

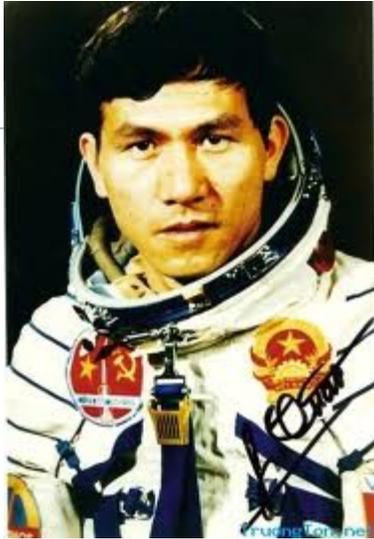
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The National Strategy, Current Activities for Space Technology Development and Application

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Brief History

- ▶ Space technology was imported into Vietnam since late 1970 years, starting with two remote sensing capacity building projects sponsored by UNDP/FAO (VIE/79/001 and VIE/83/004). The goal of them was introducing satellite remote sensing technique to Vietnam and enhancing the remote sensing capability of the Vietnam Centre of Science and Technology (former name of Vietnam Academy of Science and Technology – VAST).
- ▶ In 1978 the former Vietnam Space Research Committee was established and became a member of the Intercosmos (an international space committee of the socialist countries at that time).



Brief History



- ▶ 23/7/1980 Vietnamese cosmonaut Pham Tuan became first Asian citizen who present in space when he joined a space mission together with

Russian cosmonaut V.Gorbatko on Soyuz-37 spacecraft. The spacecraft afterward docked with Salut-6 space station. The crew staid there for 7 days and during this time they carried out more then 30 scientific



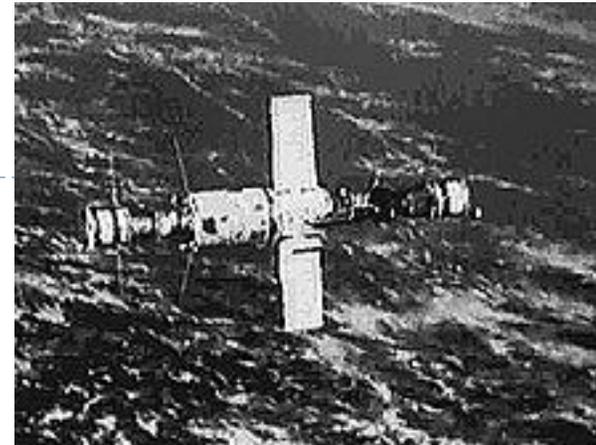
- ▶ 3 experiments.

Brief History

➤ During Pham Tuan's space mission the MKF-6 multispectral cameras were used both in space station and in airplane to photograph some selected areas in Vietnam. At the same time a field survey was conducted in these areas to form a three-stage surveying campaign.

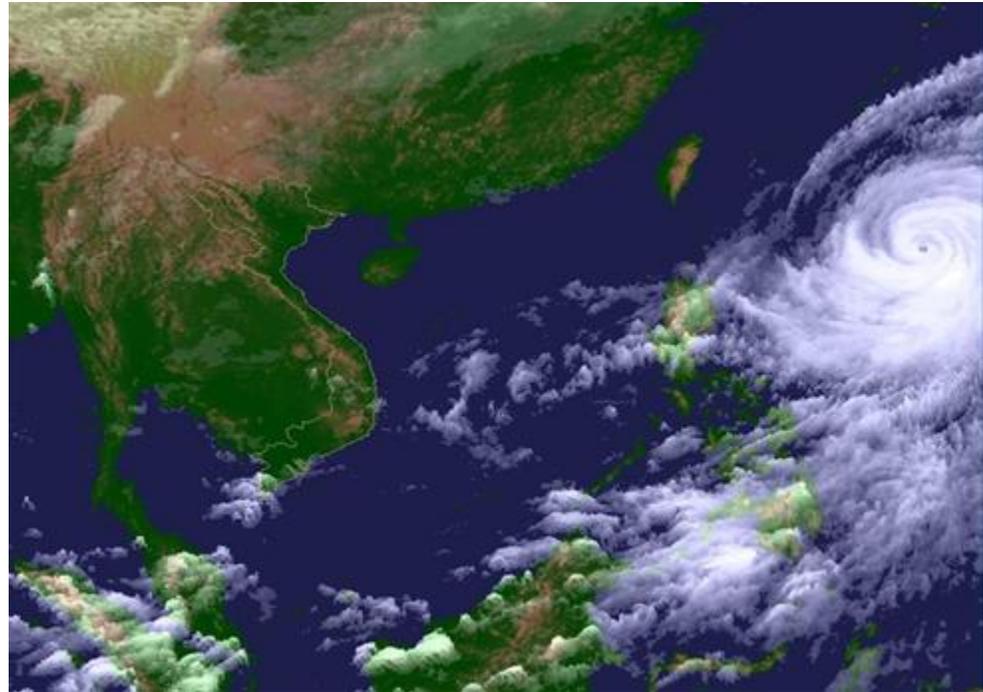
➤ The campaign has involved participants from various institutions in different fields that's why played important role in spreading remote sensing application in Vietnam and led to formation of many remote

➤ sensing groups in various institutions.



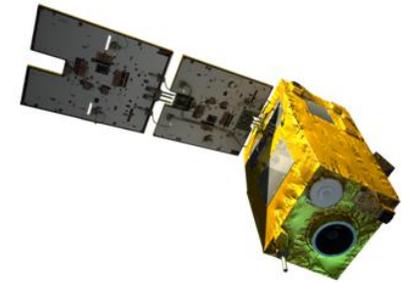
Brief History

- ▶ Under the coordination of the National Space Research Committee, the period from late 1980 to early 1990 years also witnessed the appearance and development of satellite meteorology, satellite communication and broadcast, satellite-based positioning in the country.



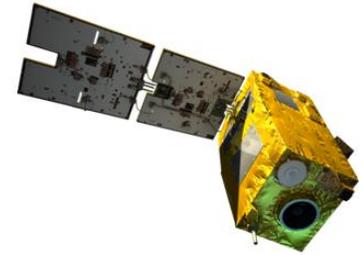
Unfortunately the committee ceased activity in 1993 after the collapse of the Intercosmos programme.

Strategy for Space Technology Research and Application



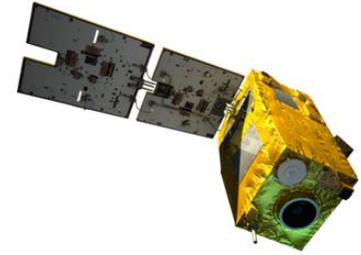
- ▶ Vietnam national strategy for space technology research and application first time appeared on June 14, 2006, when our Prime Minister signed to approve it for the period until 2020.
- ▶ The strategy defines the targets, primary tasks and implementation solutions for space technology development and application in Vietnam.

Targets (until 2010)



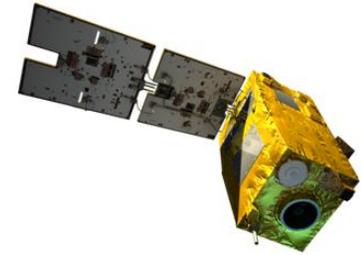
- ▶ Set up the national policy and law frame, organizational structure for steering and coordinating space technology activities; strengthen the system of research and education organizations in space technology field; newly establish a specialized space technology institute.
- ▶ Build the primary space technology infrastructure including: receiving station, image processing centre, satellite-based positioning ground network; launch and operate the geostationary communication satellite VINASAT-1; accept small satellite technology; accomplish designing, building and launching a small earth observing satellite; build and operate the corresponding satellite control station.

Targets (until 2010)



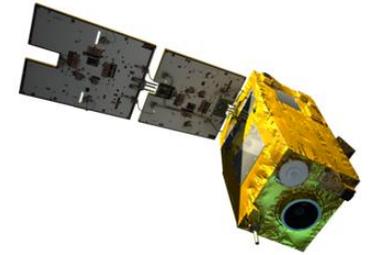
- ▶ Set up and carry out a national scientific research program on space science and technology. Open bachelor degree courses on space science and technology inside the country and cooperate with countries of developed space science and technology for capacity building in order to get some high-level experts. Capable of producing some space technology hardware and software products.
- ▶ Reach to medium level of regional standard on space technology infrastructure, research and application capabilities.

Targets (until 2020)



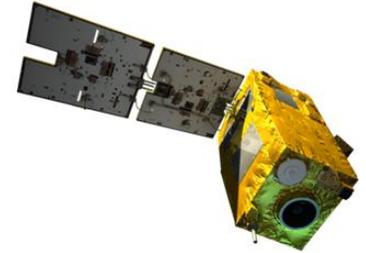
- ▶ Master the technology to build the ground station, small earth observing satellite, and launching rocket.
- ▶ Improve the infrastructure invested at previous stage. Prepare to launch the second communication satellite to fulfill the communication and broadcast requirements of the country. Build and launch some more small earth observing satellites. Complete the satellite-based positioning ground station network.
- ▶ Expand the application of space technology in various fields. Expand and commercialize the space technology products.
- ▶ Reach to fairly high level of regional standard on space technology research and application capabilities.

Strategy implementing activities



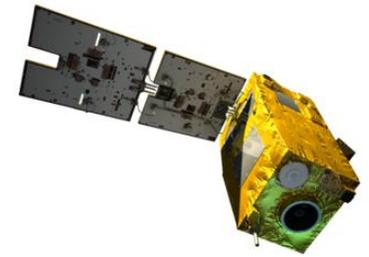
- ▶ Nov. 20, 2006: soon after approval of the strategy, the Prime Minister signed a directive to establish the Space Technology Institute to act as the national central space technology research institute as well as the permanent office of the National Space Committee (would be established later).
- ▶ Dec. 2005: kick-off of the project on establishment of the Environment, Natural Resources Monitoring System (ENRMS) with following objectives:
 - ▶ To build a ground receiving station (VNGS);
 - ▶ To establish the National remote sensing Data Centre (NDC);
 - ▶ To strengthen the Data Use System (DUS);

Strategy implementing activities



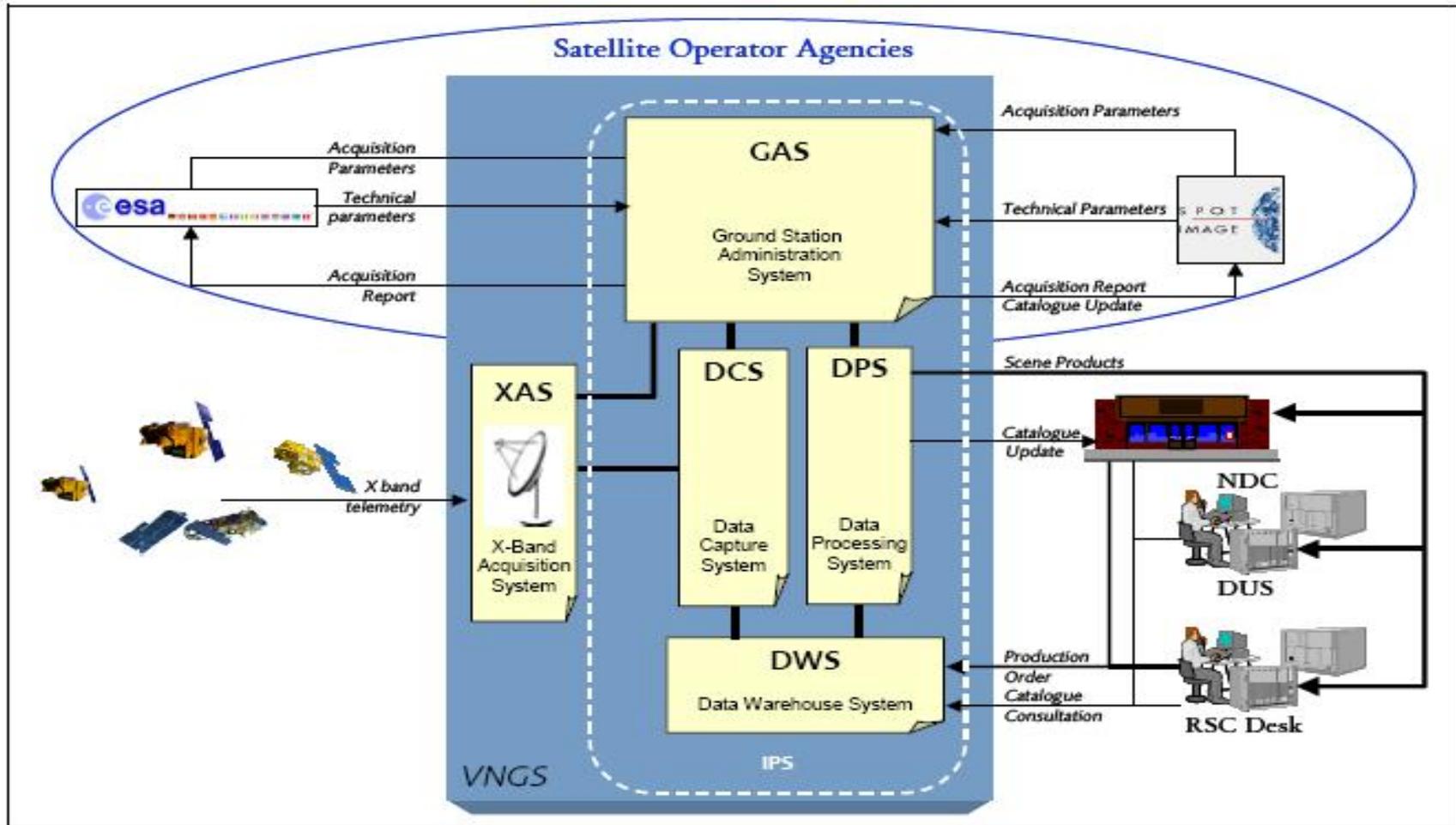
- ▶ January 2008: kick-off of the national scientific research program on space science and technology.
- ▶ April 18, 2008: the first Vietnamese communication satellite VINASAT-1 was launched.
- ▶ March 2009: soon after VINASAT-1 launch the project on second communication satellite VINASAT-2 was kicked off.
- ▶ Sep. 21, 2010: establishment of Vietnam Space Committee.

Strategy implementing activities



- ▶ January 2011: after a long preparatory period the Vietnam Natural Resources, Environment and Disaster Satellite (VNREDSat-1) project was started.
- ▶ June 30, 2011: the project on second small earth observing satellite VNREDSat-1B was approved by the Government.
- ▶ Sep.16, 2011: establishment of the National Satellite Centre as the implementing agency of the project on Vietnam Space Centre establishment.

Environment, Natural Resources Monitoring System (ENRMS)



Ground Receiving Station

- ▶ 5.4m diameter parabolic antenna
- ▶ Data capture system;
- ▶ Data processing system;
- ▶ Data warehouse system;
- ▶ Ground station administration system.



Function: capture image data (SPOT 2, 4, 5 and Envisat ASAR and MERIS), process to produce image products of level 0, 1 and 2, archive them and automatically update the image catalogue.

National Remote Sensing Data Centre (NDC)

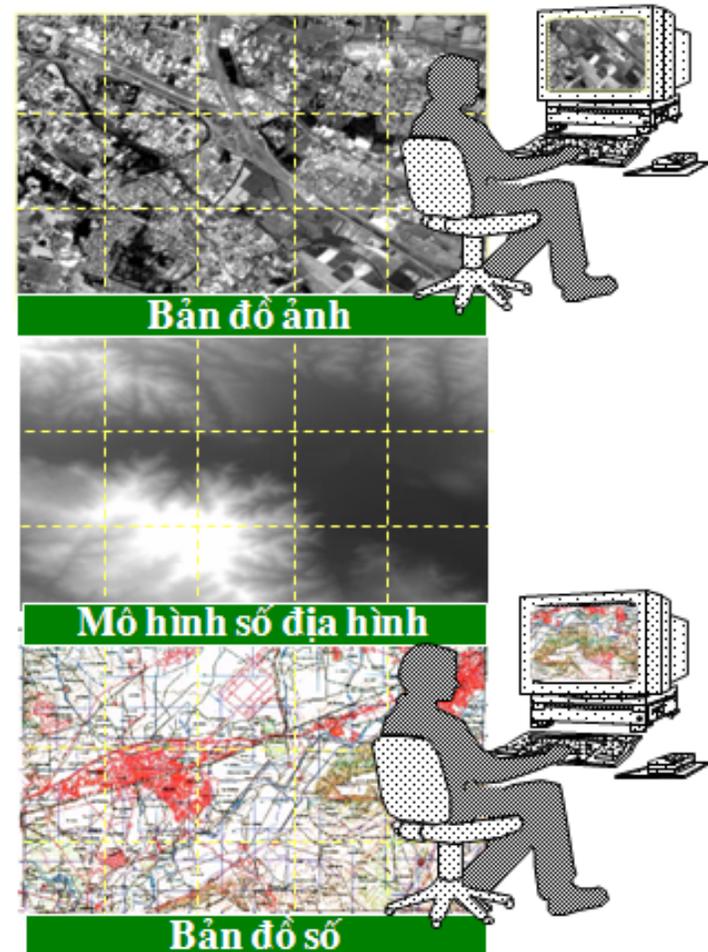
- ▶ Management System (MS);
- ▶ Product Generation System (PG)
- ▶ Data Archiving System (DAS);
- ▶ User Support System.



The role of NDC is to produce higher level products, create and manage a nationwide common use remote sensing database. It is linked with VNGS through the internal local area network and with DUS through wide area network and can online accept the request from users, co-operate with VNGS to meet the user's requirement

Data Use System (DUS)

- ▶ The DUS includes 16 organizations belonging to different ministries (MONRE, MARD, MOD, VAST, HNU, PGD), which have the right to access the image data archived at NDC as well as request for new image acquisition, process the data to produce value-added products but in return need to report the results back to NDC for updating its relevant database.



Communication satellites **VINASAT-1**

- Mass: 2.800 kg.
- Designed and built by Lockheed Martin Space Systems.
- Launched 19/4/2008 with Ariane 5 by Arianespace from Kourou (French Guiana).
- Orbit: Geostationary at 132 degrees east longitude.
- Primary satellite control station : Que Duong-Hanoi , Backup station: Binh Duong Prov.
- Number of transponders: 12 for KU - band, 8 for Extended C-band.
- Lifetime: at least 15 years.



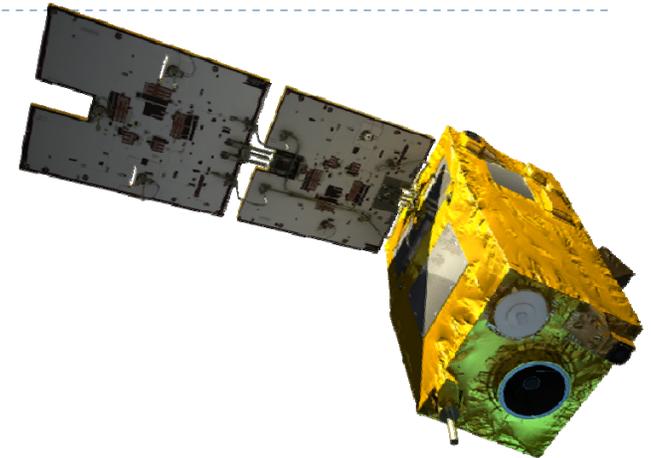
Communication satellites **VINASAT-2**

- ▶ Project Kick-off : March 2009
- ▶ Contract signing: 11/5/2010
- ▶ Manufacture and launch: Lockheed Martin Space Systems
- ▶ Specifications: A2100 Bus, 24 transponders for Ku-band.
- ▶ Coverage area: South East Asia and neighboring countries



VNREDSat-1 Project

- ▶ Mass: ~ 120kg
- ▶ Orbit: Sun synchronous at 680km altitude.
- ▶ Payload:
 - ▶ Multispectral : 4 bands, 10m spatial resolution;
 - ▶ Panchromatic : 2.5m spatial resolution.
- ▶ Revisit time: 3 days
- ▶ Life time: 5 years
- ▶ Tentative launch: 2014



The Project's budget open: 11/2010

VNREDSat-1 Project

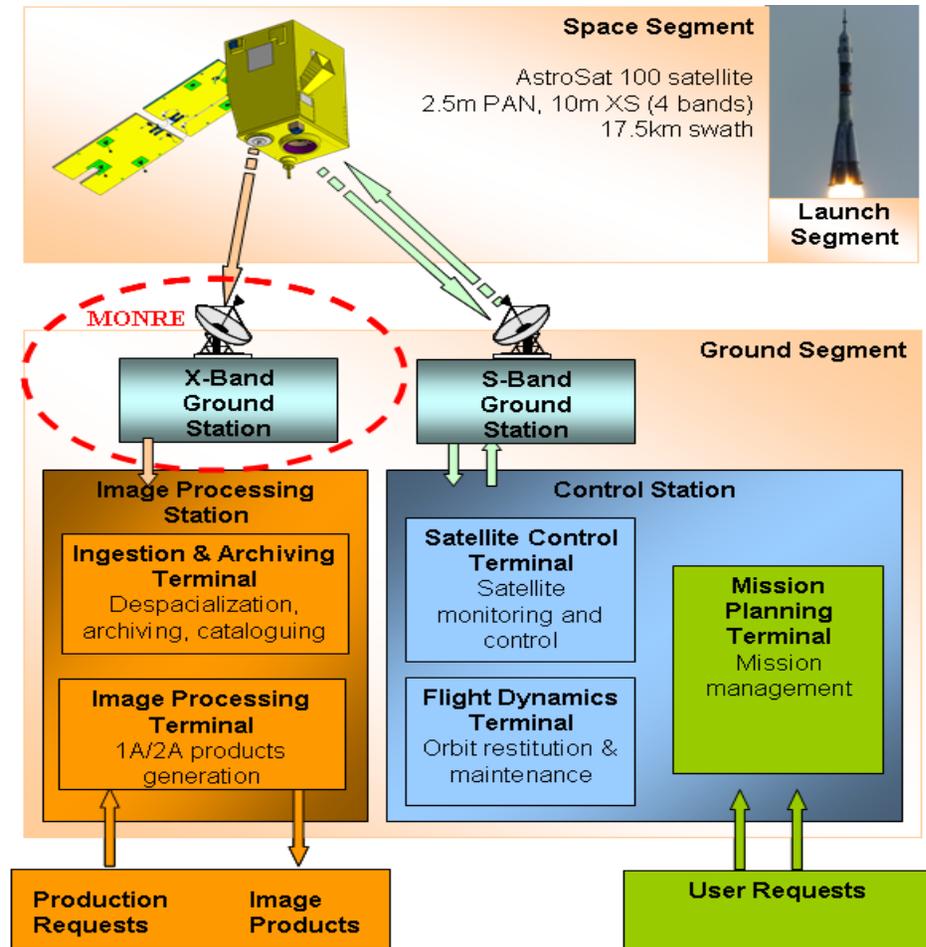
The project consists of the following two main packages:

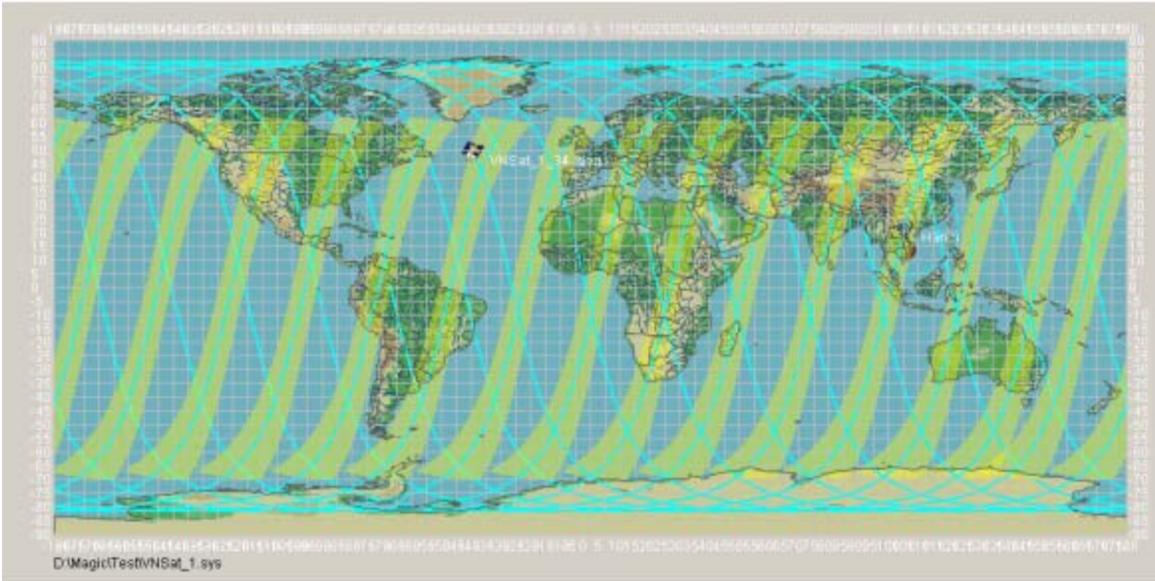
Primary package: **ASTRIUM EADS**

- Designing & manufacturing the sat.
- Ground segment installation (X-band receiving station at MONRE and S-band control station at VAST)
- Launch service
- Insurance service
- Training and know-how transfer on satellite design, assembly, integration, test, control, receive image, etc.

Consultancy package **VEGA Co.**

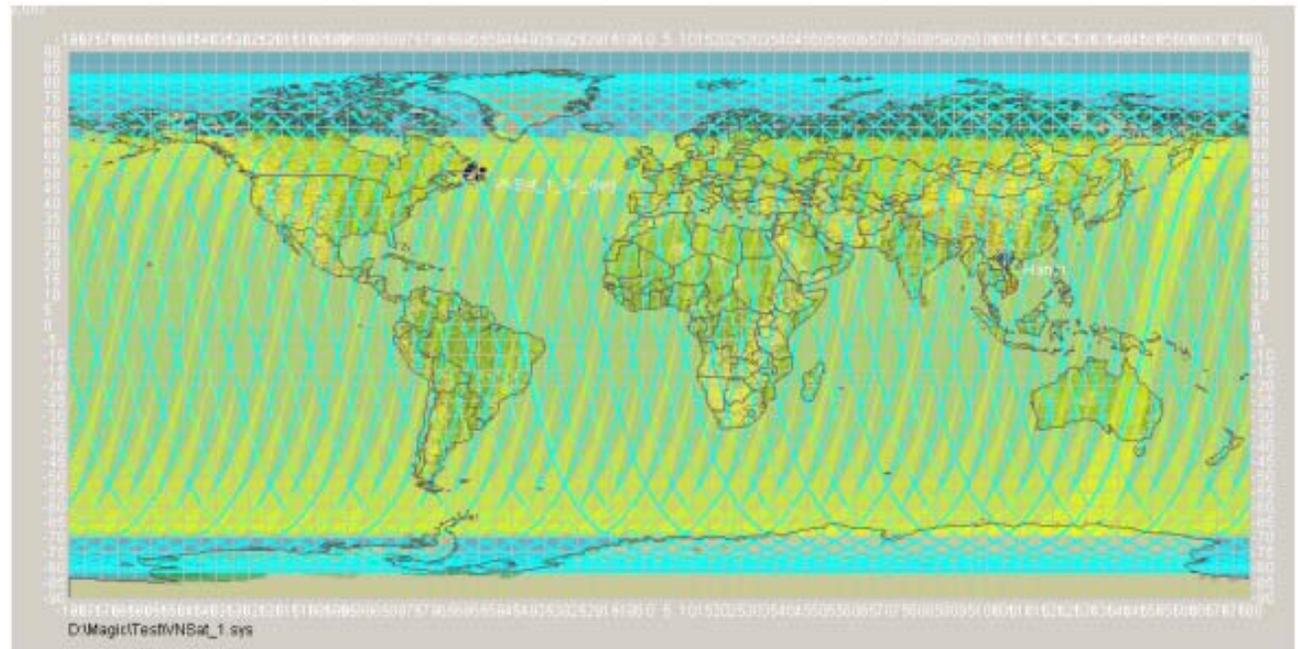
Consulting on project implementation (quality & progress) United Nations/Malaysia Expert Meeting on Human Space Technology





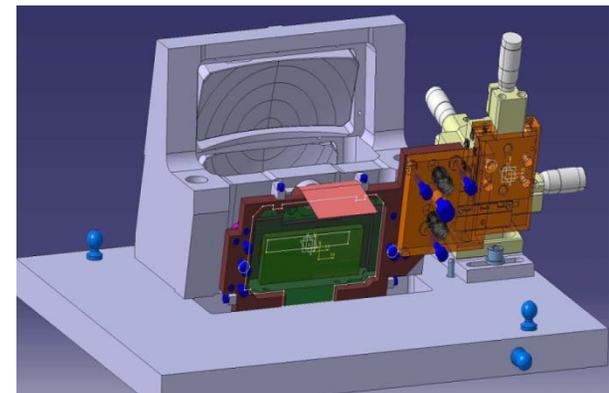
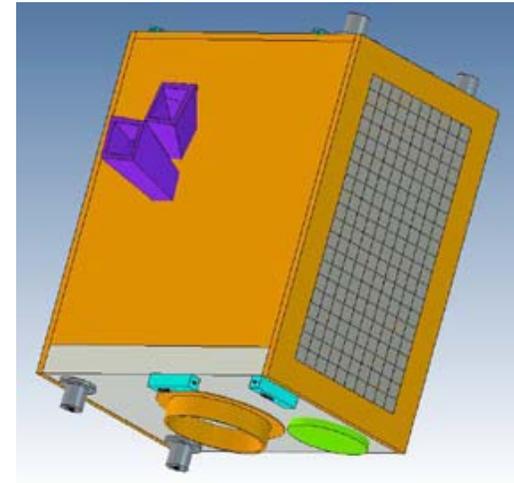
VNREDSat-1 access track over 1 day

VNREDSat-1 access track over 3 days



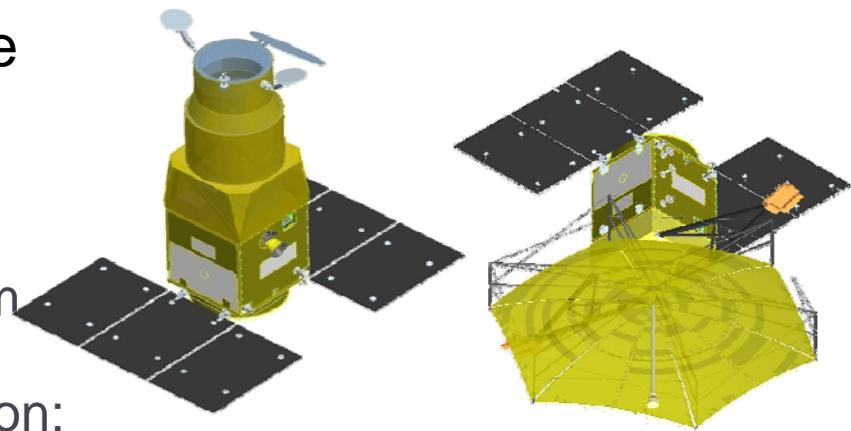
VNREDSat-1B Proposal

- ▶ Finance source: Belgium ODA.
- ▶ Orbit: SSO, altitude ~600km
- ▶ Platform: Proba, highly flexible
- ▶ Payload: Compact Hyperspectral Imager Breadboard (CHIB)
- ▶ Number of spectral bands: 80-100
- ▶ Spectral range: 400 – 830nm
- ▶ Spatial resolution: 30m
- ▶ Wide swath width: 250 km
- ▶ Revisit time: 3 days
- ▶ On-board memory: 64 Gbits
- ▶ S-band: Telemetry and Telecommand
- ▶ X-band: image downlink, 32 Mbps



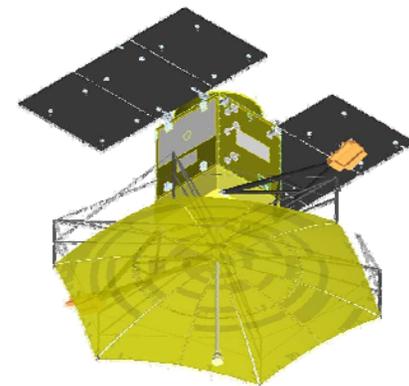
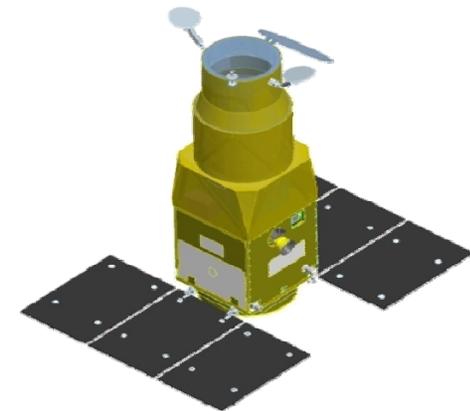
Vietnam Space Centre Project

- ▶ Building Space Centre infrastructure:
 - ▶ Satellite Assembly, Integration and Test (AIT) Centre;
 - ▶ Spacecraft(S/C) Control & Utilization Centre;
 - ▶ Research and Development (R&D) Centre;
 - ▶ Manufacturing Building etc.
- ▶ Building and launch 2 earth observing satellites (first one produced in Japan, second one assembled and tested in Vietnam)
- ▶ Capacity development:
 - ▶ Overall management of Vietnam Space Centre;
 - ▶ Satellite production and operation;
- ▶ 23 ▶ Satellite data utilization.

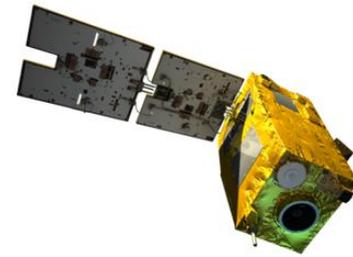


Earth Observing satellite

- ▶ Launch time: 2017 and 2020
- ▶ Launch Vehicle: H-2A, Dual Launch
- ▶ Satellite Mass: < 500kg
- ▶ Size: 1.5m x 1.5m x 3m (H)
- ▶ Orbit: 500km, SSO
- ▶ Mission Sensor: SAR (X or L band)
- ▶ Resolution: 1 to 10m
- ▶ Mode: Spot, Strip
- ▶ Data Storage: 96 Gbytes



Conclusion



- ▶ The appearance of the National strategy for Space Technology research and application shows the determination of Vietnam Government to develop the space industry of the country and expand its applications in various fields. Governed by the strategy, the space technology in Vietnam has gained some significant progresses. However, Vietnam is still in initial step of space technology development. We highly appreciate any assistance in both technology transfer and human resource development.