



VIETNAM ACADEMY OF SCIENCE AND TECHNOLOGY

Current and future application of Global Navigation Satellite Systems in VIETNAM

Assoc. Prof. Dr. Pham Anh Tuan

Vice Director of Space Technology Institute
Vice Chairman of PMU of Vietnam Space Center

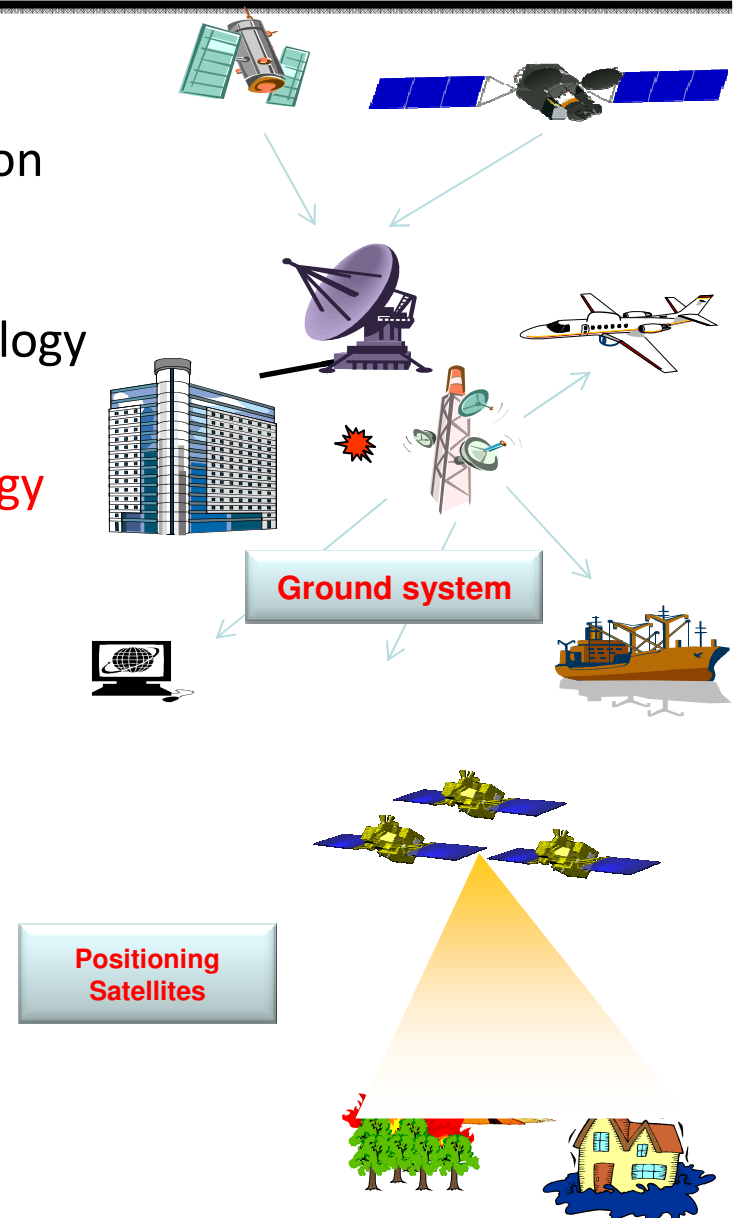
CONTENTS

- 1. Strategy for research and application of Space Technology of Vietnam until 2020**
- 2. Vietnam's telecommunications satellite (VINASAT)**
- 3. Vietnam's Remote Sensing Satellites (VNREDSat)**
- 4. Vietnam Space Center project**
- 5. Present situation of GNSS application in Vietnam**
- 6. Challenges and opportunities**

STRATEGY FOR RESEARCH AND APPLICATION OF SPACE TECHNOLOGY OF VIETNAM UNTIL 2020

Objectives of the strategy

1. To form the **national policy** and legal frame for research, application and international cooperation on space technology, human resource policies;
2. To **build the initial infrastructure** for space technology
3. To plan and carry out a **national science-technology program** on space technology.
4. To **master the manufacture technology** of ground station, the small satellite technology
5. To manufacture and launch some **earth observation small satellites**
6. To **apply the space science and technology**



VIETNAM'S TELECOMMUNICATIONS SATELLITE (VINASAT)

❖ VINASAT-1 launched 2008

❖ VINASAT-2 will have:

- ✓ higher frequency band capacity
- ✓ minimum lifetime is 15 years
- ✓ from 24-30 transceivers



❖ Vinasat-2 will cover Vietnam, Laos, Cambodia, Thailand and part of Myanmar.

VIETNAM'S REMOTE SENSING SATELLITES (VNREDSat)

- ❖ The natural resources, environment and disaster monitoring small satellite (VNREDSat-1)
- ❖ VNREDSat-1a:
 - ✓ Donor: Gov. of France
 - ✓ Amount: €55.8 mil.
 - ✓ Optical sensor
 - ✓ Resolution: 2.5 – 4 m
 - ✓ Life time: 5 years
 - ✓ Mass: 150 kg
 - ✓ Launch time: 2013
- ❖ VNREDSat-1b:
 - ✓ Donor: Gov. of Belgium
 - ✓ About €60. mil.
 - ✓ Specifications: not fixed



VIETNAM NATIONAL SATELLITE CENTER

VIETNAM NATIONAL SATELLITE CENTER

Functions and tasks

- ❖ Research and development, applying and training in the field of satellite technology
 - To implement key national projects in the research and development, applying and training in the field of satellite technology.
 - The present task is receiving, managing and implementing the project for building the Vietnam Space Center (VNSC) at the Hoa Lac Hi-tech Park
 - To research, design, manufacture, assembly and test the small satellite;

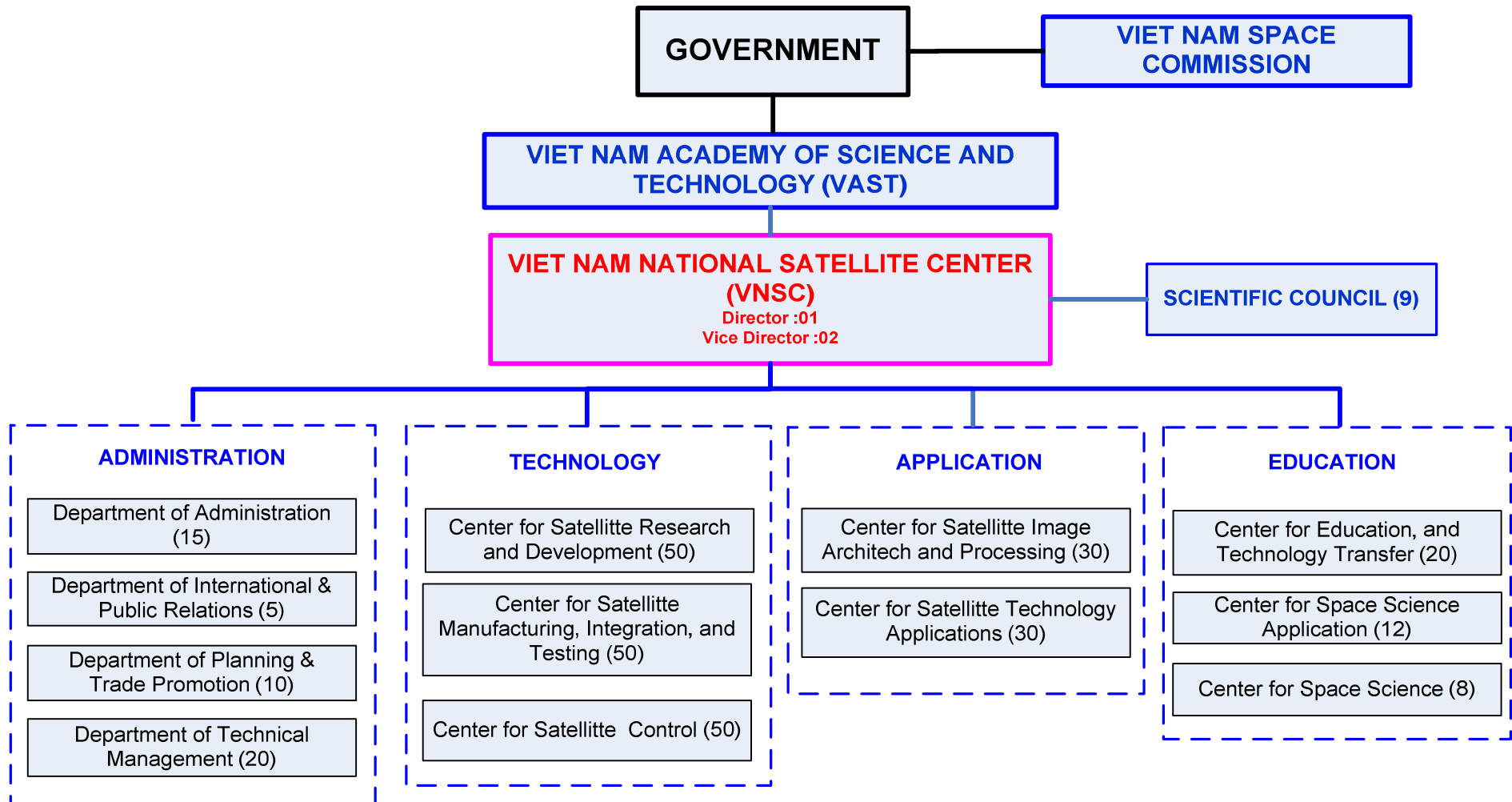
VIETNAM NATIONAL SATELLITE CENTER

Functions and tasks

- To collect data, record and process the satellite images in order to apply to the space technology
- To educate, co-ordinate and transfer the satellite technology
- To develop and carry out the international co-operation project on the space technology, especially on the satellite technology;
- To diversify the development sources for the satellite technology.
- To build the Space Science Center to popularize and improve people's knowledge about the importance and benefit of the space technology

VIETNAM NATIONAL SATELLITE CENTER

Organization structure



PROJECT: VIETNAM NATIONAL SPACE CENTER

- ❖ *Place:* Hoa Lac Hi-tech Park
- ❖ *Area:* 09 ha
- ❖ *Duration:* 2011 - 2020
- ❖ *Capital:* 54.400 billion Yen
- ❖ *Owner:* Vietnam Academy of Science and Technology



PROJECT: VIETNAM NATIONAL SPACE CENTER

❖ Human resource development

- Small satellite development
- Remote sensing technology

❖ Construction of infrastructure

- Assembling, integration & test facility of small satellite
- Data image receiving and processing facility
- Research and education facility

❖ Technology transfer

- Small earth observation satellite
- Satellite image data utilization

PRESENT SITUATION OF GNSS APPLICATION IN VIETNAM

- The application of GNSS has been developed from years of 1990, in the field related to **geodesy** and **mapping**
- GNSS has been fast popularized over the last 5 years
- Courses are being taught at various Universities around the country (e.g. Hanoi University of Mining and Geology, Hanoi University of Technology, Hanoi University of Civil Engineering and HoChiMinh University of Technology)
- GPS-based applications are found commonly in many **professionals** and **everyday activities**
- For geodesy and mapping, high accurate GPS has been used for **estimating reference station network** and/or **reference coordinate maintenance at centimetre-level of accuracy**

PRESENT SITUATION OF GNSS APPLICATION IN VIETNAM

- ❖ **The application of GNSS in the field related to geodesy and mapping:**
 - From 1991 to 1993, use GPS for measuring 117 National marks in the remote areas of Central Highland and Mekong river delta
 - Up to now, there are 12531 marks at all 64 provinces/cities have been specified by using dual band GPS equipment
 - The last few years, GPS is used on a regular basis to maintain Vietnam-China boundary

- ❖ **The other applications of GNSS:**
 - The GPS's capability to detect movements at millimetre level has been applied to monitor significant manmade structures such as Hoa Binh Hydro-Electronic station, Cam Pha cement factory (2010).
 - Low-cost GPS receivers (handhelds) are usually used to coordinate registered locations during field visits in remote area.

PRESENT SITUATION OF GNSS APPLICATION IN VIETNAM

- ❖ **The application of GNSS (in combination with GIS):**
 - GPS is important role in building the GIS database for main cities in Vietnam
 - A GPS-based automatic train speed control and supervision technology was successfully designed and deployed for many long-distance Vietnamese rail trains
- ❖ **In the field of business, the most famous company working in GNSS application is Vietmap (<http://www.vietmap.vn>). Its products are:**
 - Vietmap-GPSmile52 and Vietmap-GPSr12
 - Navigation Software for smart phones
 - Handle Navigation equipment
 - In car navigation equipment
 - GPS based for car management system (car tracking)

CHALLENGES AND OPPORTUNITIES

The challenges:

- No strategic direction and specific work programs for study and application of GNSS in Vietnam
- The infrastructure of information, communication, and especially the databases in Vietnam is fragmented, inconsistent lead to difficulties in the process of building applications
- Habits and attitudes of users also influence a lot to the expansion of application of new technologies. In Vietnam, during a long time, many people think that GPS is only related to the surveying and mapping

CHALLENGES AND OPPORTUNITIES

The opportunities:

- The objective of the Development Strategy for Vietnam Survey and Mapping up to 2020, is “The Vietnam survey and mapping sector should become one of the basic investigational sector with modern technological and scientific development equal to modern of regional level and gradually approach to the world level”
- The DOSM has started implementing the GNSS project which will be used for multiple applications and will provide an efficient, cost effective infrastructure for survey and mapping within Vietnam.
- The proposed GNSS network for Vietnam will provide a base framework for survey and mapping which will deliver real time DGPS positioning to support an aggressive mapping program of both land and sea.

CHALLENGES AND FUTURE OPPORTUNITIES

The opportunities:

- The proposed GNSS network will also support the vision for an accurate Spatial Data Infrastructure (SDI) for Vietnam.
- All of the proposed base stations will be accurately coordinated in terms of the International Terrestrial Reference Frame (ITRF) as well as Vietnam National Reference System (VN 2000) and will form the highest order framework for the 6 geodetic networks.
- The GNSS network will not only serve as a base framework for survey and mapping but also other related GIS applications within Vietnam.

CHALLENGES AND OPPORTUNITIES

The opportunities:

- The GNSS network has the potential to contribute to international initiatives to improve the understanding of not only global earth but also the Vietnam territory monitoring researches, to contribute to the following social benefit issues affecting everyday life for the Vietnamese.
- The listed application require the integration of GNSS data to GIS database: Natural Disaster, Energy Resources, Climate Change, Water, Weather, Ecosystems and the impacts of carbon cycles, Land Use,...
- To expand the scope of application of GNSS, it is necessary to build the support system such as SBAS or GBAS.
- Since 1999, this issue has been aware and undertook to build a variety of DGPS stations nationwide. Unfortunately, because of many reasons, the exploitation and use a DGPS stations network is limited. It is leading to limitations in expanding the applications of GPS as well as GNSS



VIETNAM ACADEMY OF SCIENCE AND TECHNOLOGY

(VAST)

THANK YOU!