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SPACE TECHNOLOGY DEVELOPMENT IN VIETNAM



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OUTLINE

1. **Overviews** of the disasters in VN - requests for Space Technology development & applications
2. **Strategy for Space research & applications until 2020 of Vietnam**
3. **Satellite technology development**
 - VINASAT-1
 - VNREDSat-1
4. **Space Technology Applications**
 - National Research Program for Space Science & Technology
 - Activities for Flood, Drought, Climate change managements
 - MONRE, VAST's activities
5. **International cooperation**
 - APRSAF - SAFE
 - APRSAF – Star program
 - Vietnam Center for Space R&D – HHTP
 - IAF member
 - COPUOS, UNESCAP, etc.

Vietnam – nature & population

Vietnam figures S; Center of South East Asia; North: China; West: Laos & Cambodia; South East: Sea; Coastline: ~ 3200km; Capital: Ha Noi; $\frac{3}{4}$ area: mountain & hills; Population: ~ 85 mil.; Natural resource: forest, sea products, tourist; Climate: tropical monsoon ; People: diligent & hospitable;



1. Overviews of the disasters in Vietnam

- Climate change → the human safety is threatened by natural disasters → Space Technology could contribute to reduce them.
- Vietnam is one of the most prone heavily suffered by disasters like typhoons, flash floods, soil erosions, etc.
- In Vietnam every year, natural disasters killed more than 400 people and caused losses of \$1.5 billions



- For climate change → sea level rises, Ho Chi Minh city every afternoon is tidal flooded up to 0.5m
- Forests are heavily destroyed by habitants → soil erosions. Mangroves are destroyed for aquafarming → salt infiltration into fields and fresh water → need to protect forest and afforest

→ climate change are our challenges. Space technology applications could contribute actively for disaster management and mitigation

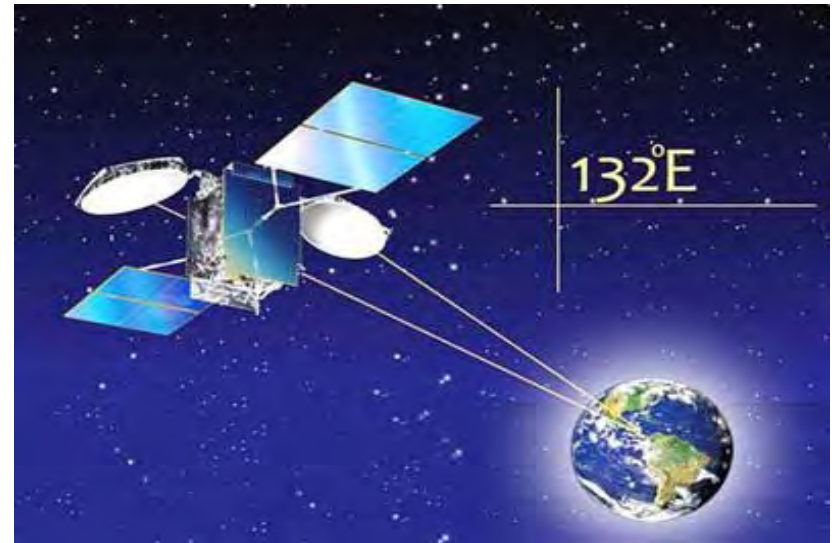


2. “STRATEGY FOR SPACE RESEARCH & APPLICATIONS UNTIL 2020”

- Approved by Prime Minister in 2006, open policy & tasks for ministries to take part in the Strategy:
 - Ministry of Science & Technology (MOST)
 - Ministry of Natural Resource & Environment (MONRE)
 - VAST
 - MARD
 - Ministry of the Information & Telecommunication, etc
- Content:
 - Receive then master the satellite & GRS technology;
 - Develop space infrastructure/ Establish Space Technology Institute (STI) in Nov.2006
 - Training for space S&T engineers
 - Take space technology applications serve the socio-economy inquires/ natural resource, environment, disaster management/ communication service, education, etc
 - Promote International cooperation for space S&T development / *best way*

3. Satellite Technology Development

3.1.VINASAT-1



- **May 2006**: VN signed a contract with Lockheed Martin Space Systems for a turnkey telecommunications satellite system VINASAT-1.
- **VINASAT-1**: First communication satellite of Viet Nam
- **Launched** on 19/4/2008 on 132.0 East Orbit
- **Expected** : use in 20 years

THE ANNOUNCEMENT CEREMONY OF VINASAT-1 SATELLITE LAUNCH

Hanoi, April 19, 2008



VINASAT-1 after 1 year



- In the period 2008-2012, VINASAT-1 will serve 90% of domestic customers needs and 10% of the foreign customers needs (Thailand, Laos, Singapore, Indonesia)
- In 2009: sold out Ku band (9,5 band)
- In 2010: will sell out C band (3 band)
- **Expected to launch VINASAT-2 in 2012 at 107.0 East Orbit**

3.2. Project of Vietnam small satellite for natural resource, environment & disaster management (VNREDSat-1) – 2010/2015

Characteristics:

- ❑ M ~ 140kgs
- ❑ Earth Observation
Small satellites, low orbit
- ❑ Optical satellite
- ❑ Spatial resolution :
10m/Multispectral
and
2.5m/Panchromatic

Source of funds :

Official Development Assistance (ODA) of French Government.



Use the ready Ground receiving station of EADS in Hanoi, Vietnam



3.2. VNREDSat-1 project (con't)

- Vietnam Academy of Science and Technology (VAST) is appointed by Government to be full responsible for implementation and investigation of the Project.
- Project schedule: 2010-2015
- 7/2010: VAST signed contract with Astrium France (EADS) for VNREDSat-1
- VAST sends 15 engineers to France for training & technology receive of satellite technology & GRS operation
- Estimated launch time : 2013

4. Remote sensing applications

- Recently, Vietnam Government especially promote research and application of space technology for natural resource, environment and disaster management
- RS & GIS are used for coastal management, marine products investigation and protection.
- Space Technology applications for rescue (fishery boats, wildfire, soil erosion), oil slick, etc.

4.1. National Research Program of Space Science & Technology

Purpose: Implement the “Strategy for space research and applications until 2020” of Vietnam, incl. R&D of Satellite technology and RS applications.

National Program of Space Science Technology (con't)

- **Content:** In 2008-2010, the Program has approved 13 projects funded by Government with following subjects:
- Research method & simulation software for identifying, monitoring, control the movement and posture of small satellite in low orbit
- Build software for controlling the posture of satellite for the experiment system
- Investigate the GRS of MONRE; preparedness for receiving and processing the VNREDSat-1 data with new software
- Research and development of an optical payload for small satellite
- Development software open source for process of satellite image
- Research and development of the Vietnam legal framework for the use of outer space for peaceful purposes

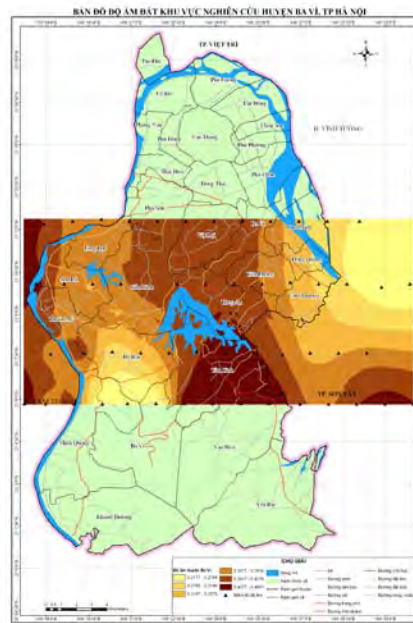
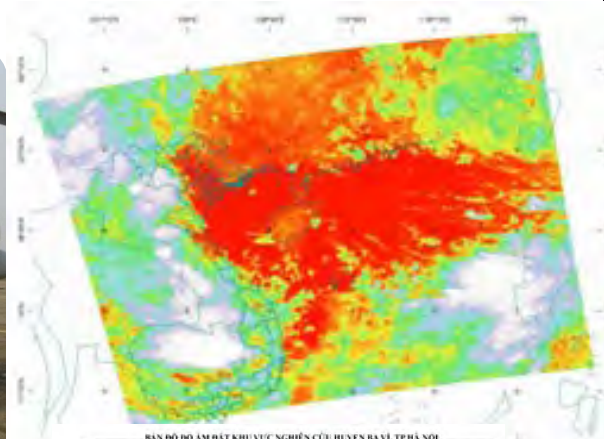
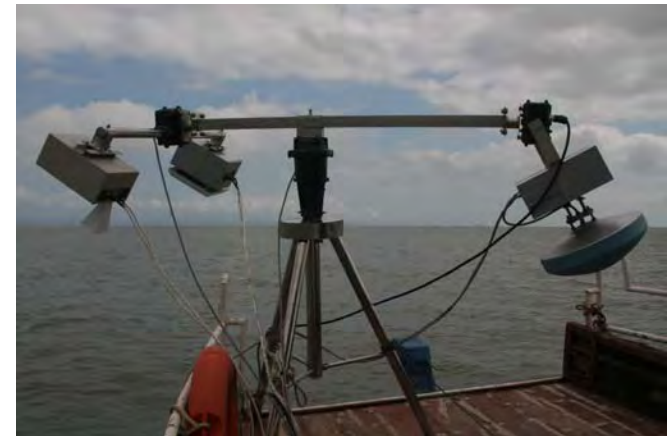
4.2. Ministry of Agriculture & Rural Development (MARD) – Flood, Drought, Climate change management

- MARD has taken many measures to estimate & mitigate the disaster events like drought, flood, flash flood, typhoons, etc using remote sensing and GIS technology:
 - Cooperate with Sweddisch Inter. Develop. Coop. Agency SIDA, Pacific Disaster Center PDC implement many programs, build website for disaster information.
 - Cooperate with ESRI Vietnam for GIS training and applications for disaster ,management and reduction
 - In 2009 MARD started a project with Frech ODA loan of 14 mil.EUR for bulding a network of GPS system and receiving station for coastal and marine management, set up GPS receivers on 1500 fishing boat for fishing, weather and rescue information.
 - In 2009, Forest Management Department of MARD cooperate with JAXA using satellite data, software, GIS for forest management like estimate the forest cover change, types of forest, economic value of forest types, etc

4.3. MONRE, VAST

- **MONRE (Ministry of Natural Resource & Environment):** Provide satellite data of the RSC (SPOT5, ENVISAT) to VN agencies for land & urban planning, environment management.
- Use of RS & GIS for natural resource management of Vietnam, incl. land, water, forest resources.
- Many projects for disaster management, protection of natural resource and environment have implemented in Vietnam with different financial sources: Governmental, bilateral, multilateral cooperations, ODA, etc.
- **VAST:** the National Research Program for Space Science and Technology, the Center for Earth quake and Tsunami Early Warning are set up for use of Space Technology for disaster management.
- **STI/VAST:** Manufacture radiometers for environment research and monitoring – aerial RS, field trips, urban management, natural resource management, soil erosion, coastal, climate change, mapping forest cover, etc.

Design, manufacture & apply the MW radiometers L,C,X bands, integrated with GPS receiver for mapping soil moisture from the aircraft (Aerial remote sensing), measure salinity of sea surface water SSS, SST



Source: Phòng nghiên cứu và ứng dụng địa lý và GIS, Viện địa lý và GIS, Viện Khoa học và Công nghệ Việt Nam

5. International cooperation

1. APRSAF/SAFE

- Asia Pacific Region Space Agency Forum (APRSAF)
- Space Applications for Environment management WG

Vietnam is one of the members of SAFE, working on the use of satellite data, RS and GIS for disaster management.

Training course for using new technology for satellite image processing: in Sept, 2009, JAXA-STI started project for forest management.

Projects are implemented by STI & MARD, forest management using new satellite data and technology

This cooperation is very useful for Vietnam as well as the region, under the support of JAXA.

APRSAF/Space Education & Awareness WG

- Annual event: Water rocket; Cubesat; Poster contest for pupils; Astronomy, etc

Water rocket & Poster contest (APRSAF-15, 12/2008 Hanoi)



2. APRSAF – Star program

- STI/VAST - member of the STAR program for the APRSAF satellite project → develop APRSAF EO satellite (50kgs)

3. Vietnam Center for Space R&D – HHTP

- Project started from 2007 in the Hoa-Lac high tech-park (HHTP)
- The Center has blocks for R&D, assembly & test, training, key laboratories, magnetic test, etc as international standard (model as like Tsukuba, USA, etc)
- Executive organization is STI – VAST
- It is the result of the JAXA-VAST agreement signed in Jun. 2006
- Supported by Japan: accomplish FS, technical design (JETRO team), technical support, financial support, provide, etc).
- Financial source: Japanese ODA and Vietnamese budget.
- Tentative duration of the Project: 2010-2015

4. Others:

- In 2010, STI become member of the IAF
- Vietnam is member of COPUOS, UNOOSA, UNESCAP, etc.

Vietnam Space Center Model





Training:

- Agreement between Viet Nam - French Governments was signed on the establishment of **Hanoi University of Science and Technology**.
- Lecturers from VN-ese and French professors
- Faculty of Aerospace Technology is established in the University with the taking part of STI (lecture & experiment)
- Since 2010 - receive students for Mas and PhD
- Expected to begin enrolment students on 2012
- International standards training.

CONCLUSIONS

- Space Technology in Vietnam has just developed and in a low level comparing with regional countries, but is being promoted strongly by Government & international cooperation.
- Recently, Vietnam Government pays attention very much and launch **“Strategy for space technology research and applications until 2020”** leading all space activities of the country.
- Vietnam will develop some more satellites (communications, EO, etc) through technology transfer, then to master it.
- **Vietnam Space Committee** will be soon established for coordinating all Space research & activities in the country & international cooperation.
- International cooperation is very important for Vietnam in R&D that’s the best way to develop Space S&T of Vietnam
- Thank you very much for your helps, supports and cooperation with Vietnam
- We hope to continue to receive your kind cooperation.



THANK FOR YOUR ATTENTION

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