bộ Tài nguyên và Môi trường  
Địa chỉ: 108 Chùa Láng, Đống Đa, Hà Nội  
Điện thoại: 04-3834 3811

# Flood map over Quang Binh Province





# RAPID MAP OF CENTRAL VIETNAM, 2011/10/20



**LEGEND**

- - - - - Border
- - - - - Province Boundary
- — — — District Boundary
- Affected Locations

## Disaster Situation

On 15<sup>th</sup> October, tropical storm Banyan, at that time a tropical depression, gradually weakened into a low pressure zone before entirely dissipating in the early morning of 16<sup>th</sup> October.

On 16<sup>th</sup> October, heavy rainfall over 100 to 200mm, with locally up to 300 to 400mm (in Quang Ngai, Thua Thien Hue, Quang Nam, Binh Dinh) has caused severe flooding and flash floods in a number of provinces in Central Vietnam from Quang Tri to Binh Dinh.

Flooding in the Central provinces peaked in the evening of 19<sup>th</sup> October.

Damage information caused by flood in the Central region which had been taken from the flash report of Standing Office of Central Committee for Flood and Storm control on 21 Oct 2011 as below:

- Death: 14 people
- Injured: 16 People
- Missing: 05 people
- House flooded: 65.754 houses
- Paddy area flooded: 3.146 ha; secondary crop damaged: 15.733 ha
- Number of households moved: 7.395 households.

## Source

Image RADARSAT-2, WGS84 Zone 48 acquired on 20 October 2011.

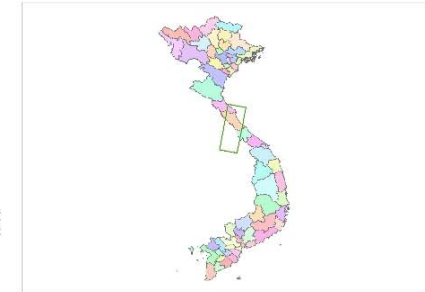
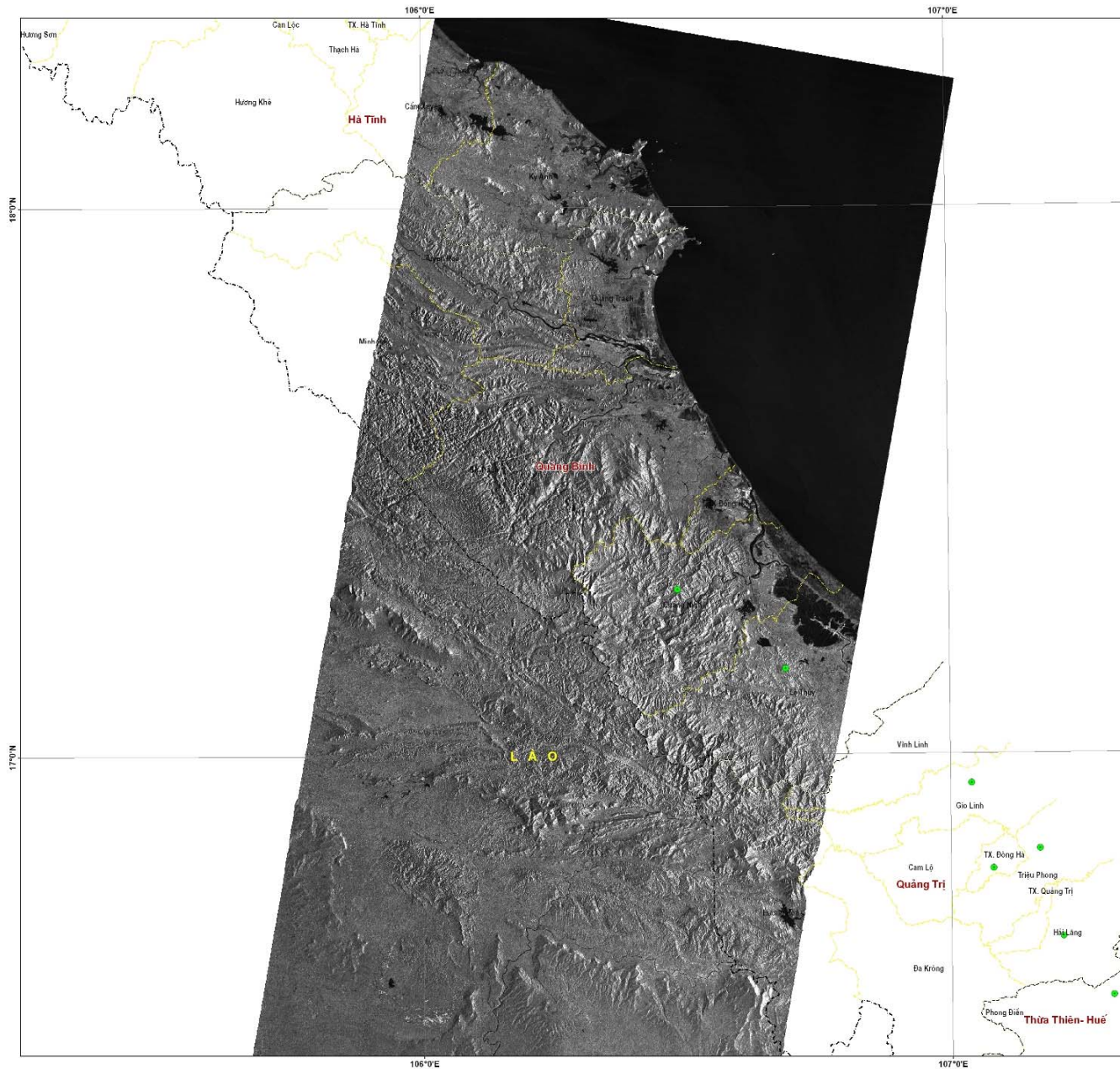
Copyright: RADARSAT-2 Data and Products © MacDonald, Dettwiler and Associates Ltd. (2011) - All Rights Reserved. RADARSAT is an official trademark of the Canadian Space Agency.

Rapid map made by National Remote Sensing Center, Vietnam

Website: <http://rsc.gov.vn>



# RAPID MAP OF CENTRAL VIETNAM, 2011/10/22



**LEGEND**

- Border
- Province Boundary
- District Boundary
- Affected Locations

**Disaster Situation**

On 15<sup>th</sup> October, tropical storm Banyan, at that time a tropical depression, gradually weakened into a low pressure zone before entirely dissipating in the early morning of 16<sup>th</sup> October.

On 16<sup>th</sup> October, heavy rainfall over 100 to 200mm, with locally up to 300 to 400mm (in Quang Ngai, Thua Thien Hue, Quang Nam, Binh Dinh) has caused severe flooding and flash floods in a number of provinces in Central Vietnam from Quang Tri to Binh Dinh.

Flooding in the Central provinces peaked in the evening of 19<sup>th</sup> October.

Damage information caused by flood in the Central region which had been taken from the flash report of Standing Office of Central Committee for Flood and Storm control on 21 Oct 2011 as below:

- Death: 14 people
- Injured: 16 People
- Missing: 05 people
- House flooded: 65.754 houses
- Paddy area flooded: 3.146 ha; secondary crop damaged: 15.733 ha
- Number of households moved: 7.395 households.

**Source**

Image TerraSAR-X, WGS84 Zone 48 acquired on 22 October 2011.  
 Copyright: TerraSAR-X/TanDEM-X © German Aerospace Center (DLR) 2011, Commercial exploitation rights: Astrium GEO-Information Services.  
 Rapid map made by National Remote Sensing Center, Vietnam.  
 Website: <http://rsc.gov.vn>



# Operation of the WINDS station



- NRSC keep WINDS station in operational mode continuously and also maintain internet lease line;
- Commitment to acquire data and process them provide freely to users in Viet Nam.
- However, the data delivered by the WINDS satellite has not been done very often; most of time data were transferred by the internet lease line.
- In many cases data were delivered too late when the flooding were already over.
- For using MTSAT data, Hotspot data and Rainfall data need technology transfer for application in users agencies.

# Operation of the WINDS station



- The WINDS- VSAT system provided by JAXA will terminate in February, 2014. Thus, it is necessary to apply for extension so that NRSD can continue to exploit this system.



Thank you for attention