

INTERNATIONAL WORKSHOP
Air Quality in Asia-Impacts of Land Cover/Land Change on Green House
Gasses/SLCP Emissions and Aerosols
Bogor, August 4-7th, 2015

**VNREDSat-1 satellite: active cooperation
in disaster management in Asia, and
remote sensing activities in Viet Nam**

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VNREDSat-1 Overview

VNREDSat-1 Satellite

(Vietnam Natural Resource, Environment & Disaster monitoring Satellite)

Owner: VAST

Launch date: 07/5/2013 from Kourou, French Guiana

Resolution: PAN (2.5m) and 4 MS (10m)

Orbit: **SSO**, 680 km altitude

Revisit time: **3 days**

LTAN : **10:42 PM**

Mass: ~**120 kg**

Lifetime: min **5 years**

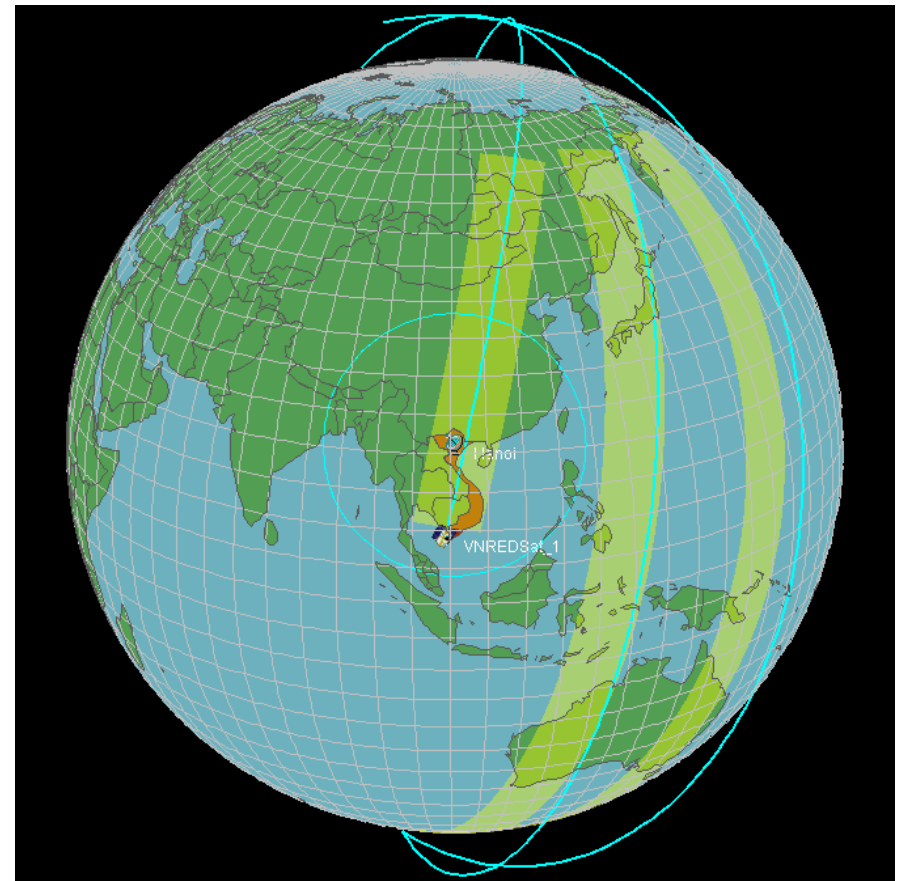
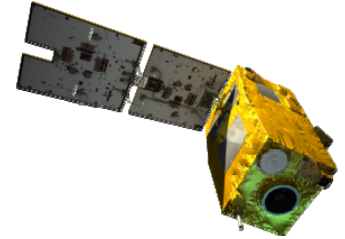
Imaging mode: single shot, scanning, stereo

Swath: **17.5 km**

Length: **823 km (PAN + MS)**

Scenes/day: **100 scenes**

Agility : +/- 35 degrees

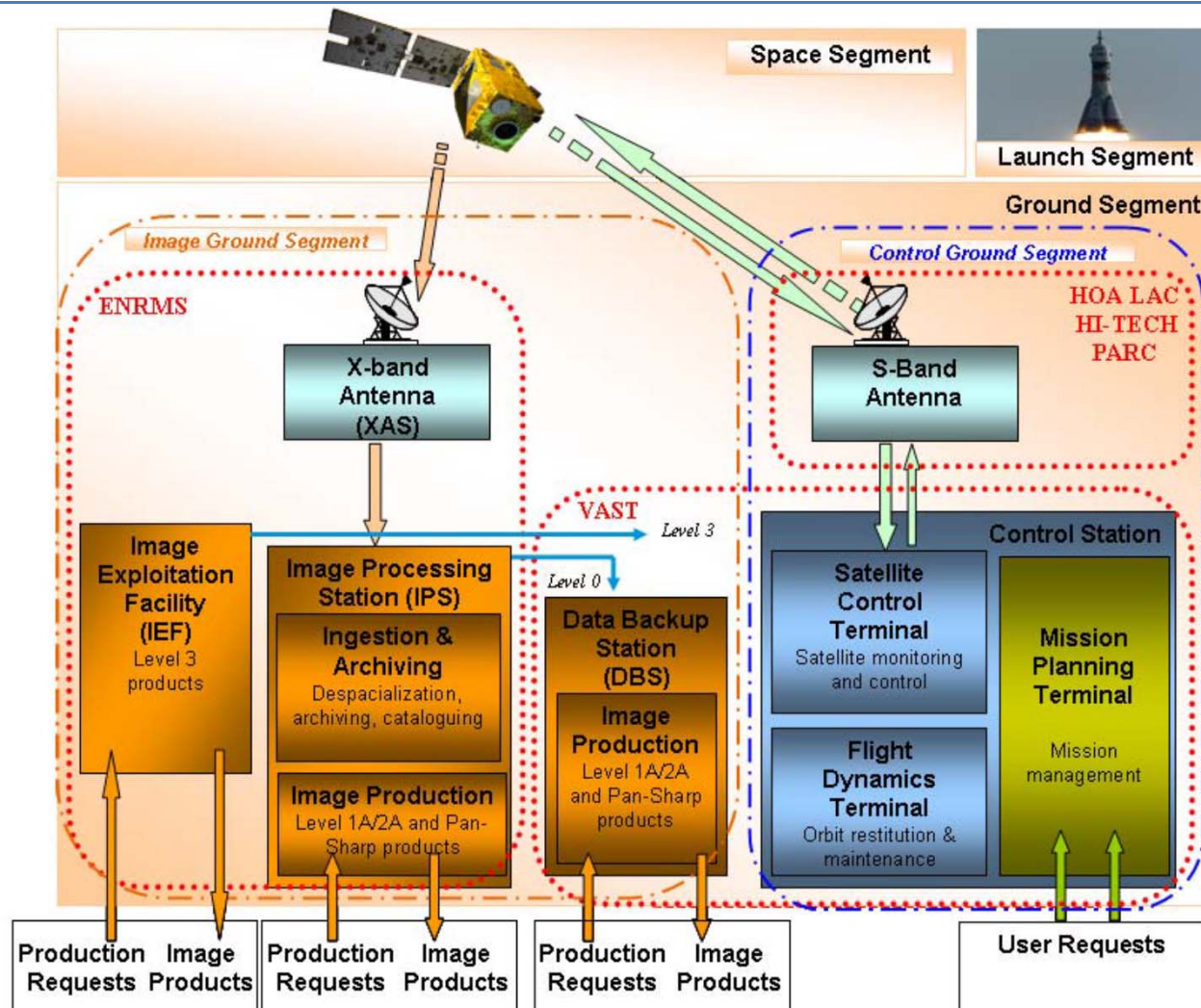


VNREDSat-1 Overview



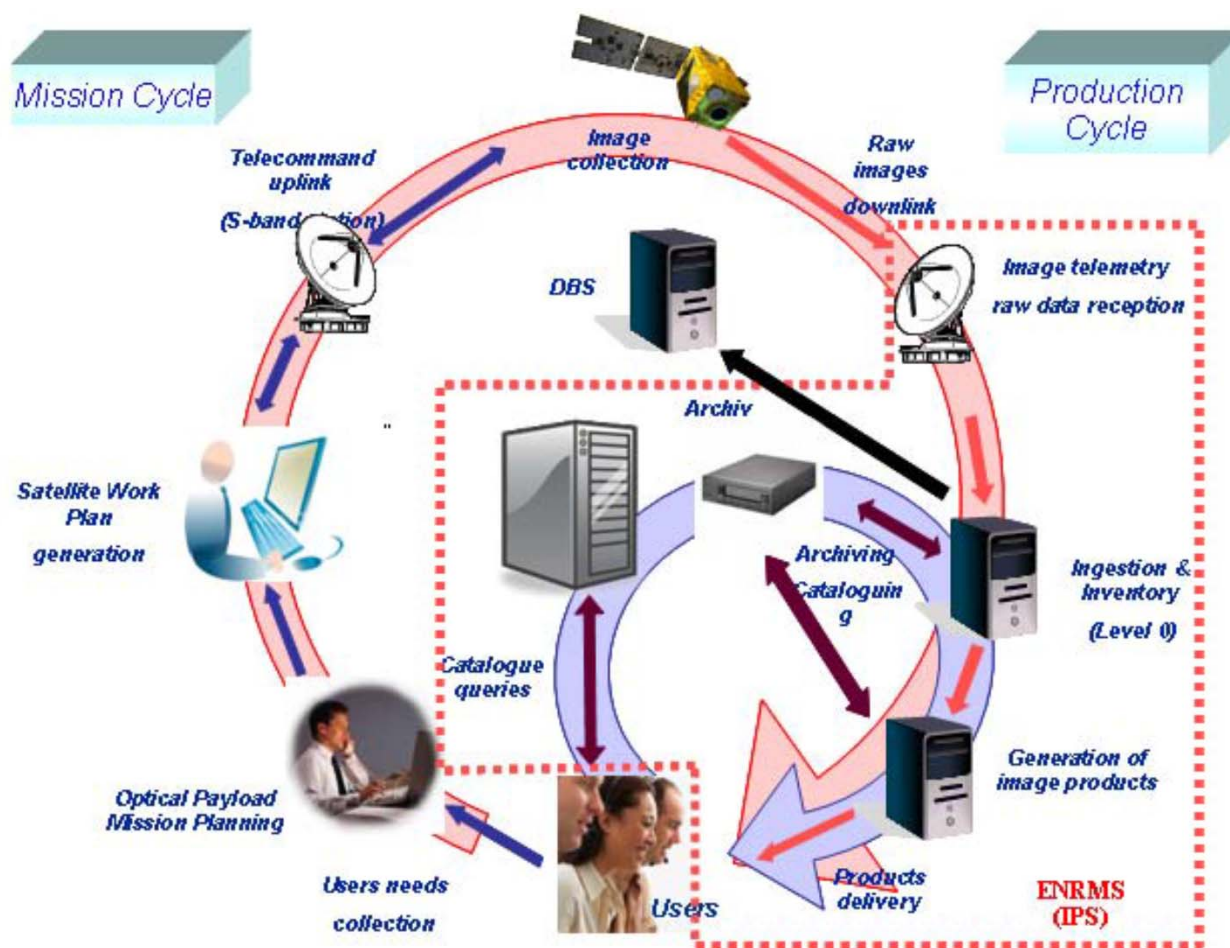
VNREDSat-1 satellite overview

VNREDSat-1 Overview



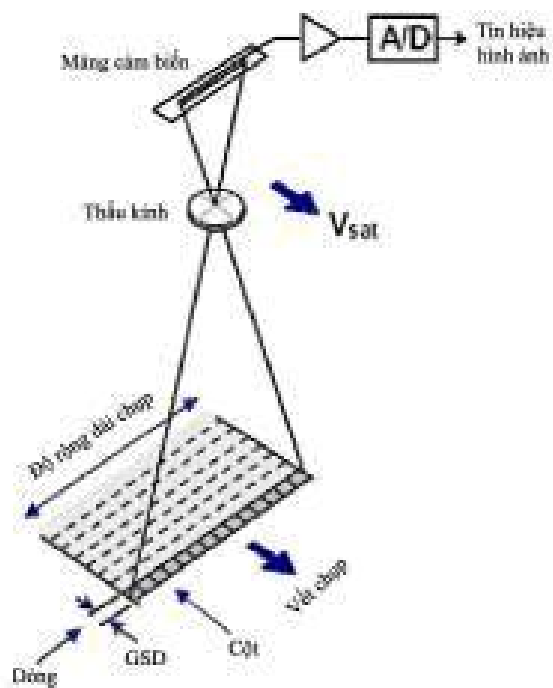
VNREDSat-1 System Structure

VNREDSat-1 Overview

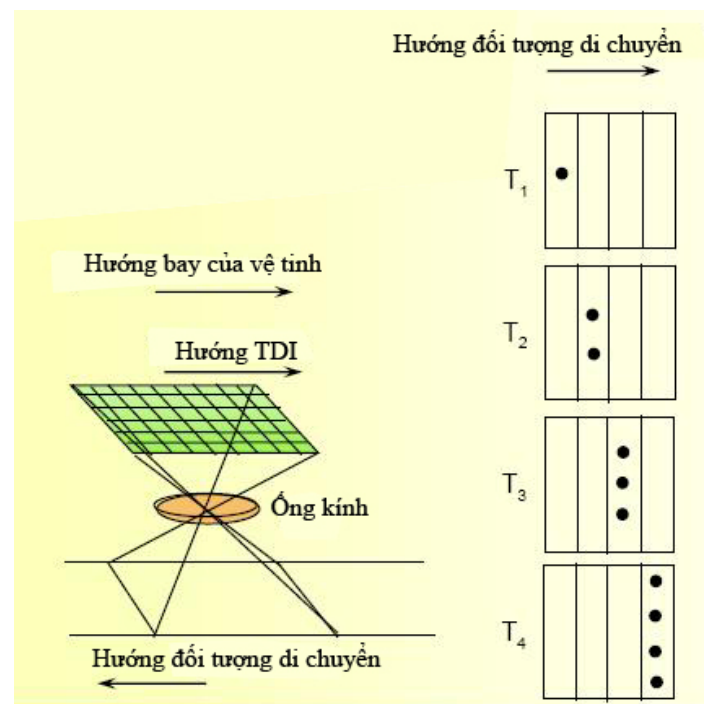


Operation cycle

VNREDSat-1 Overview



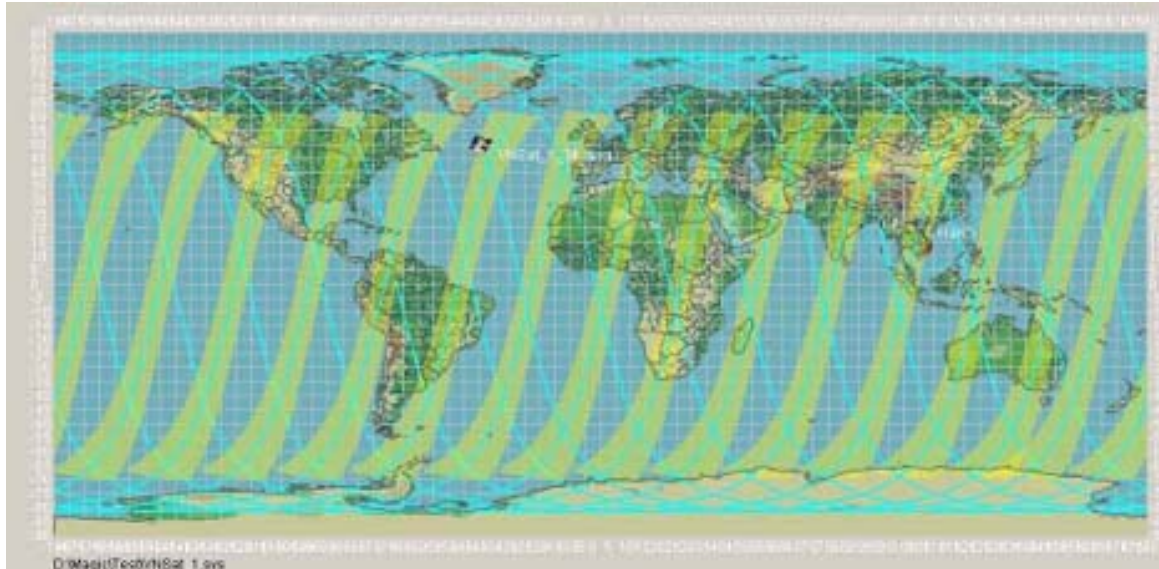
Push-Broom



TDI for stereo mode

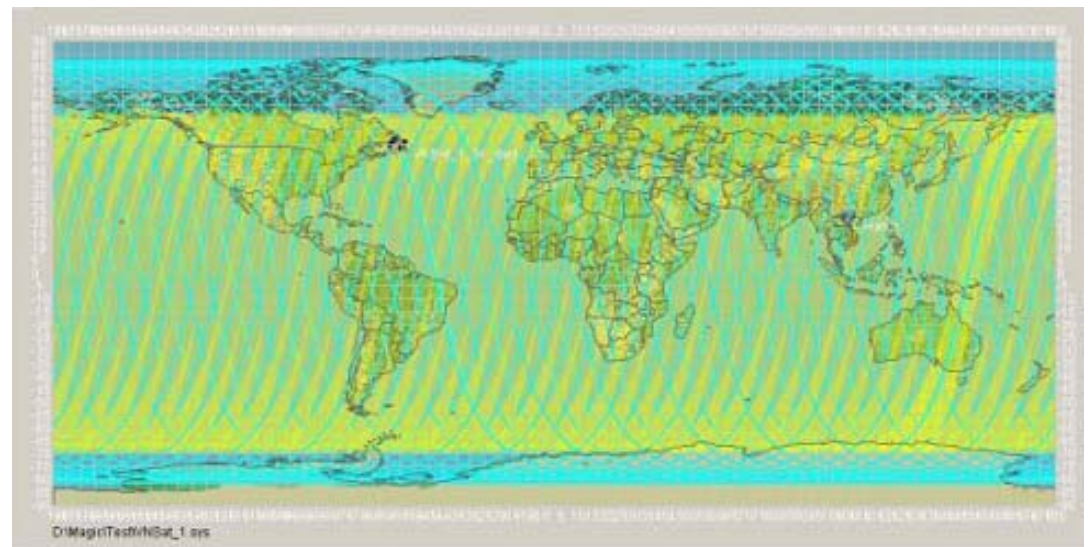
Imaging capabilities

VNREDSat-1 Overview



VNREDSat-1 access
corridors over 1 day

VNREDSat-1 access
corridors over 3 days:
whole world coverage



VNREDSat-1 Overview

Spectral bands



Band	Name	Lower Band Edge (μm)	Upper Band Edge (μm)
Panchromatic	PAN	0.45 +/- 0.02	0.75 +/- 0.02
Blue	B1	0.45 +/- 0.02	0.52 +/- 0.02
Green	B2	0.53 +/- 0.02	0.59 +/- 0.02
Red	B3	0.625 +/- 0.02	0.695 +/- 0.02
Near-Infrared	B4	0.76 +/- 0.02	0.89 +/- 0.02



VNREDSat-1 Overview

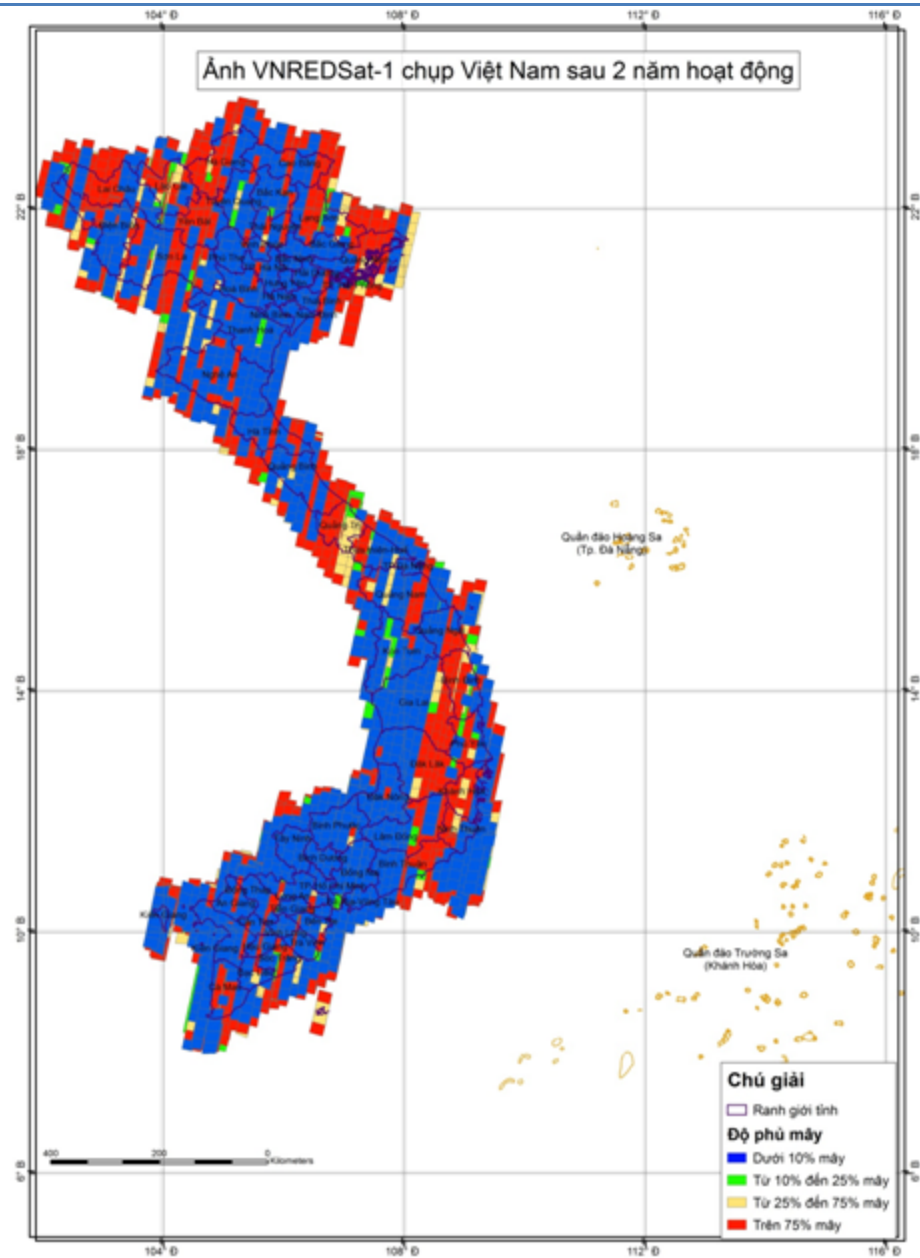
VNREDSat-1 Image Products

- Basic Product
 - Level 1A
 - Level 2A
 - Pan-sharpening
- Advanced Product
 - Level 3
 - DEM generation

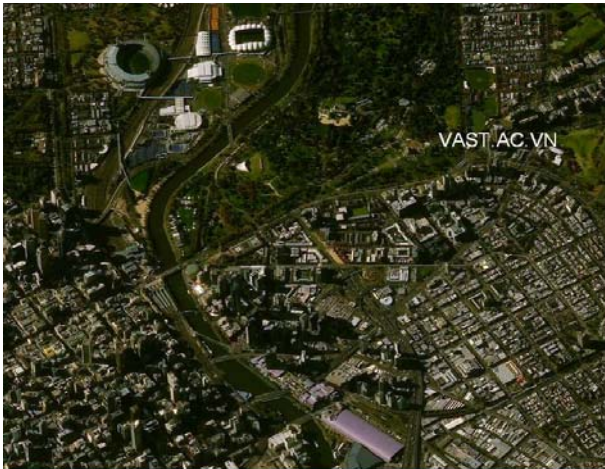
VNREDSat-1 Overview

VNREDSat-1: 2 years in orbit

- In total: **34.000** scenes
- **Vietnam**: 18.325 scenes
(9.050 MS and 9.175 PAN)



VNREDSat-1 Overview

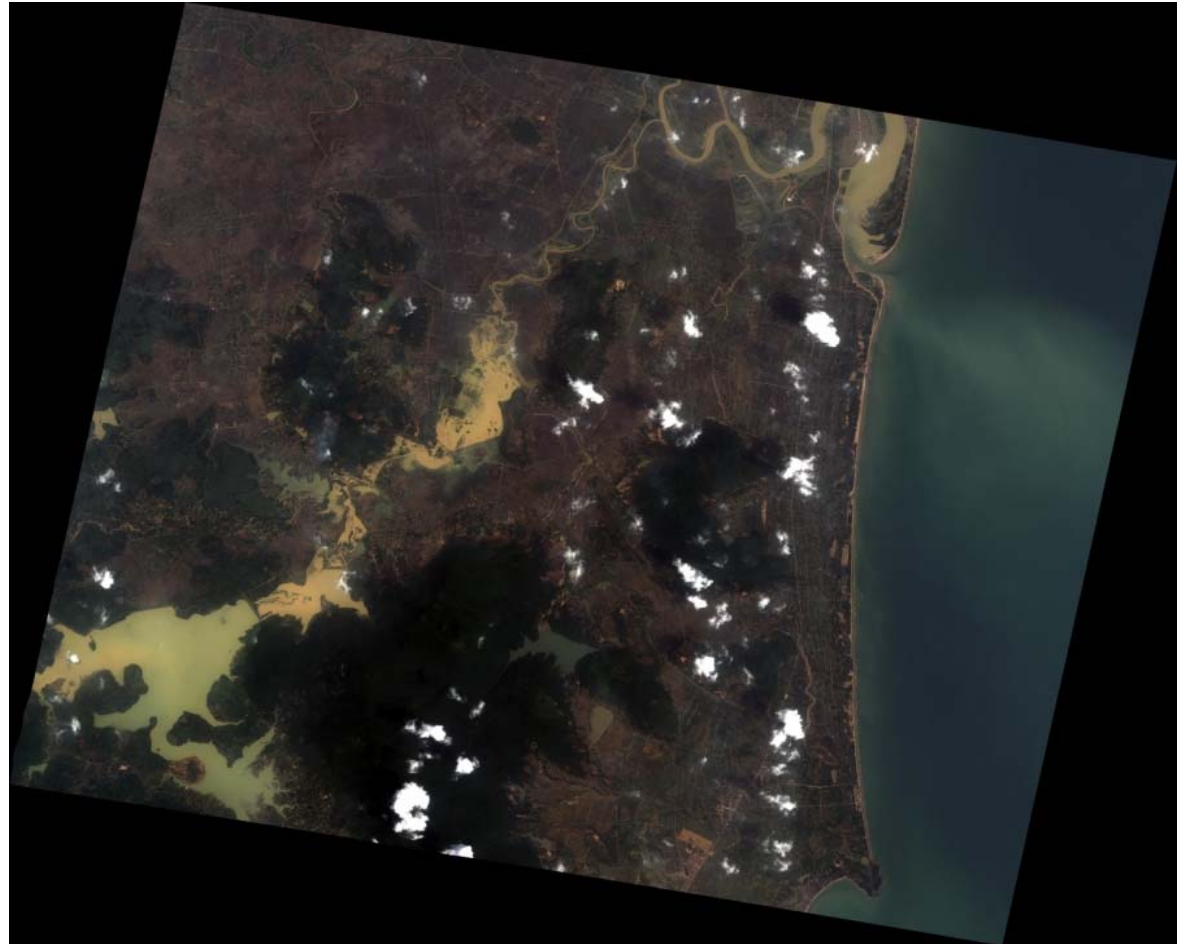


First images from VNREDSat-1

VNREDSat-1 Overview

Applications of VNREDSat-1

- Land use mapping
- Agriculture (land, rice,)
- Forest management
- Environment and territory (oil spill, water, atmospheric pollution,...)
- Island and coastal management
- Disaster management: monitoring, early-warning, assessment,...



*VNREDSat-1 image dated 4/10/2013 over
Nghe An Province.*

International cooperation of VNREDSat-1 in disaster management in Asia

Vietnam: a member of UNESCAP (UN Economic and Social Commission for Asia and the Pacific), since 23 August 1954.

STI is contact point for Space technology

International cooperation in disaster management

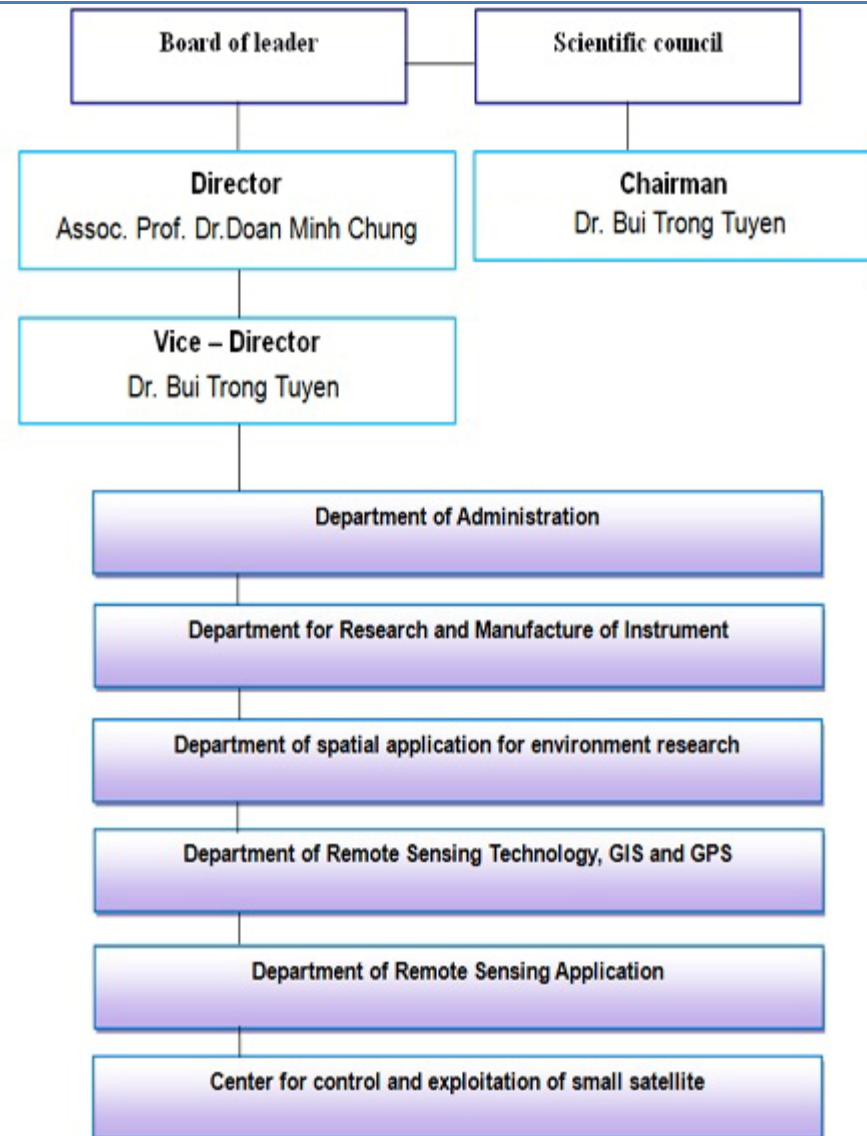
- Space Technology Institute (STI), a member of Vietnam Academy of Science and Technology (VAST) since 2006,
- STI: an advanced research institute on space technology in Vietnam.
- STI is responsible for
 - Fundamental and advance researches
 - Development of technology and applications
 - Tech-transfer, training and consultant service
 - R&D, and international cooperation

International cooperation in disaster management

Organization structure

Human resources

Total members: ~60 persons
(Prof, Dr, Msc, Engineer)



International cooperation in disaster management

Images for disaster management in Asia

Haiyan Typhoon

Tacloban, the Philippines, 15/11/2013



Srinagar_India

Floods in
India and
Pakistan,
09/2014.



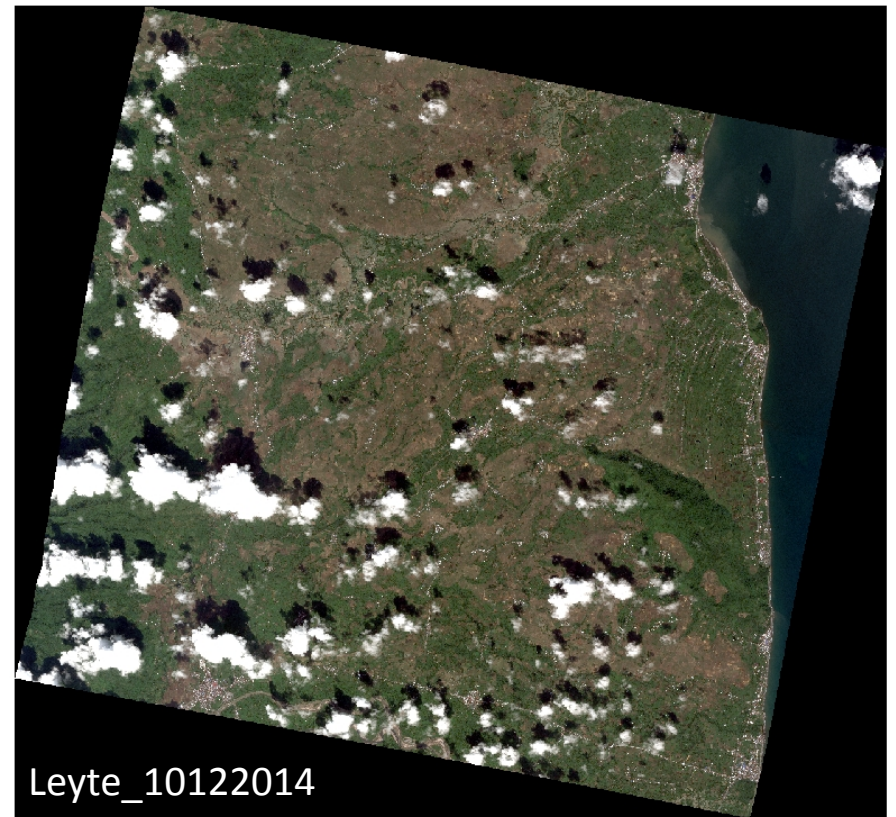
Muzaffargarh_Pakistan

International cooperation in disaster management



“HUDHUD” cyclones, VNREDSat-1 image in 23/10/2014, causing mud flooding in Visakhapatnam, India

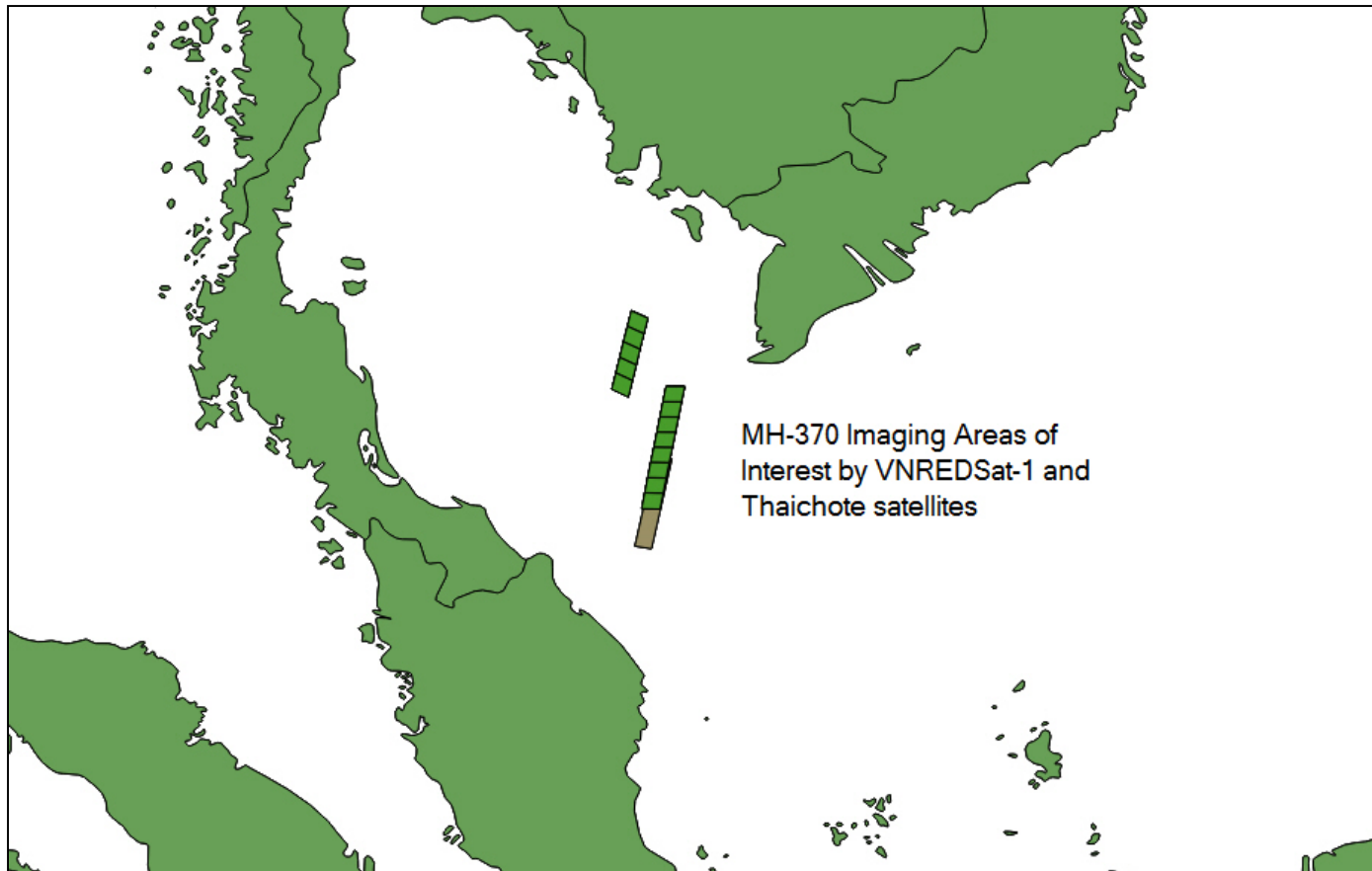
International cooperation in disaster management



VNREDSat-1 images: flood, landslide in the Philippines
(Hagupit typhoon (07/12/2014))

International cooperation in disaster management

- VNREDSat-1: joint with GISTDA in search for data sharing possibilities between VNREDSat-1 and THEOS (Thaichote) systems.
- Jointly imaging in search for missing MH370 airplane (Malaysia Airlines) in 2014.



Remote sensing activities in Viet Nam

Typical applications of remote sensing

- Urban management
- Nature resource management
- Hazards and disasters monitoring

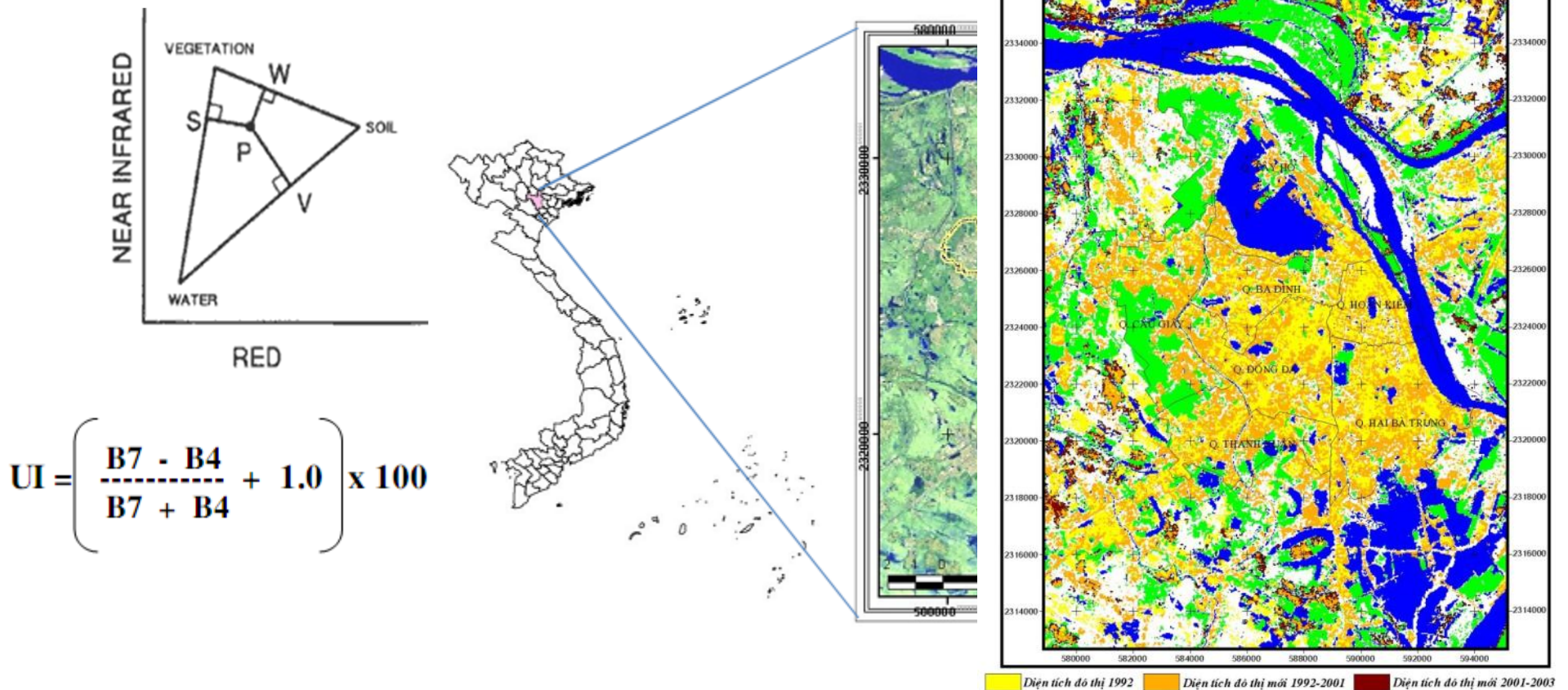
Others activities

- Research and studies
- Workshops

Applications: Urban management

Urbanization

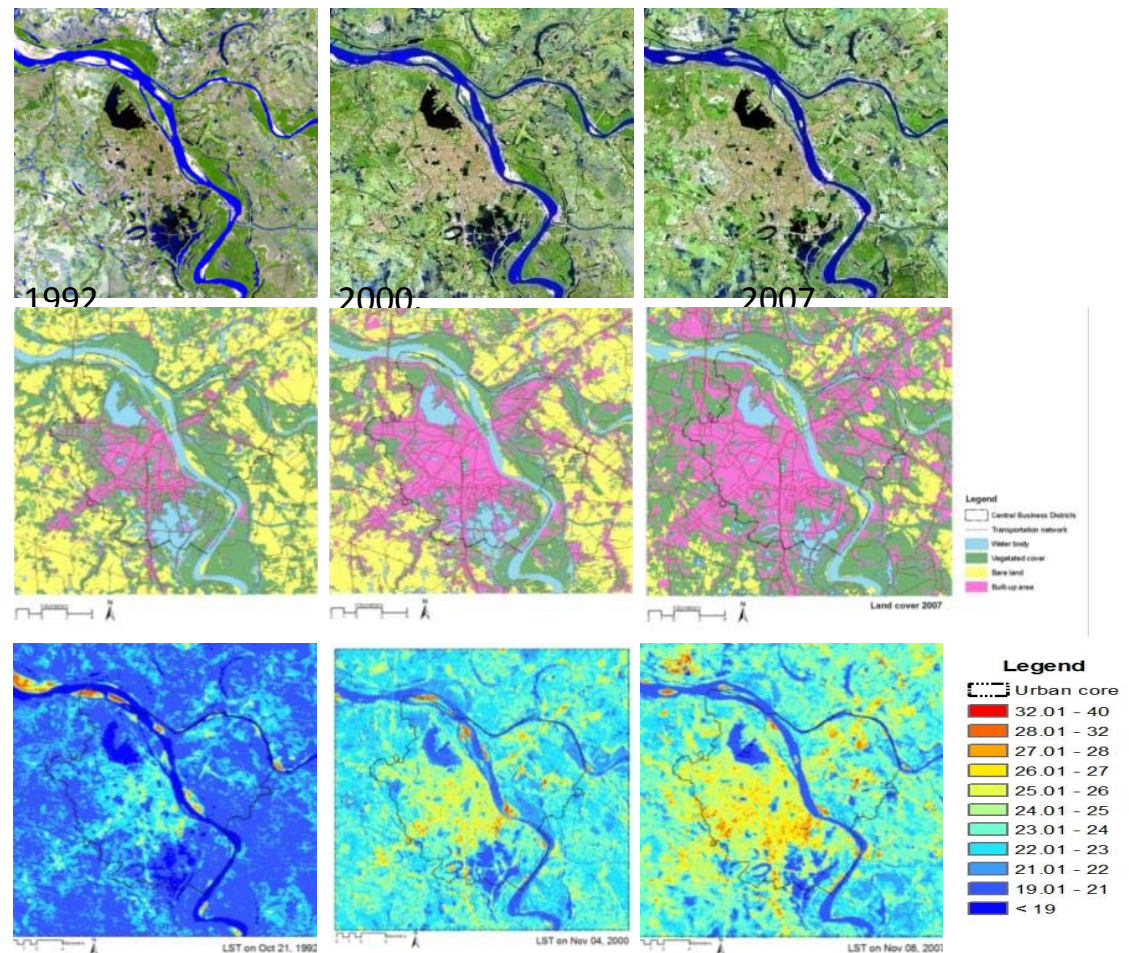
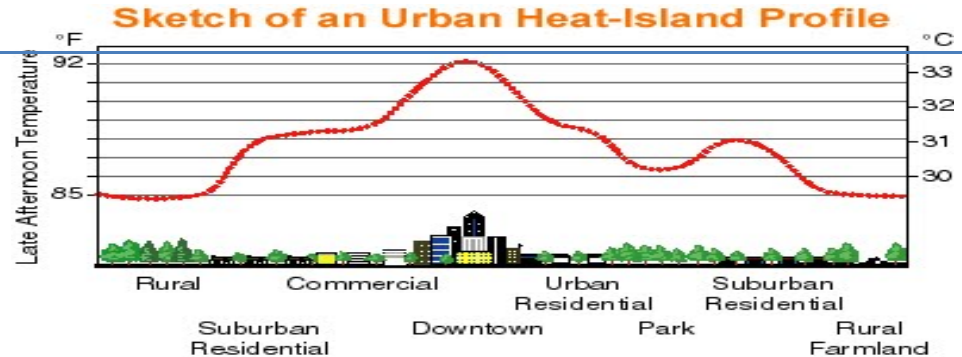
- Urbanization in Hanoi: filling up or ...



Applications: Urban management

Urban Heat Island

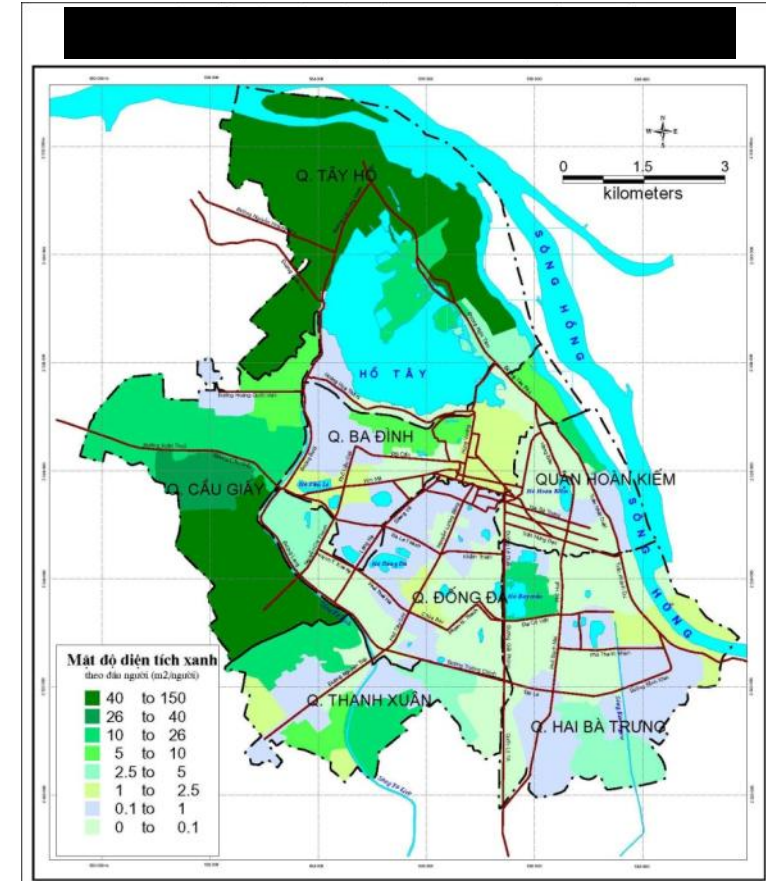
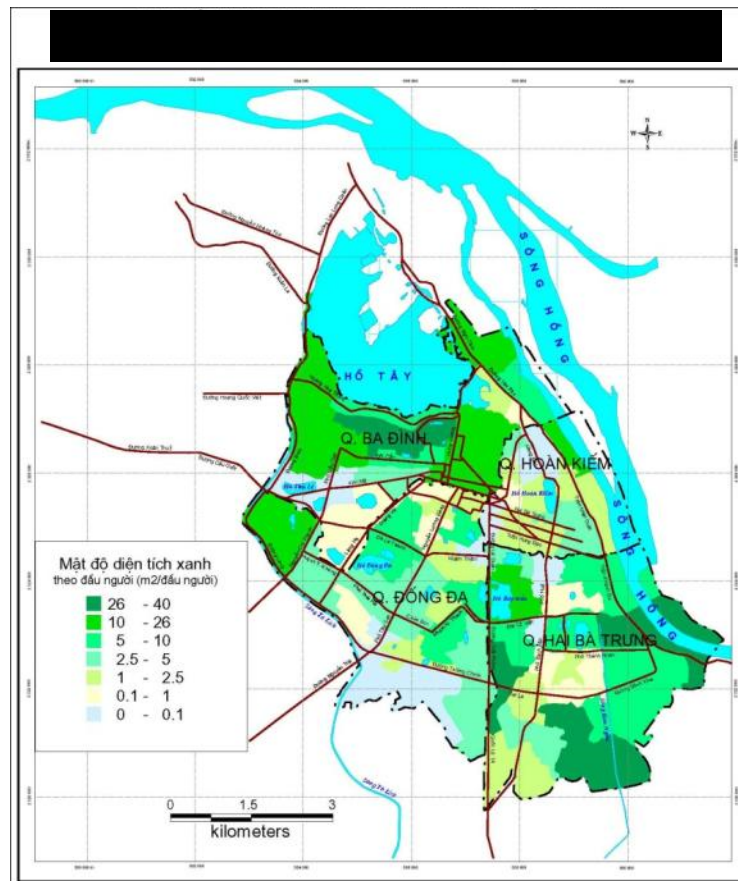
- Understand the Past
- Predict the Future:
Temperature of land surface in Hanoi would rise 0.54°C in 2022.



Applications: Urban management

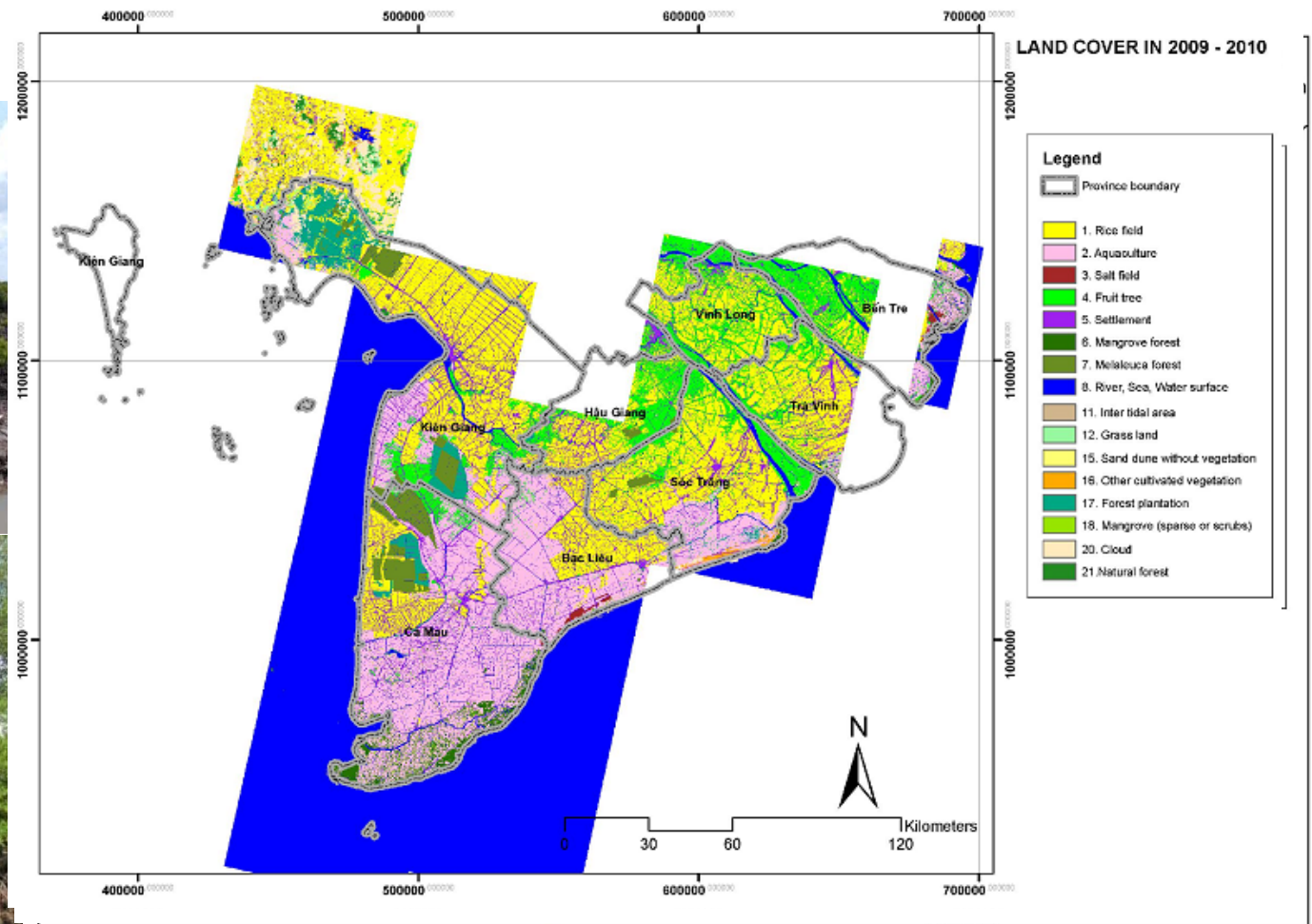
Urban planning

- Urban green space management and city planning
- Distribution, density, and green space reservation

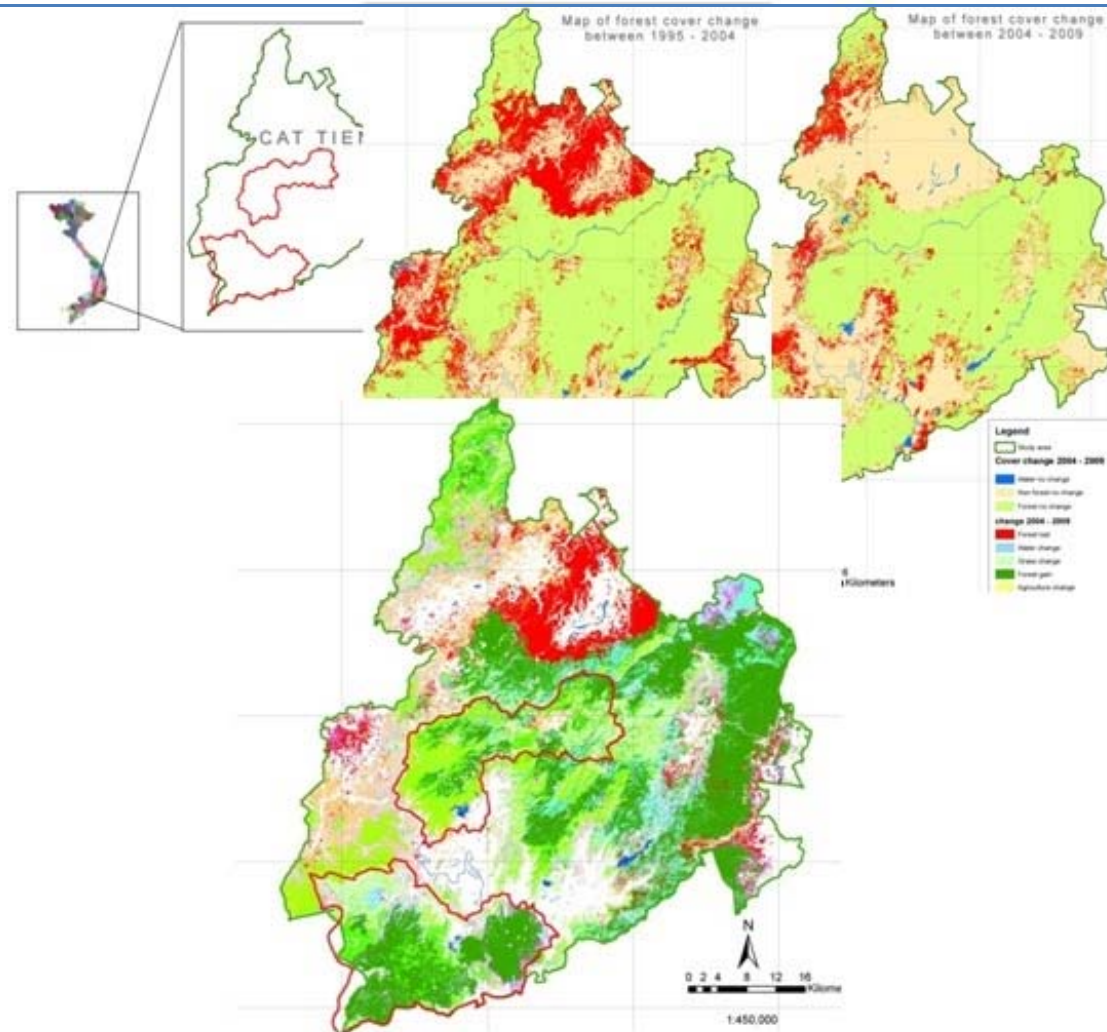


Applications: Natural Resource management

Forest management



Applications: Natural Resource management

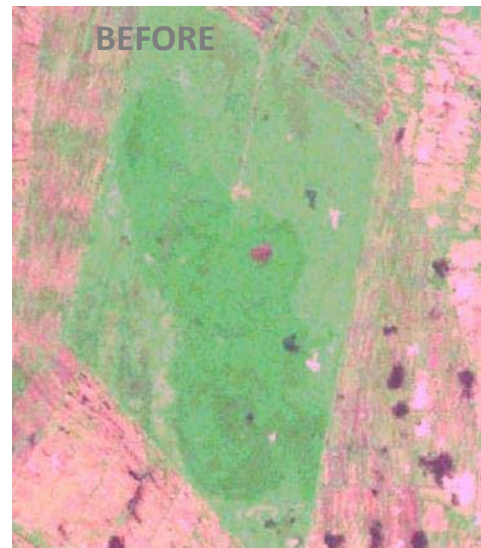
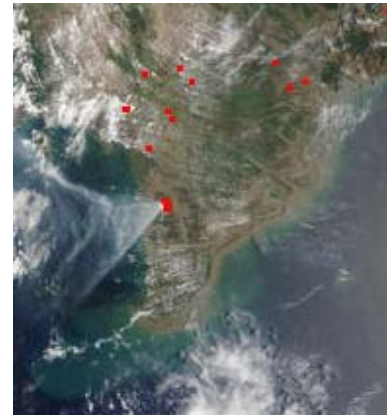


Assessment on change of forest cover, REDD (Reducing Emissions from Deforestation and Degradation) project in Viet Nam

Applications: Natural Resource management

Forest fire

U Minh Thuong national park
3000ha of primary melaleuca
forest burnt in 16 days



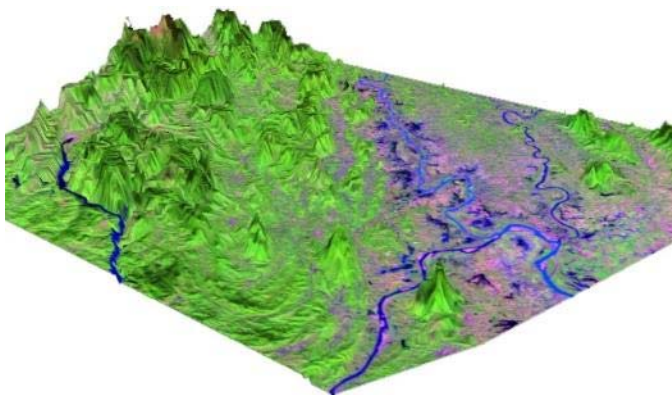
LANDSAT-ETM image on 4/2/2002

SPOT image on
28/9/2002

Applications: Natural Resource management

Drought monitoring

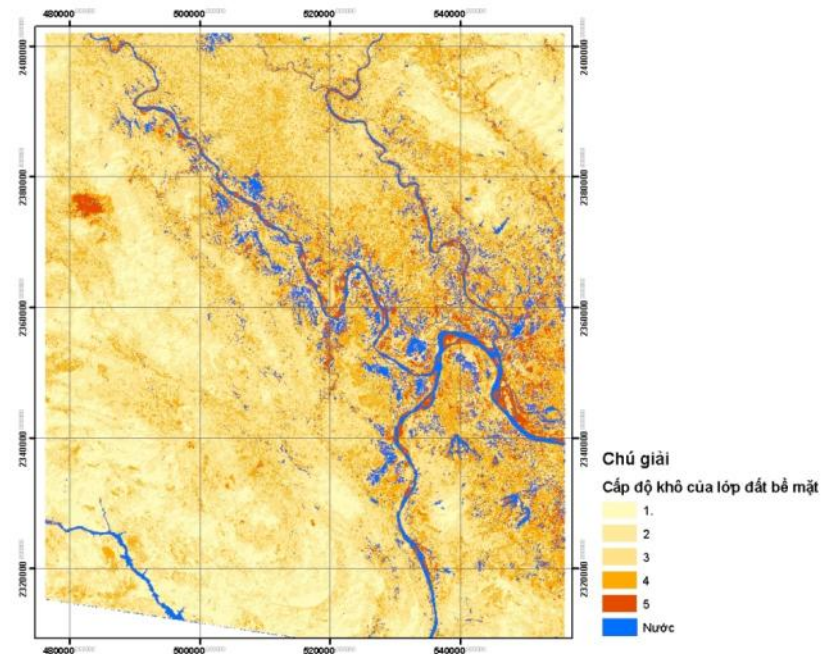
- Drought monitoring in Phu Tho province, upper stream of Red river delta area.
- Results was use for cultivation planning and soil degradation countermeasure.



3D perspective scene
of study area



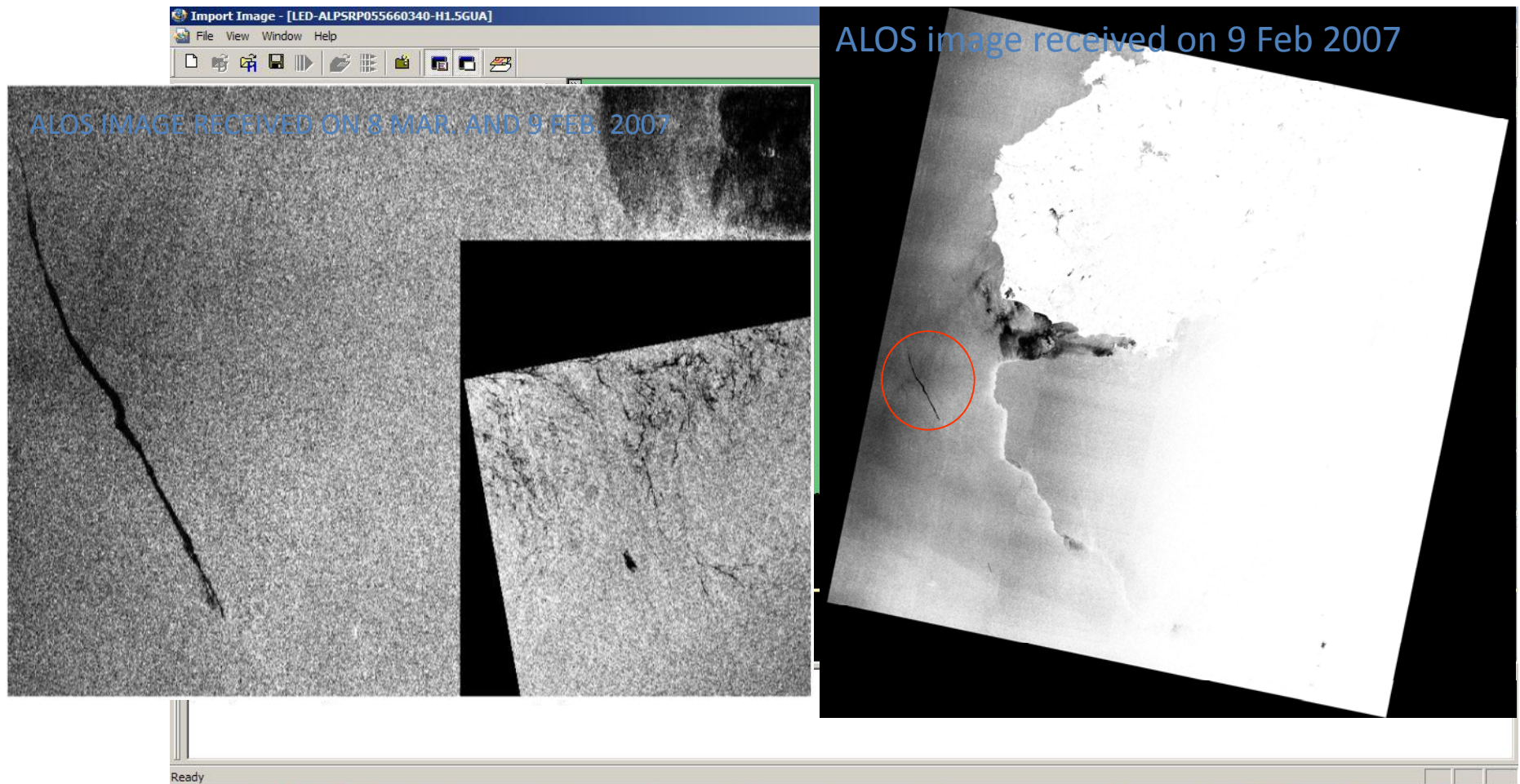
11/2



Applications: Hazard and Disaster

Hazard

- Oil spill found since 30 Jan until 11 April, 2007
- 500km coastal line effected

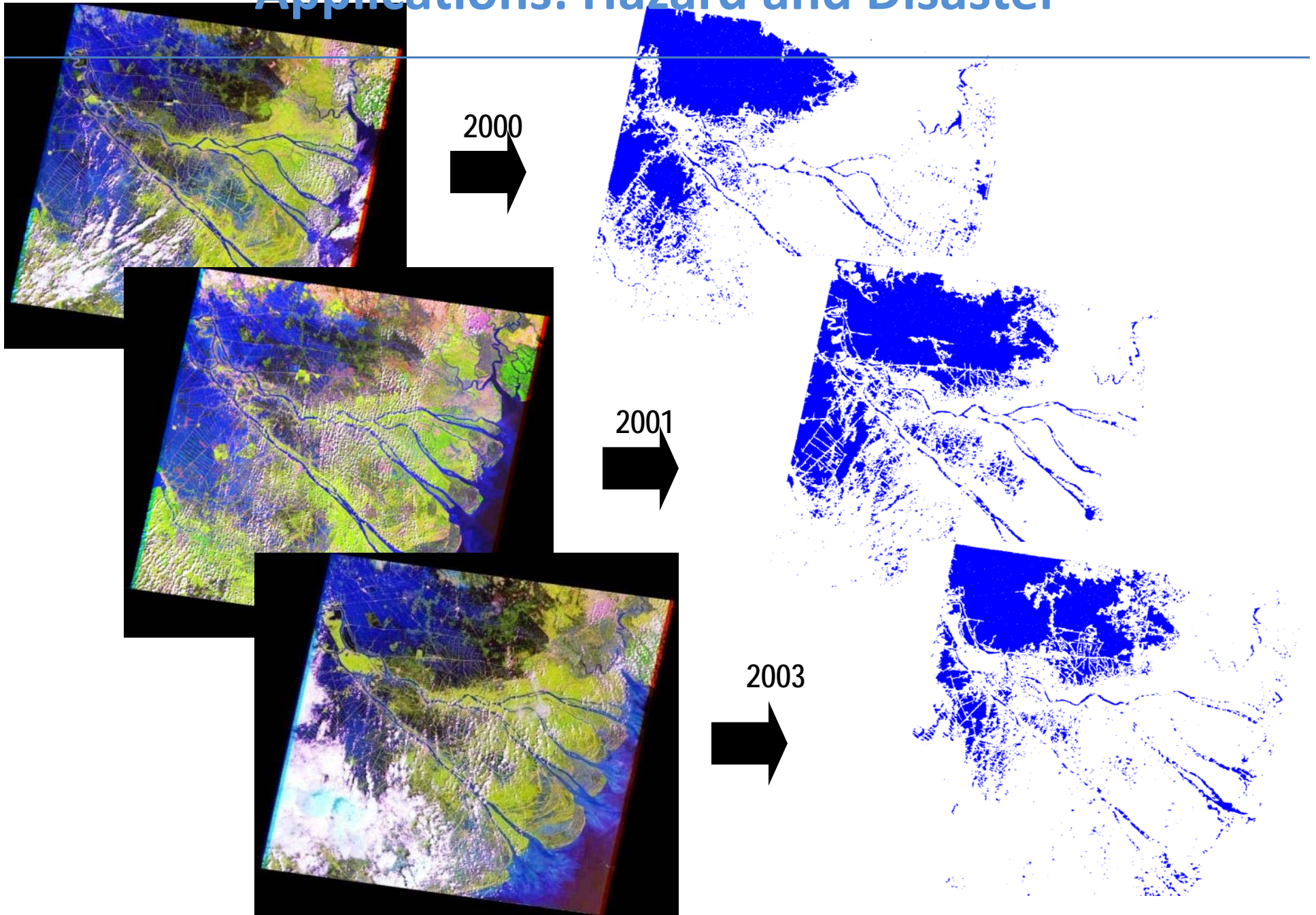


Applications: Hazard and Disaster

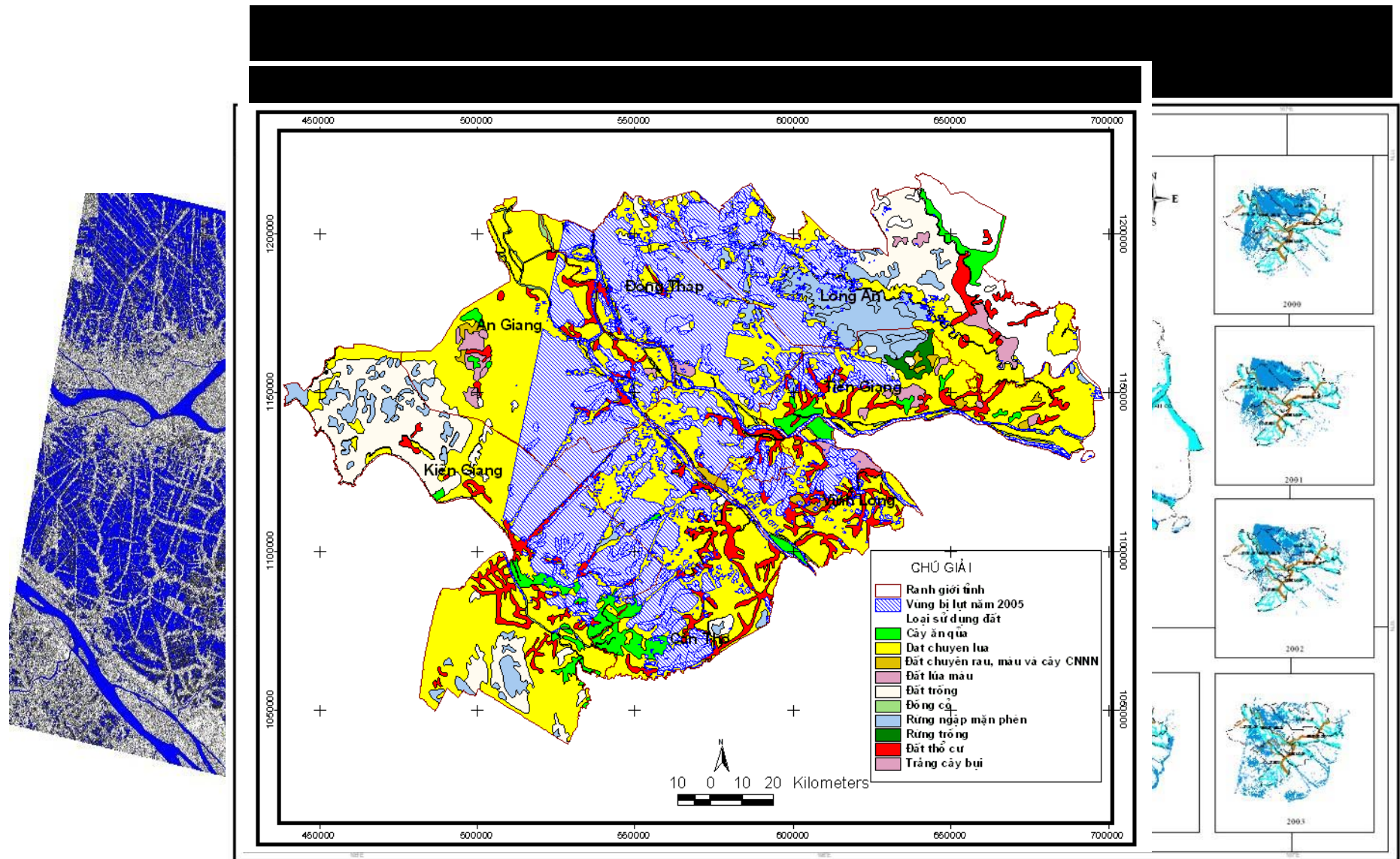
Disaster

- Flooding monitoring and assessment in Hue and Mekong river delta in 2008
 - risk, damage, vulnerability, warning
 - Strategic environment assessment for economic development planning, especially, in coastal region – coastal zone development

Applications: Hazard and Disaster

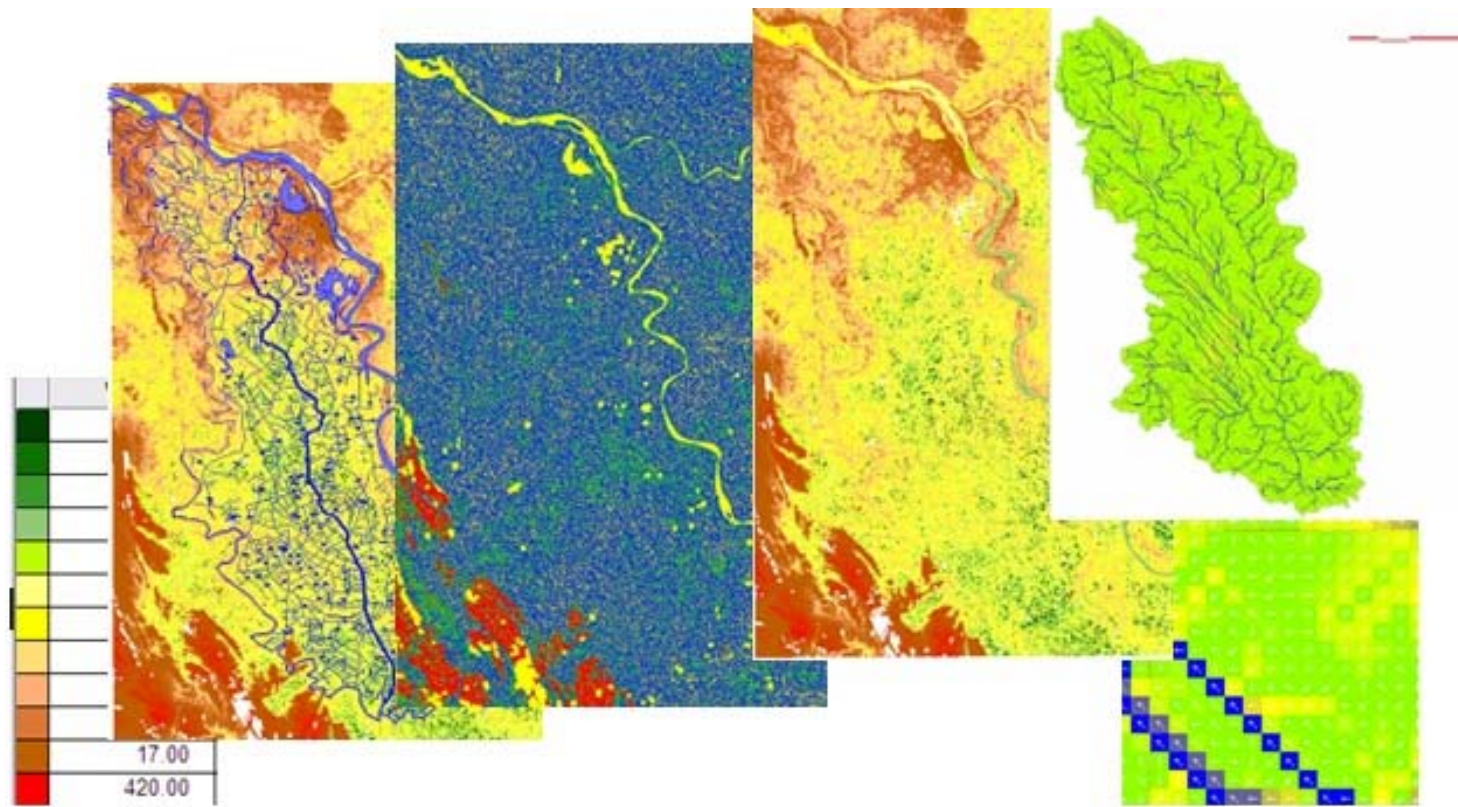


Applications: Hazard and Disaster



Monitoring of flood area in the Lower Mekong Delta

Applications: Hazard and Disaster



Integration and modeling of remote sensing information in GIS for Cau River basin, disaster management

Other activities

- Studies on
 - Satellite technology and ground station developments
 - RS sensors: Spectrometer
- Workshop

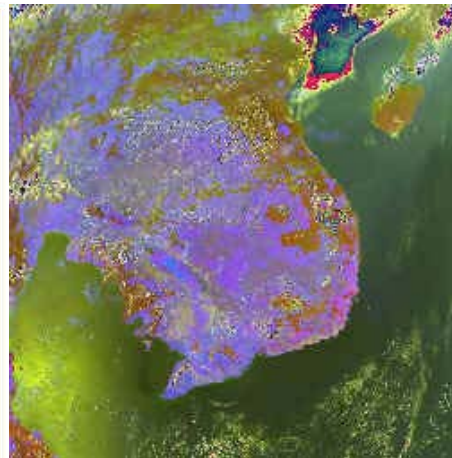
Other activities on Space technology and RS

Satellite technology and ground station

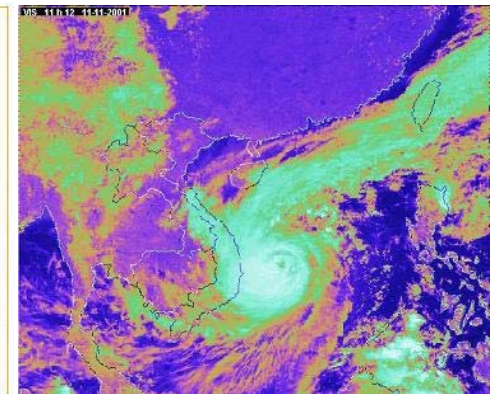
- Pioneer in research, design and manufacture of receiving stations for polar and geo-stationary metrological satellites.



WEAFAX APT receiving system



GMS/MT-SAT/FY-2 receiving system

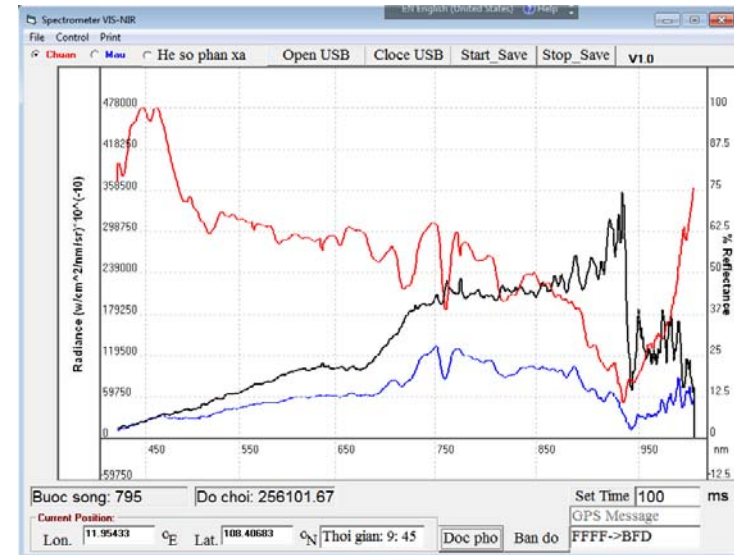
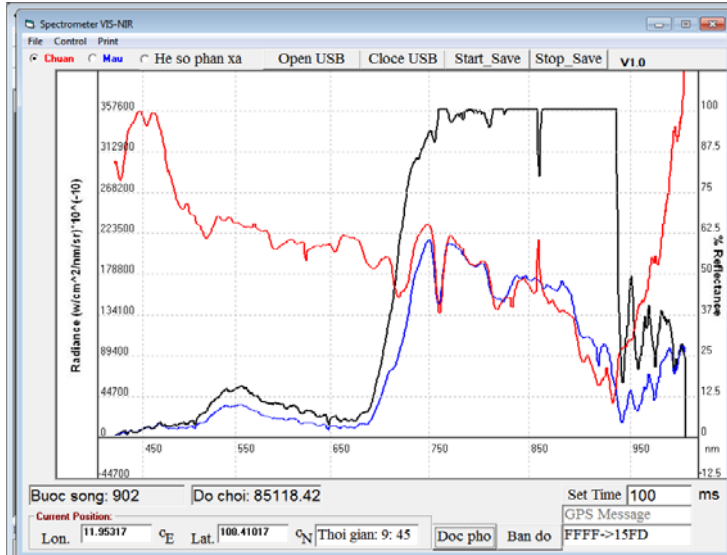


NOAA receiving system

Other activities on Space technology and RS



Optical & Near-infrared spectrum



Spectrometer (manufactured by STI) used for measuring the reflective spectrum of the natural objects

Other activities on Space technology and RS



VIS-NIR Spectrometer

Spectrometer



Spectrometer onboard UAV

Workshops



“Space technology and application 2010”
16-17/12/2010, organized by Space Science
and technology program and STI



Workshop

“Applications of space technology for socio-economic benefits”
by UNOOSA/ESA/Viet Nam
Ha Noi 10-14/10/2011



Workshops

**20th Asia-Pacific Regional Space Agency Forum (APRSAF-20),
Hanoi 03-06/12/2013**



THANK YOU VERY MUCH