

Assoc.Prof. Dr. Doan Minh Chung,

SPACE TECHNOLOGY INFRASTRUCTURE DEVELOPMENT OF VIETNAM UNTIL 2020

1. Develop & launch some communication satellites:

- 2008: VINASAT-1 with 12 transponders;
- 2012: VINASAT-2 with 24 transponders.

2. Develop & launch some EO satellites:

- 2013: VNREDSat-1 optical 130 kgs; 2.5m PAN, 10m MS
- 2018: JVLOTUS-1 radar 500kgs
- 2020: JVLOTUS-2 radar 500kgs

Planning VNREDSat-2 (optical; 1m) & VNREDSat-2B (hyperspectral)

3. Project “Vietnam Space Center” - Japan ODA

- Build Space Center (Hoa Lac high tech. Park)
- Develop & launch JVLOTUS-1; -2 radar

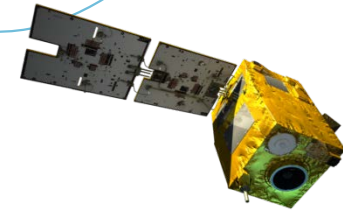
VNREDSat-1

(VietNam small satellite for natural Resource, Environment
& Disaster management)

Project Owner: VAST

Prime contractor: EADS Astrium

Launch time: 07/5/2013 at Kourou, France



Mission: Earth observation in PAN and 4 MS spectral bands

Revisit time: **3 days**

Orbit characteristics: **SSO, 680 km** altitude

LTAN : **10:42 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)**

Imaging modes: single shot, scanning, stereo

Swath : **17.5 km**

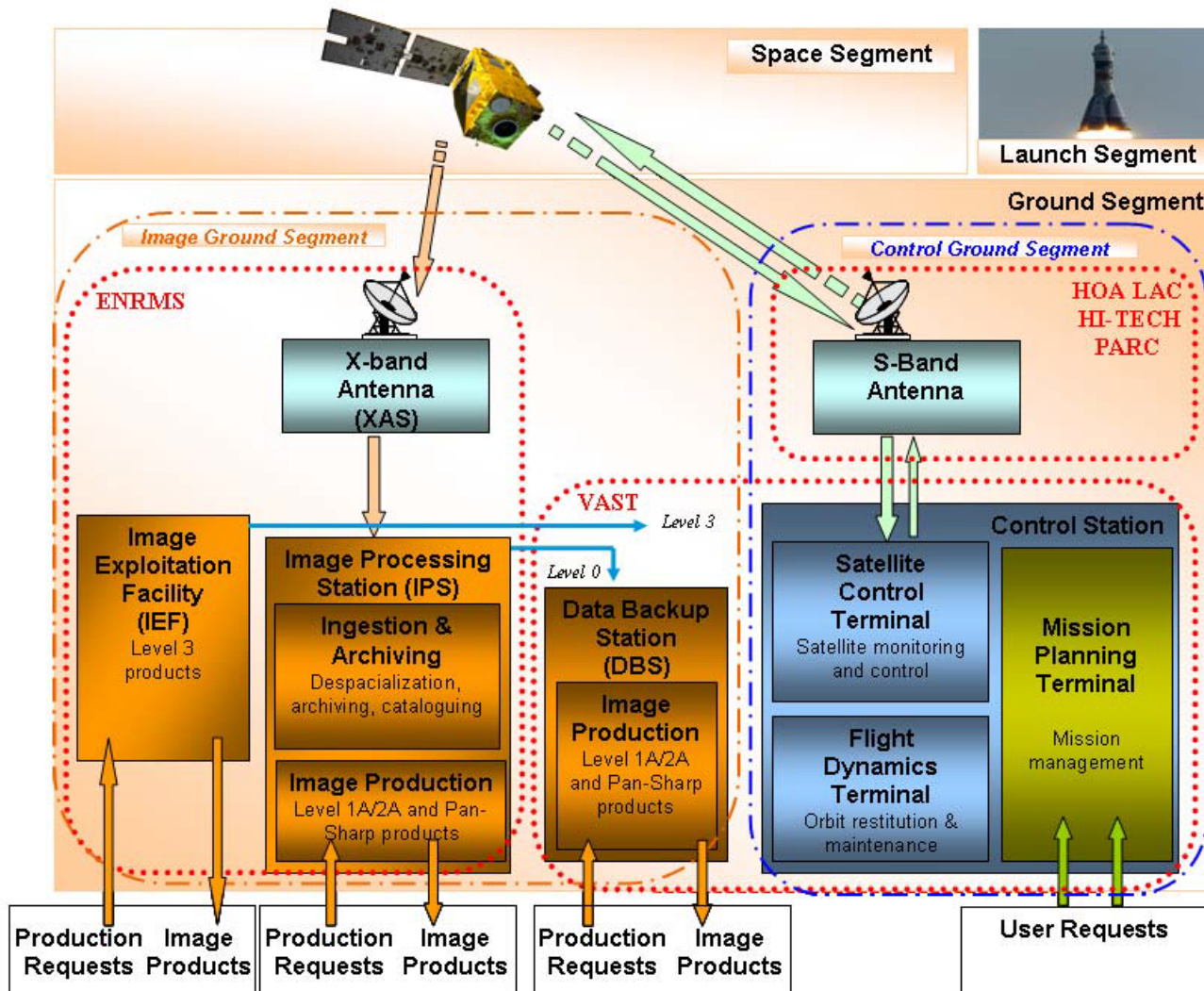
Strip length: **823 km (PAN + MS)**

Number of acquired images per day: **100 scenes**

Agility : **+/- 35 degrees**



Architecture of the VNREDSat-1 system

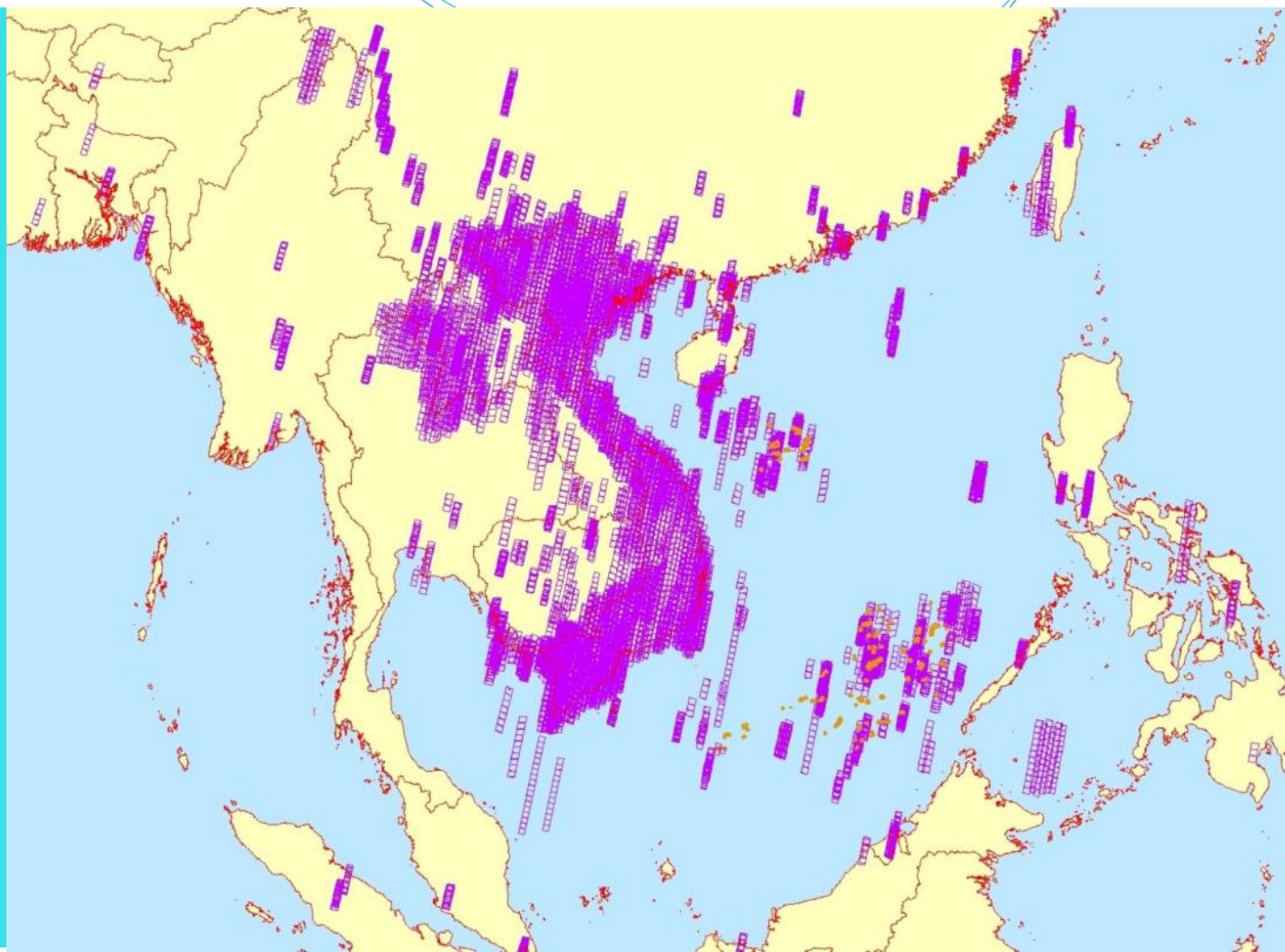


Acquired Images

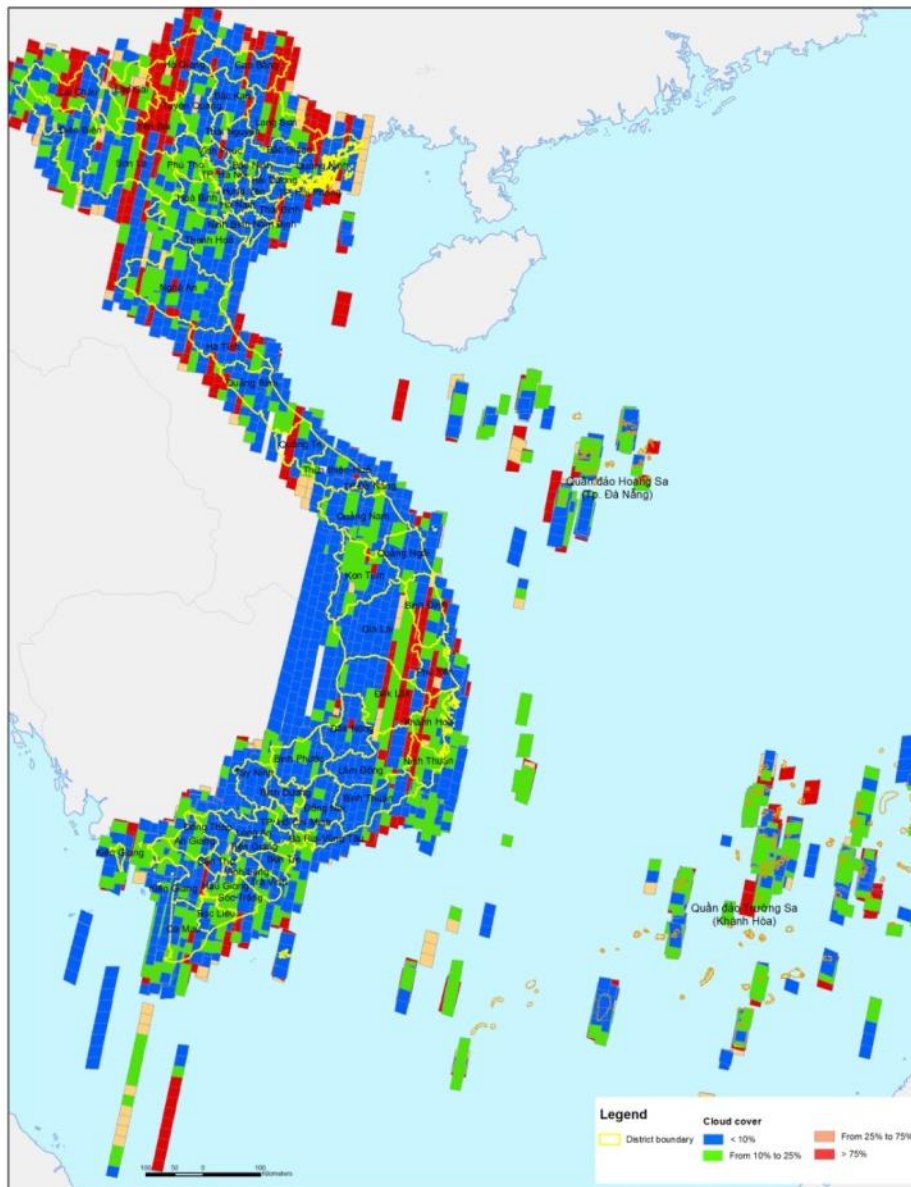
VNREDSat-1 images over ASEAN

As of 31th August 2016, VNREDSat-1 satellite has captured and downlinked:

- In total: more than **54.000** scenes



VNREDSat-1 images from 01/09/2013 to 30/08/2016



VNREDSat-1 satellite has captured and downlinked:

- In Vietnam: more than **29.000** scenes

Vietnam Space Center - VAST



Fund: Japanese ODA & Vietnam; Duration: 2012 – 2021; Exe. Agency: VNSC



**Center of Human
Resource Development in
Space Technology**

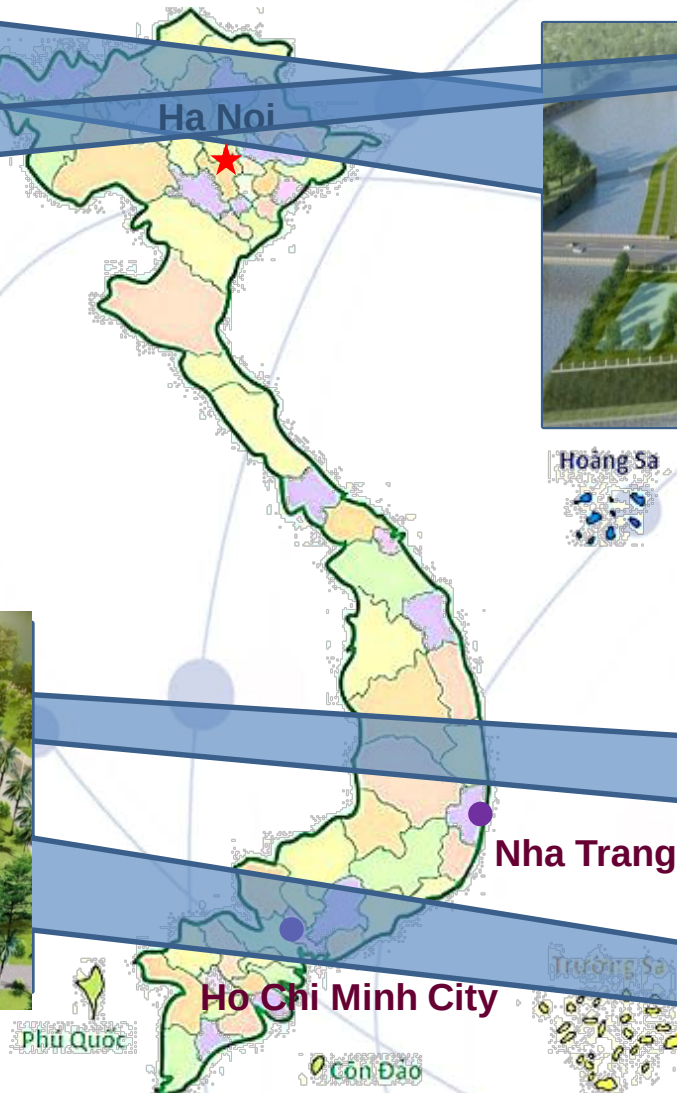


Hoàng Sa

**Vietnam Space Center in
HHTP**



**Space Application Center
in Ho Chi Minh City**



Ha Noi

Nha Trang

Ho Chi Minh City

Phu Quốc

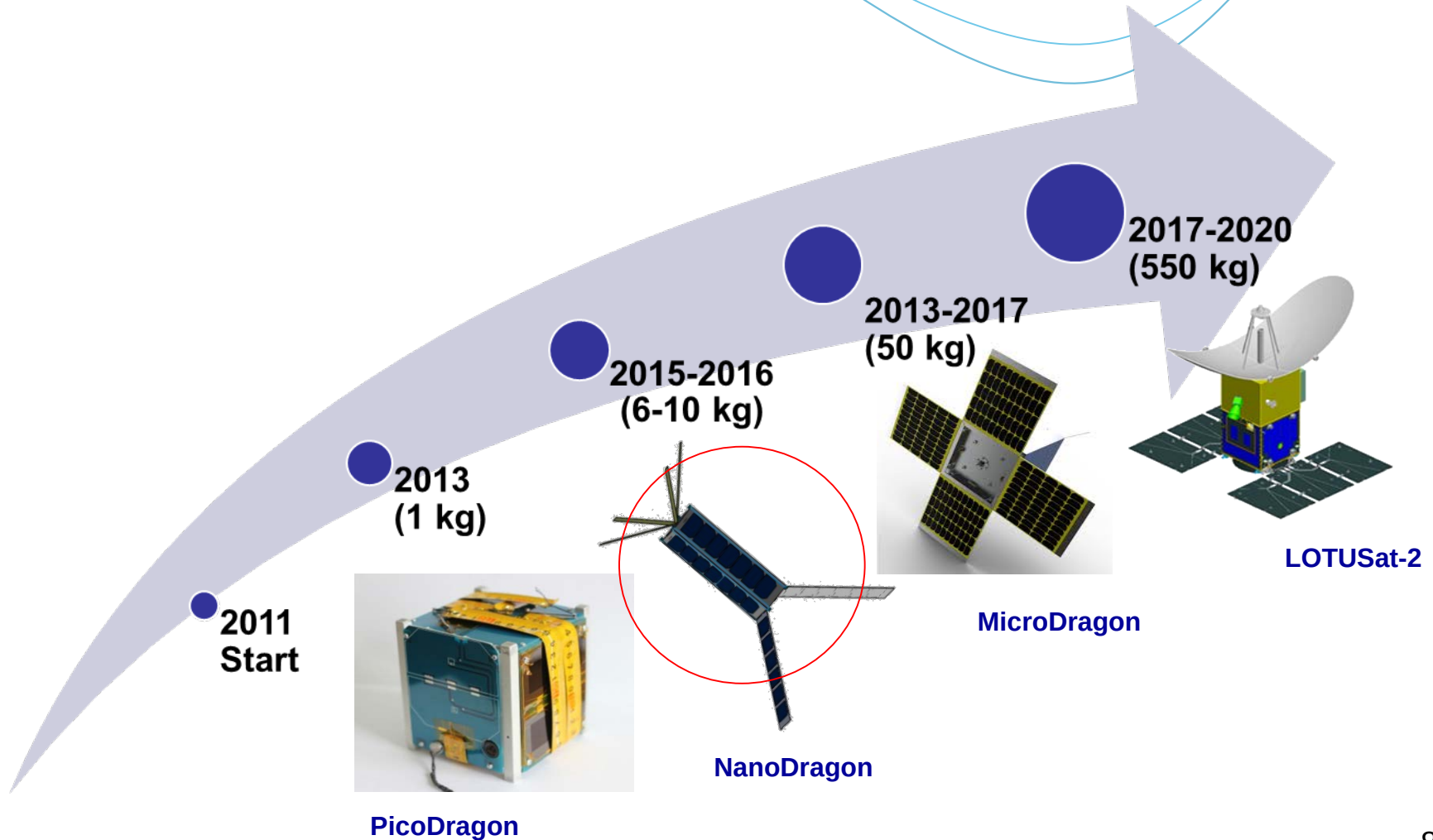
Con Đảo

Trường Sa



Nha Trang Observatory

Plan for EO satellite development of VNSC until 2020



National Research Program on Space S&T - VAST

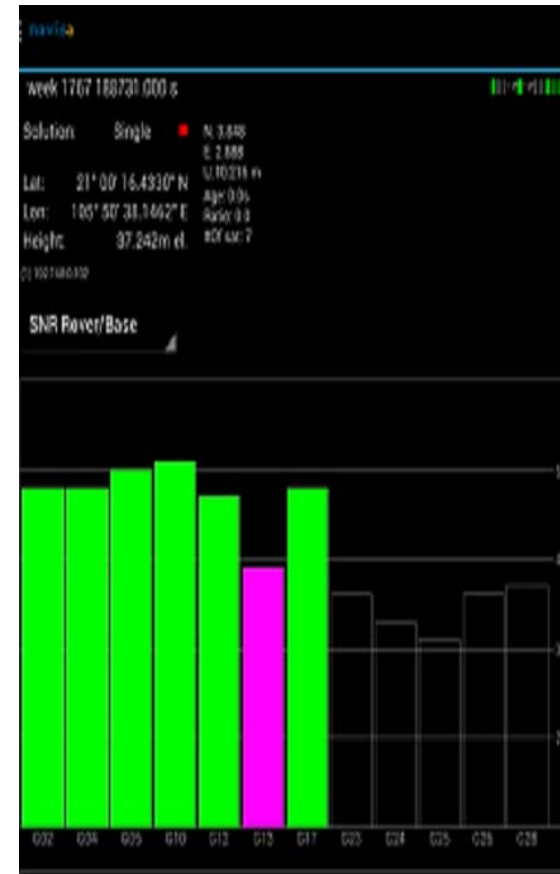
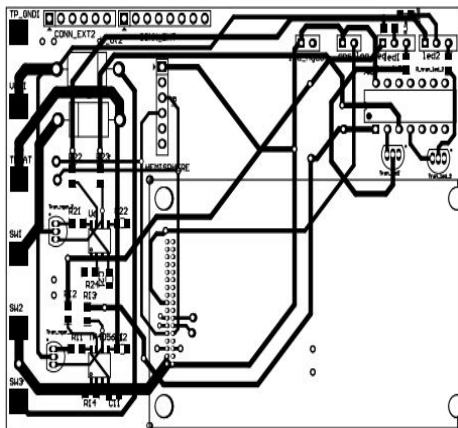
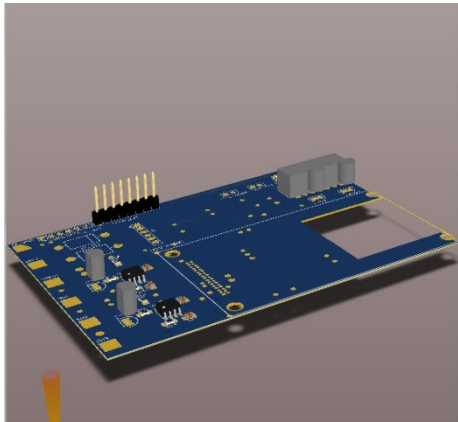
- 26 Projects approved in the period 2012-2015

Budget ~ 104 bil.VND ~ 5 mil.USD

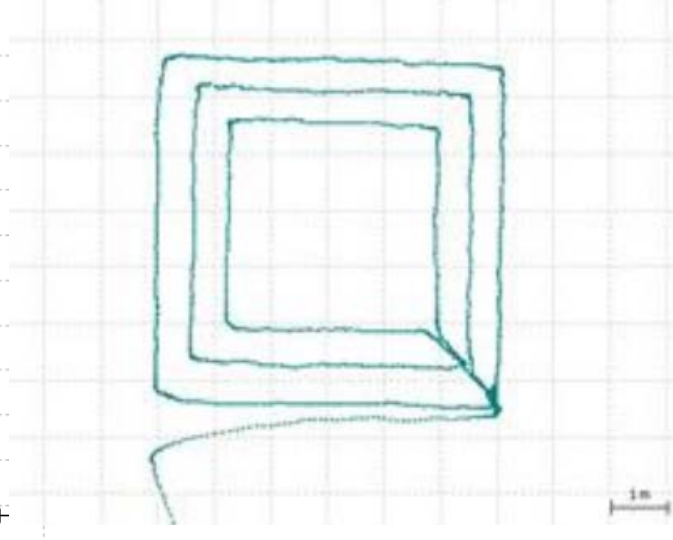
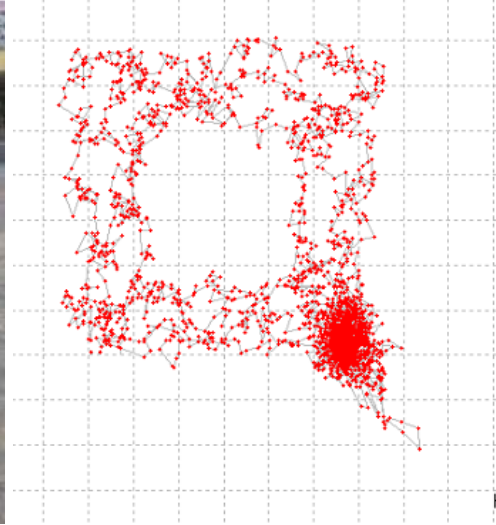
- 22 projects started in 2016 & 2017 with budget ~ 7 mil.USD

- Small satellite, GNSS, GRS technologies.
- Applications of RS, GIS, GPS and communication satellite for economic development; natural resource, environment and disaster management, transportation, sea navigation;
- Fabrication space technology equipments such as MW radiometers, optical payloads, spectroscopy on UAV, atmospheric sensors on balloons, nano satellite, GPS high resolution receiver, mobile receiving station for communication satellite, etc.
- Fundamental research for space technology applications (medical-biology in space; material science in space environment).
- Launcher rocket technique.

Design and manufacture of the GPS high resolution receiving station (NAVIS, HN Univ.) - 2013-2016

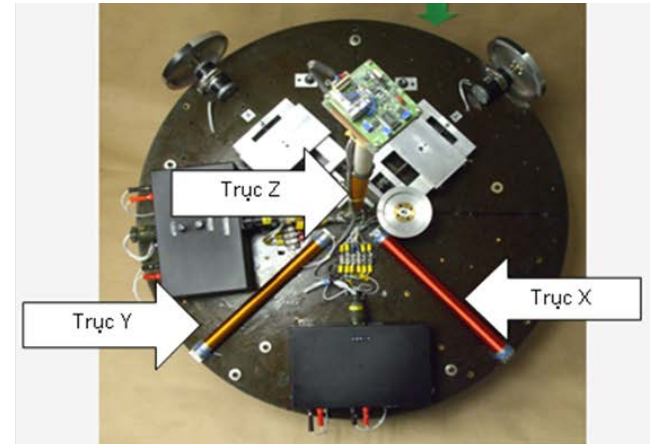


Testing and potential applications of NAVIS's GPS receiving station

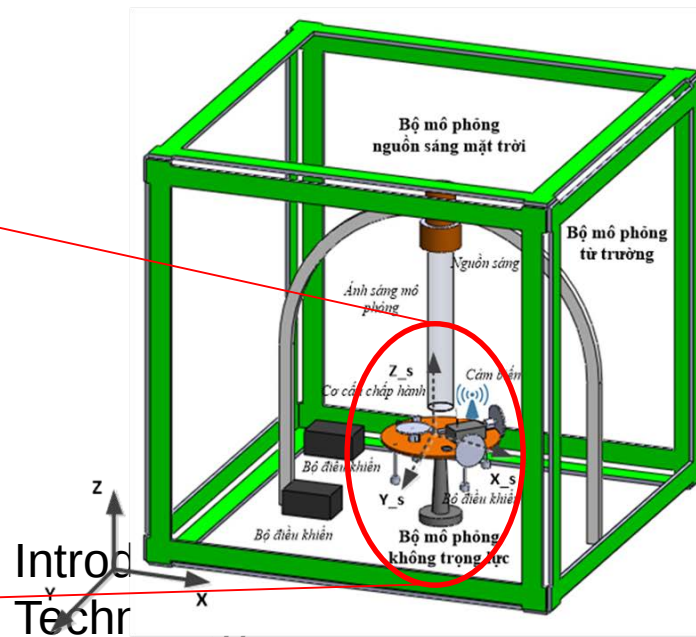
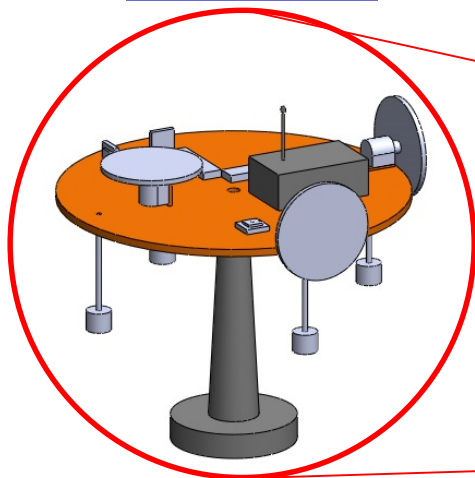


VNSC – simulation of the satellite posture system – ADCS 2012-2016

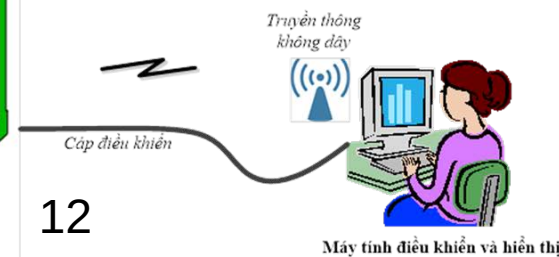
(2008-2011)



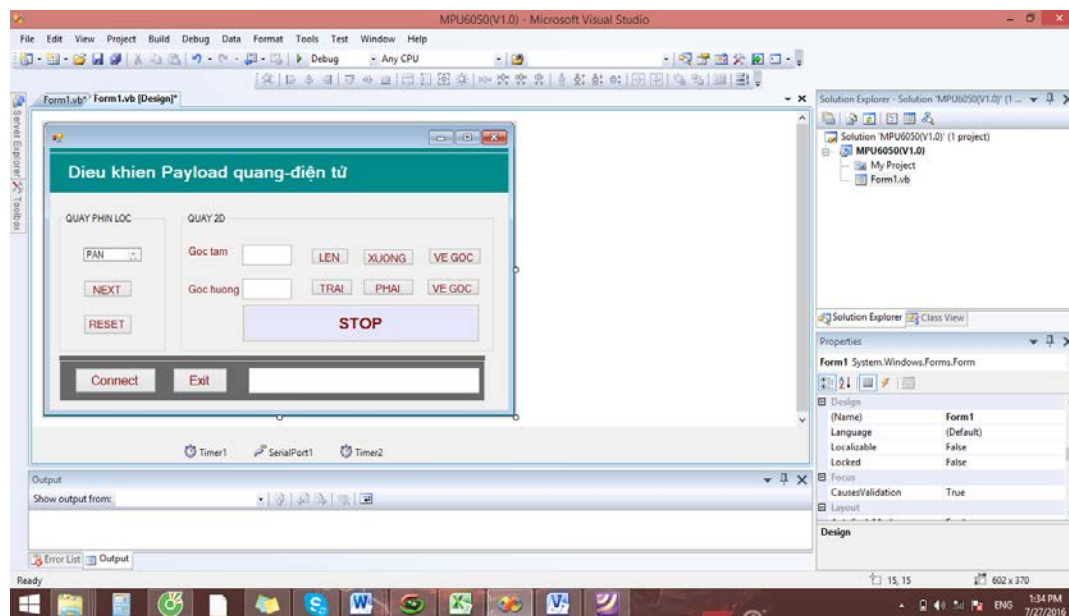
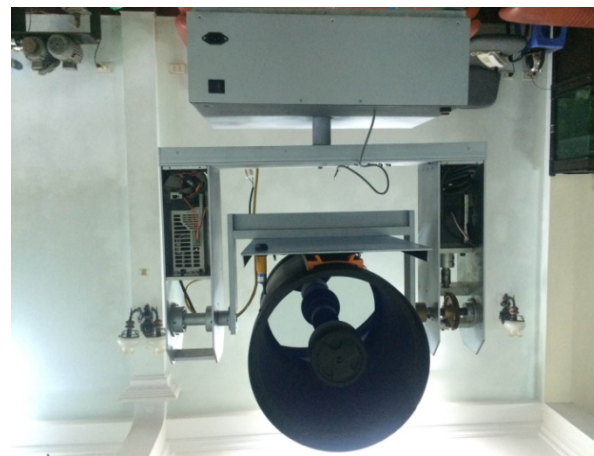
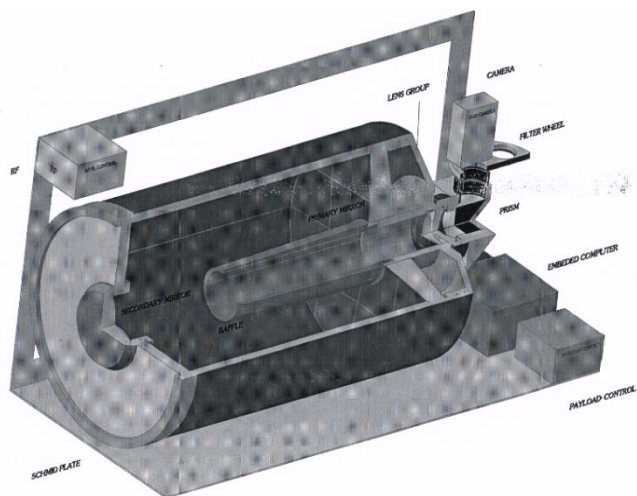
(2014 -2015)

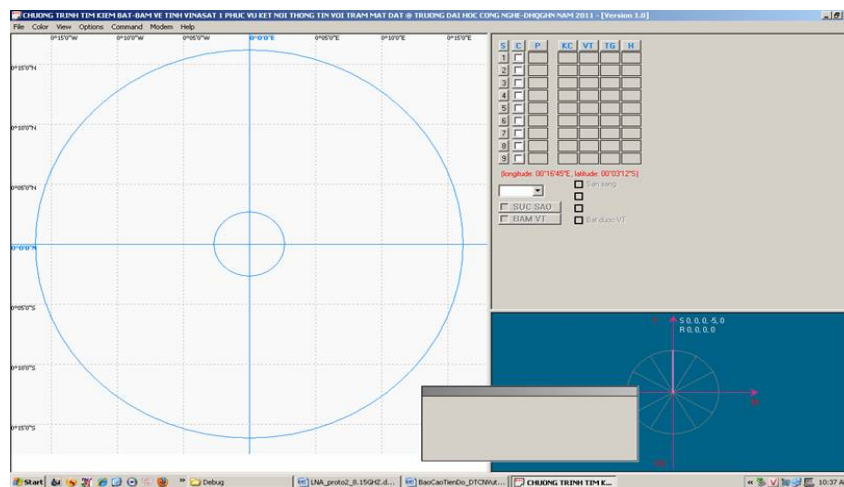


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DESIGN AND MANUFACTURING A MODEL ELECTRO-OPTICAL PAYLOAD FOR MULTISPECTRAL IMAGER FOR SMALL EO SATELLITE (2013-2016)

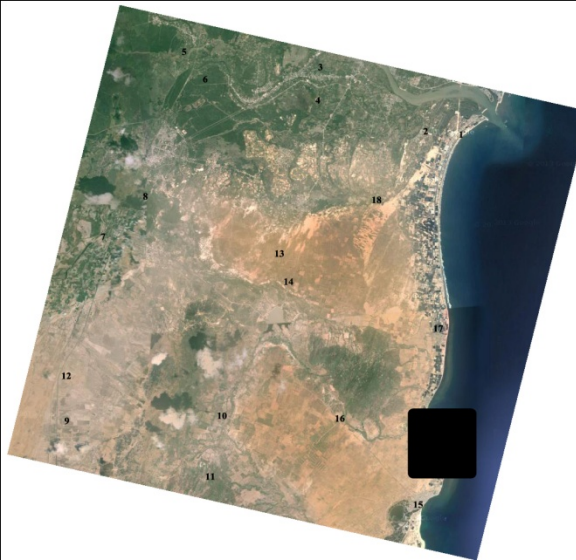
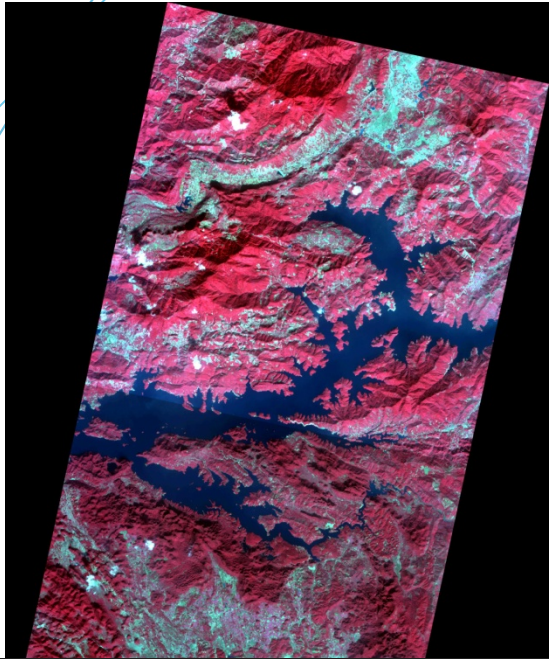




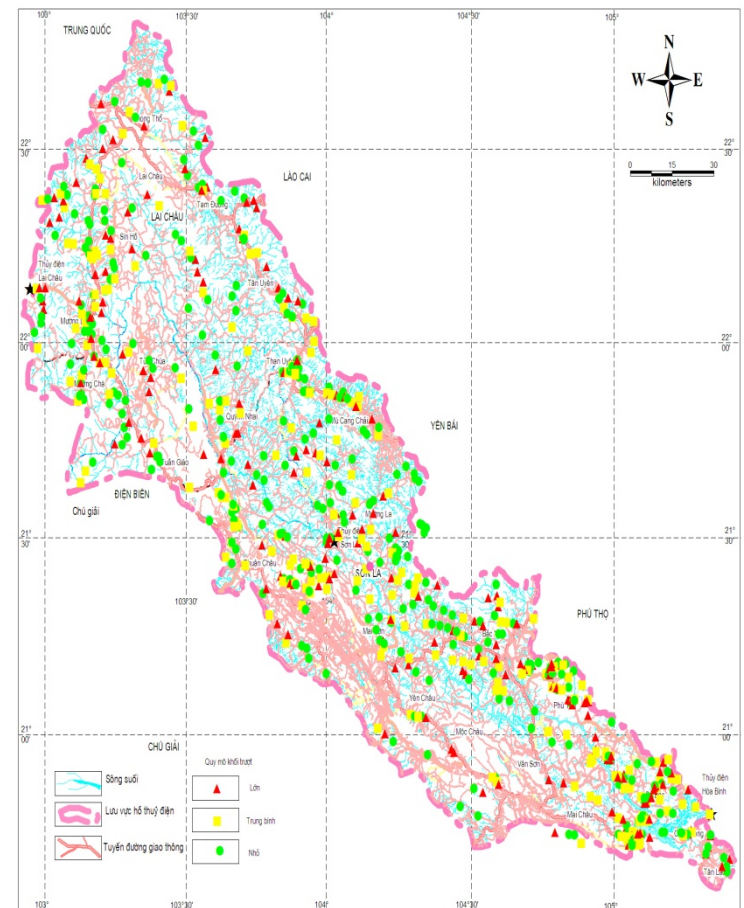
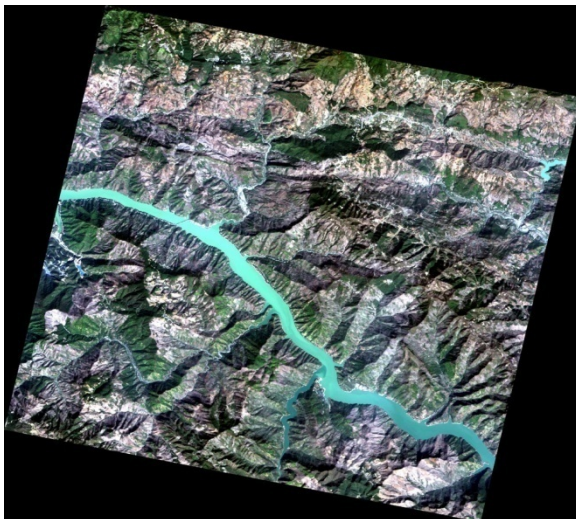
VAST manufacture UAV & its application for monitoring forest fires, drought /flood, water quality, ship and oil spill, etc
STI design & manufacture the Reflect-Radiometer and use it for measuring the reflect spectrum of the natural objects



Applications of VNREDSat-1 for disaster management - landslides



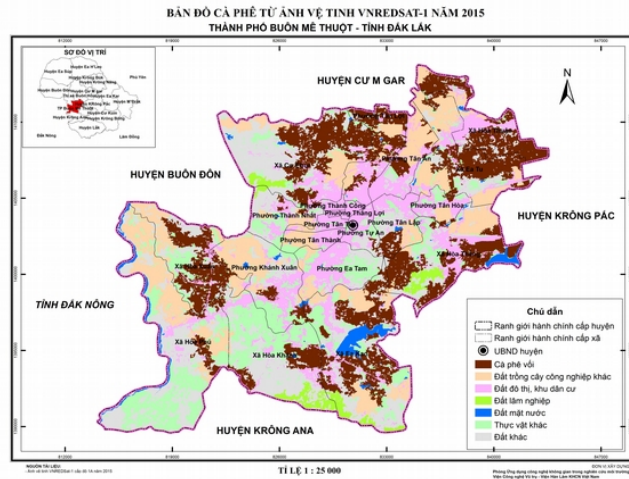
Applications of RS&GIS for estimation of the geological hazards (landslides) in highland



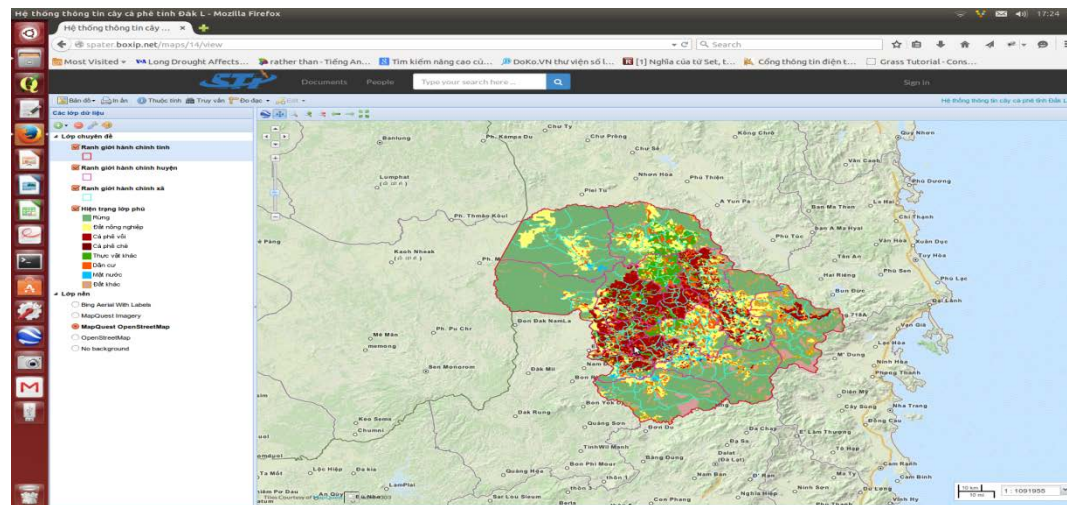
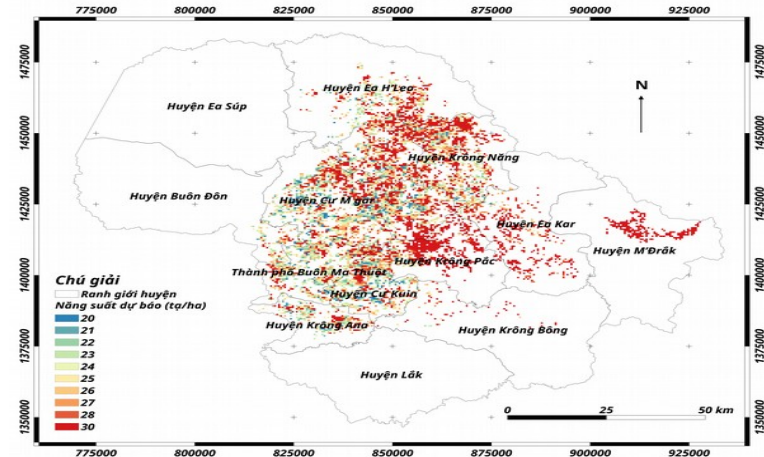
Establish the spectral library for natural objects of Vietnam using spectroscopy on UAV - 2014



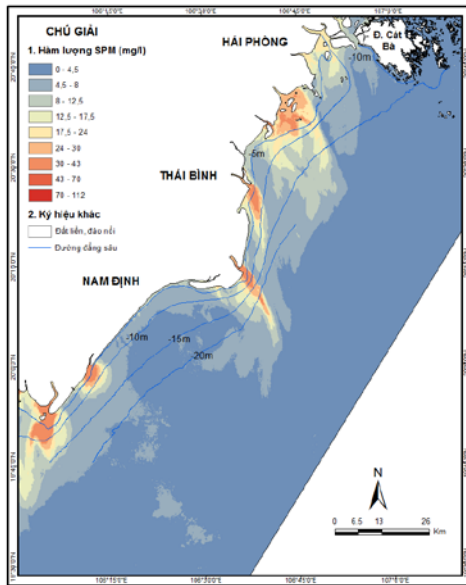
Applications of RS&GIS for coffee monitoring of growing status, prediction of its yield & production, pilot in DakLak - 2013-2016



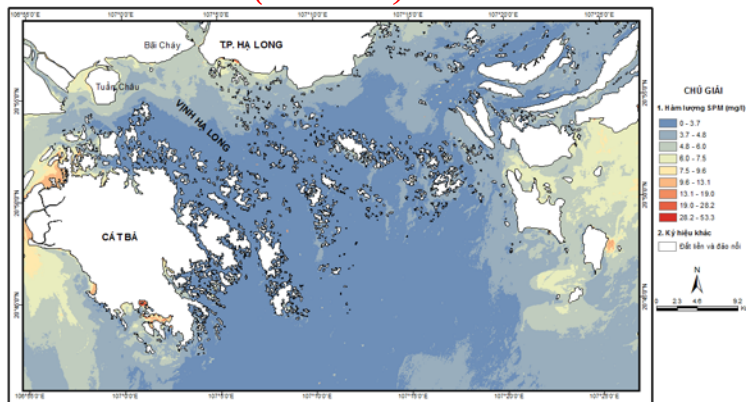
BẢN ĐỒ DỰ BÁO NĂNG SUẤT CÀ PHÊ TỈNH ĐẮK LẮK NĂM 2015



Project “Research of methodology for estimation and monitoring the coastal water quality of Vietnam using high, everage, multi-temporal satellite data, trial utilization with VNREDSat-1 data – VT/CB-01/14-15



Map of SPM distribution of River Hong zone (25/9/2014)



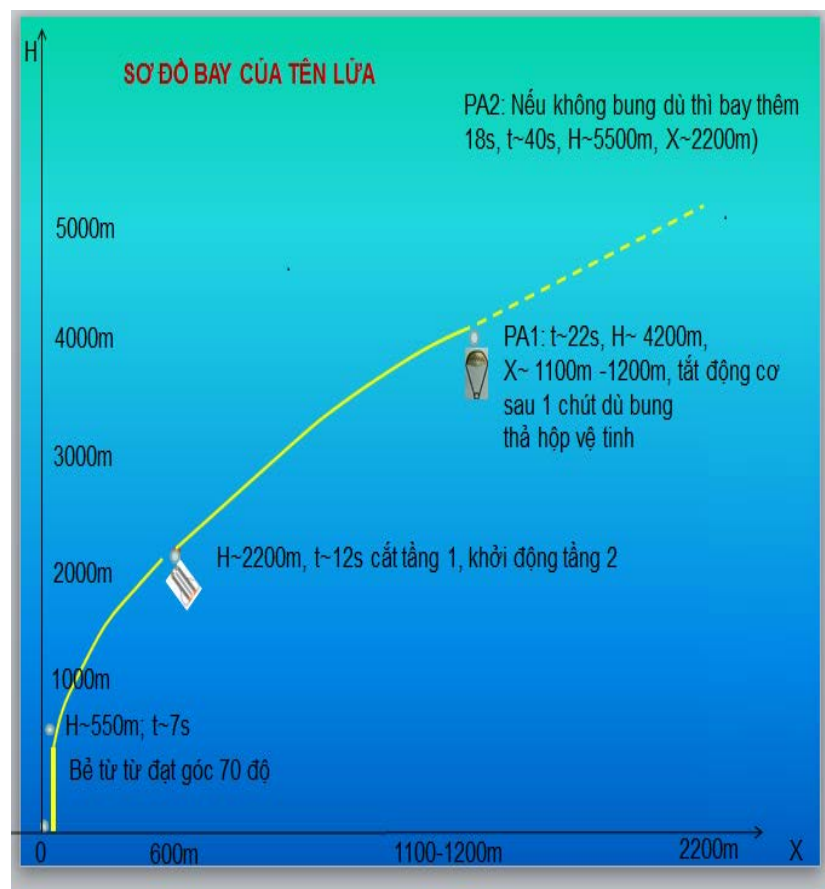
Map of SPM distribution of HaLong bay zone (25/9/2014)



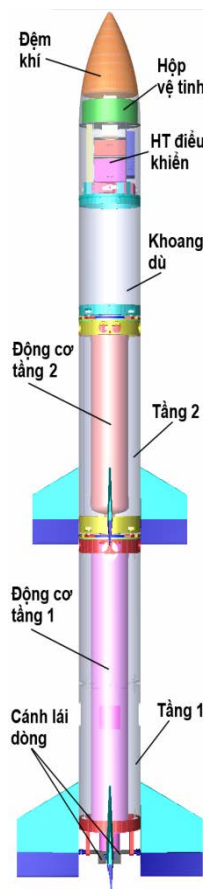
Main electronic Portal of the water quality of coastal zone of Vietnam

Thiết kế và chế tạo tổ hợp tên lửa thử nghiệm TV-01 mô phỏng tên lửa đẩy tầm thấp (2013-2015)

Bảng thông số cơ bản



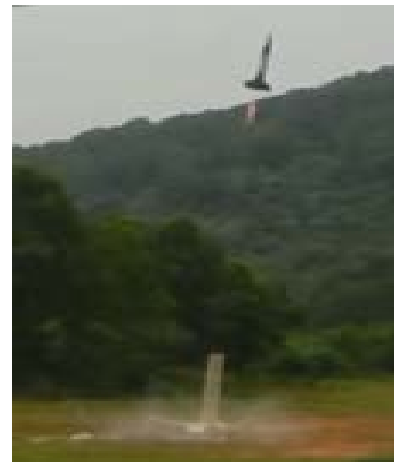
Sơ đồ bay



Sơ đồ phối trí tên lửa

Độ cao bay tối đa	≥ 4000 m
Cự ly bay tối đa	≥ 3000 m
Tốc độ tối đa	≥ 200 m/s
Tải có ích (hộp vệ tinh)	≥ 3 kg
Số lượng tầng	02
Phương pháp phóng	thẳng đứng
Hệ thống điều khiển	ô-tô-nôm
Loại động cơ	nhiên liệu rắn

TEST THE PV-01 AT THE TRIAL AREA (2013-2016)



Thu nong TV-01.mp4



Thu bay TV-01 lan 3.2.mp4



TLMH 1.mp4

Passive MW RS on soil moisture, vegetation, sea surface temperature & salinity

- Design and manufacture 3 passive microwave radiometers (L, C, X bands).
- Utilizations of MW radiometers and passive MWRS methods to determine SMC, biomass, SST, SSS, etc.
- Conduct and promote Space education for junior students and children (water rocket, space poster competitions, etc.)

Data process in the
Microwave Laboratory



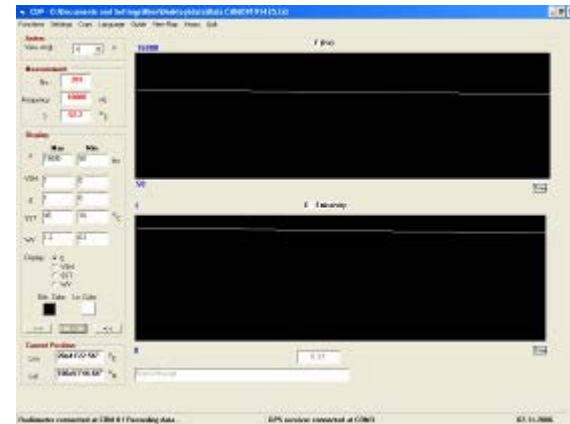
Số 18, Xô Viết Nghệ Tĩnh, Quận Thủ Đức, TP. Hồ Chí Minh
Phòng Thí nghiệm STAC, Viện Vật Lý, Trung tâm KHTN & CNQG (10/2003)



To measure soil moisture
content (SMC) on crop fields



L band microwave
Radiometer

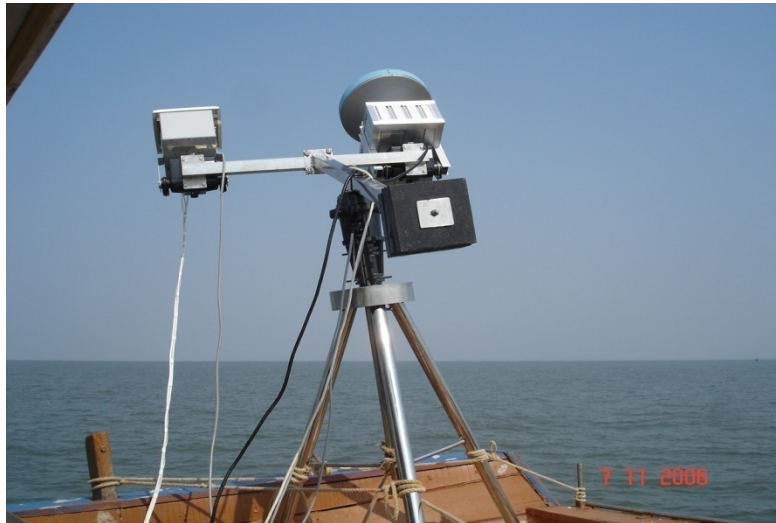
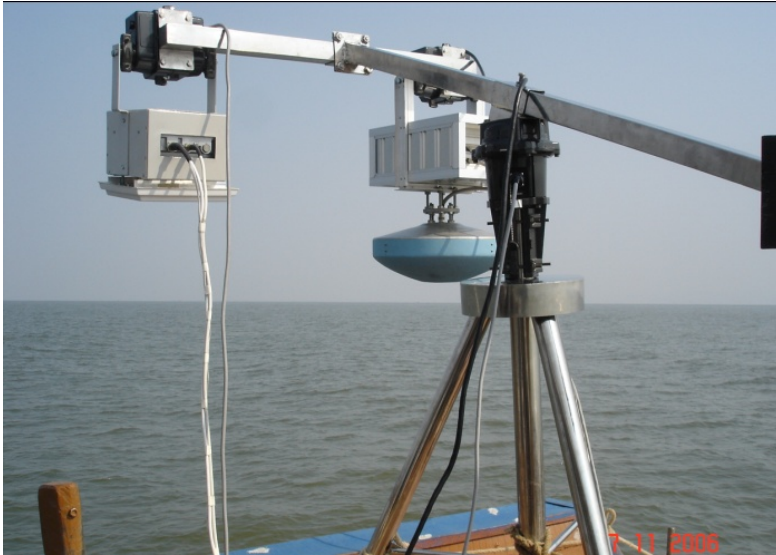


Software for RDM data receiving
and processing

To determine biomass on
corn field



Ứng dụng các hệ Phổ kế SCT nghiên cứu độ mặn (SSS) và nhiệt độ mặt nước biển (SST)

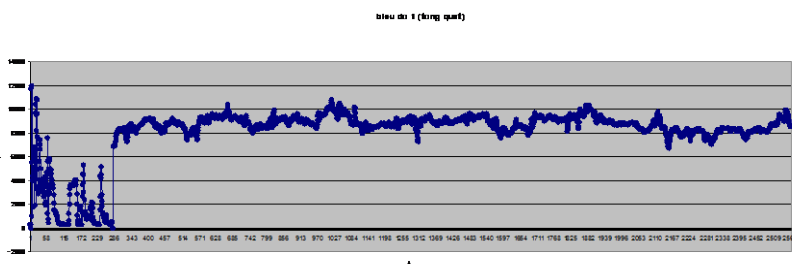
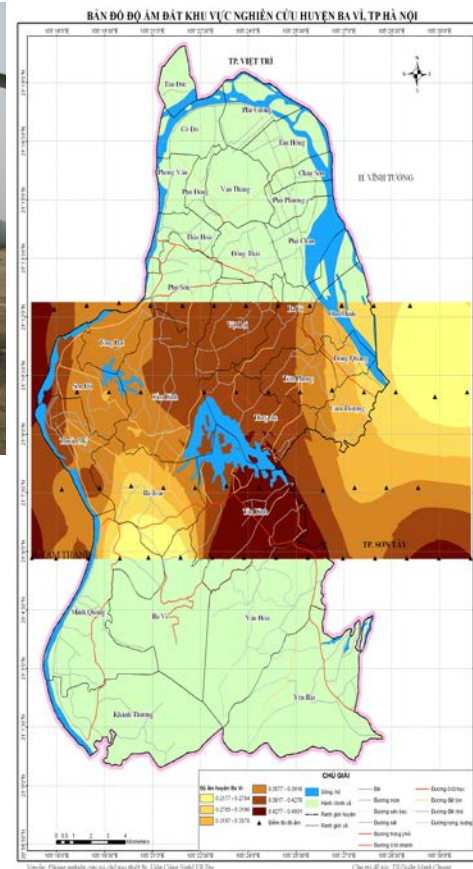


Cán bộ Viện Tài nguyên & Môi trường Biển, VAST tham gia đo độ mặn nước biển.

Aerial remote sensing for soil moisture mapping

Assembly Radiometers on helicopter

Aerial Remote Sensing for soil moisture mapping



Registered TB over rice field in 60 minutes



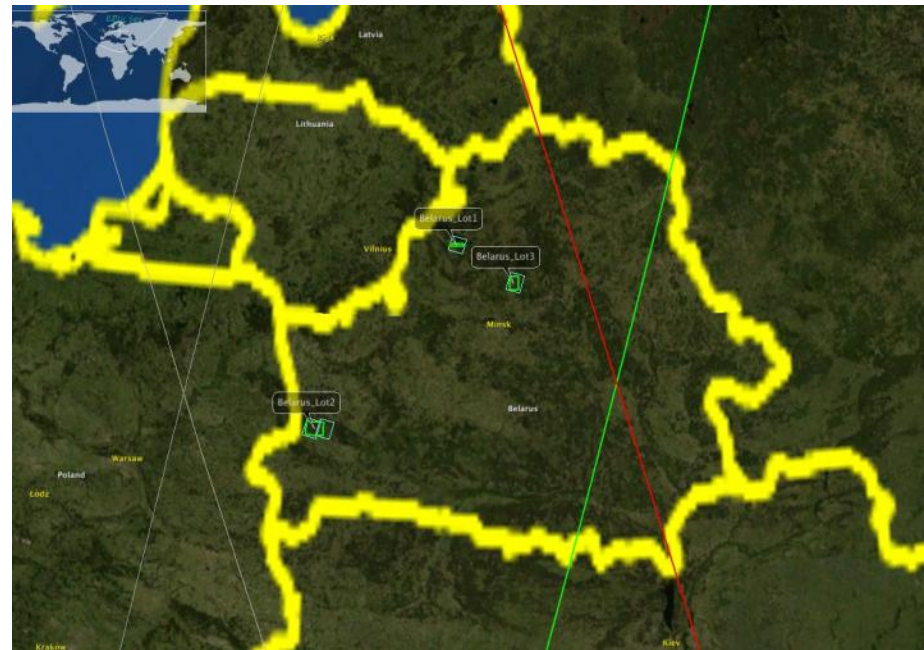
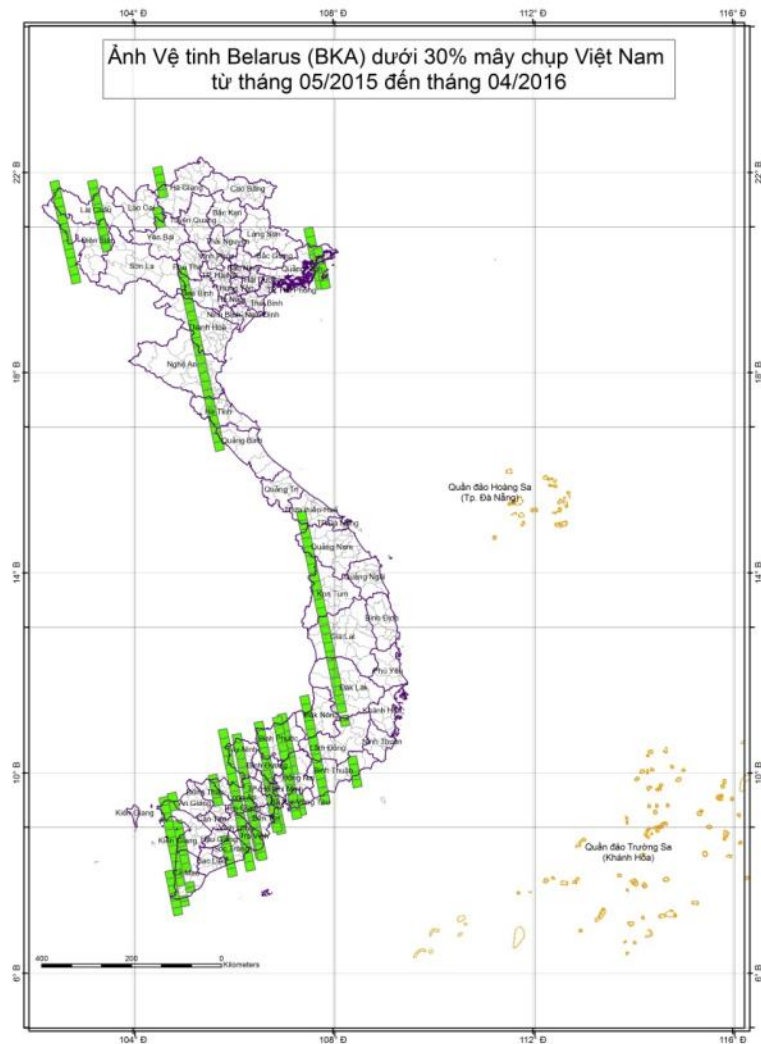


International cooperation for disaster management in Vietnam

(through UNESCAP – STI (VAST) – DMC (MARD))

International Cooperation between STI & UE “Geoinformation Systems”, National Academy of Sciences of Belarus, 2015

MoU signed on Cooperation in effective utilization of VNREDSat-1 and BKA systems



VNREDSat-1 plan for imaging



BKAs' image: Tan Son Nhat Airport

Cooperation with JAXA for disaster management

Kick-off workshop on utilization of remote sensing & GIS for disaster management – Sentinel Asia Mini-project – 10/2014 (JAXA-AIT-STI-DMC)

- JAXA: Dr. Naoto Matsuura
- DMC: Dr. Hoang Van Thang – Dir. Water Management Dept., Vice-Minister MARD
- VAST/STI: Vice-President of VAST

will sign MOU for cooperation.



STI: VNREDSat-1 as a SA-DPN

- Vietnam is a member of UNESCAP since 23/8/1954
- 18/11/2015: VNREDSat-1/STI accepted as a SA-DPN/DAN

No.	Area	Disaster	Date of image	Date of request	Requester
1	Souther Luzon andã Vasasy, Philippines	Typhoon	17/12/2015	15/12/2015	ESCAP
2	Tamil Nadu, India	Flood	3/12/2015	2/12/2015	SA
3	Kathmandu, Nepal	Earthquake	4/5/2015	27/04/2015	ESCAP
4	Gandaki, Nepal	Earthquake	1/5/2015	27/04/2015	ESCAP
5	Vanuatu, Australia	Cyclone	18/03/2015	16/03/2015	ESCAP
6	Tacloban, Philippine	Typhoon	10/12/2014	9/12/2014	SA
7	Vishakhapatnam, India	Cyclone	15/10/2014	13/10/2014	ESCAP
8	Srinagar, India	Flood	18/09/2014	15/09/2014	ESCAP
9	Muzzaffargarh, Pakistan	Flood	18/09/2014	15/09/2014	ESCAP
10	Ludian, China	Earthquake	8/8/2014	6/8/2014	ESCAP
11	MH370	Missing	11/3/2014	10/3/2014	GISTDA
12	Jakarta, Indonesia	Flood	16/01/2014	15/01/2014	SA
	Total scenes received: 283 scenes				
	GISTDA: Geo-Informatics and Space Technology Development Agency, Thailand				

➤ **VNREDSat-1 responses to Sentinel Asia in 2016**

Total scenes received: **330** scenes

STT	Date	Disasters	Location
1	08/11/2015	Heavy rain, Flood	Tamil Nadu, India
2	14/12/2015	Melor Storm	Southern of Luzon, Philippines
3	06/02/2016	Earthquake	Taiwan
4	22/02/2016	Typhoon	Fiji Island, Pacific Ocean
5	25/02/2016	Glacier melt	Northern of Myanmar
6	01/03/2016	Flood	Northern of Myanmar
7	02/03/2016	Flood	Jakarta, Indonesia
8	14/03/2016	Flood	Bandung, Indonesia
9	01/04/2016	Forest fire	Philippines
10	01/04/2016	Oil Spill	Taiwan
11	06/04/2016	Land slide	Pakistan
12	14/04/2016	Earthquake	Myanmar
13	16/04/2016	Earthquake	Japan
14	16/04/2016	Earthquake	Ecuador
15	16/05/2016	Flood	SriLanKa
16	23/05/2016	Vocalno eruption (Sinabung)	Indonesia
17	20/06/2016	Land slide	Indonesia

International cooperation of VNREDSat-1 image for disaster management

Image over Tacloban, Philippines,
15th Nov 2013



Flood areas on 18th Sep 2014



Srinagar_India



Muzaffargarh_Pakistan

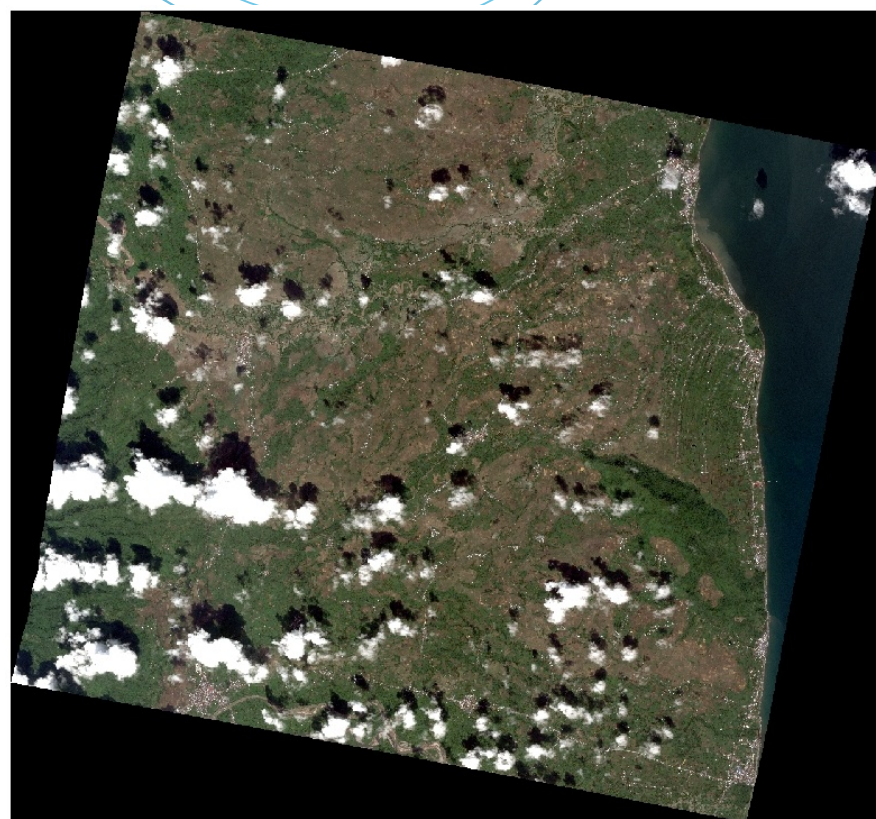
“HUDHUD” cyclones, VNREDSat-1 image in 23/10/2014, causing mud flooding in Visakhapatnam, India



Image VNREDSat-1 captured flooding, landslides of Philippines
(Typhoon Hagupit - N.5 (07/12/2014))

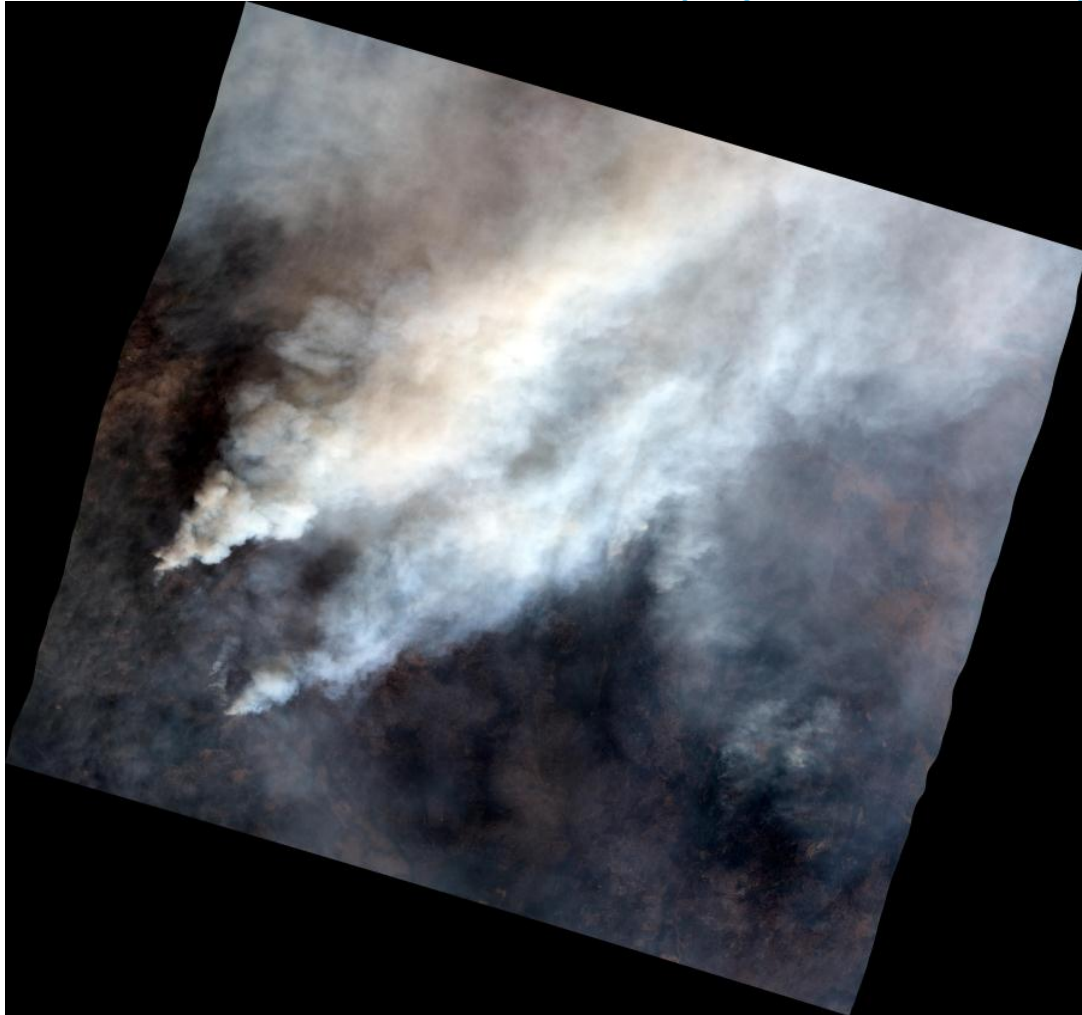


Tacloban_10122014

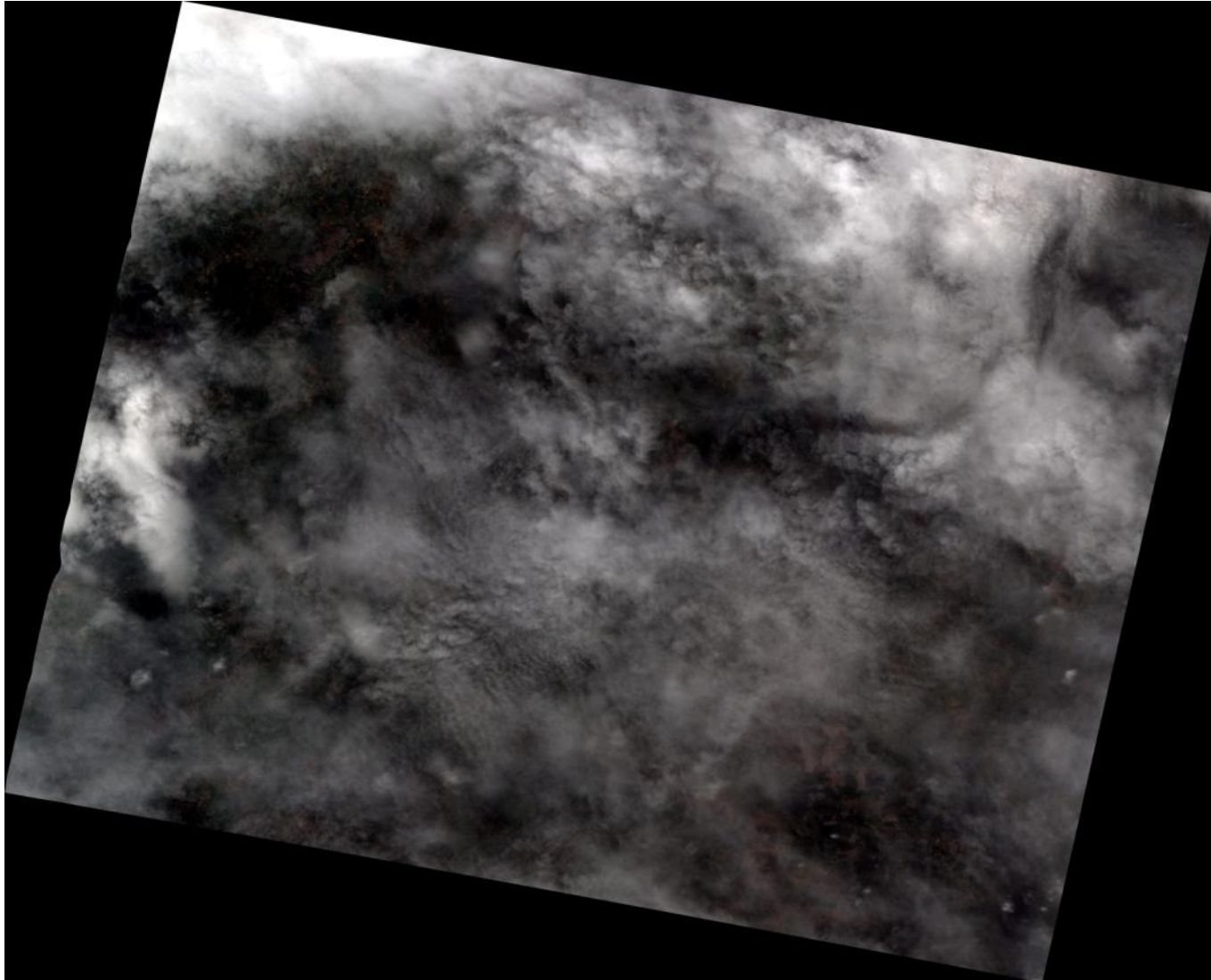


Leyte_10122014

VNREDSat-1 captured forest fires at Pateros, Washington,
USA - 27/08/2015



VNREDSat-1 image over Tamil Nadu, India (3/12/2015) –
Emergency Observation request by SA dated 2/12/2015



VNREDSat-1 image over Tacloban, The Philippines (10/12/2015) –
Emergency Observation request by SA dated 9/12/2015





Contact: www.sti.vast.ac.vn; Email: dmchung@sti.vast.vn

THANK YOU FOR YOUR KIND ATTENTION