

Earth Observation in Vietnam

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Outline

- EO satellite Projects
- EO Applications
- EO Data used
- Government investment
- Vietnam DataCube

EO Satellite Projects

- 2009: 1st project of EOS: VNREDSat 1
- 2011: VNSC project

2013:
VNREDSat 1

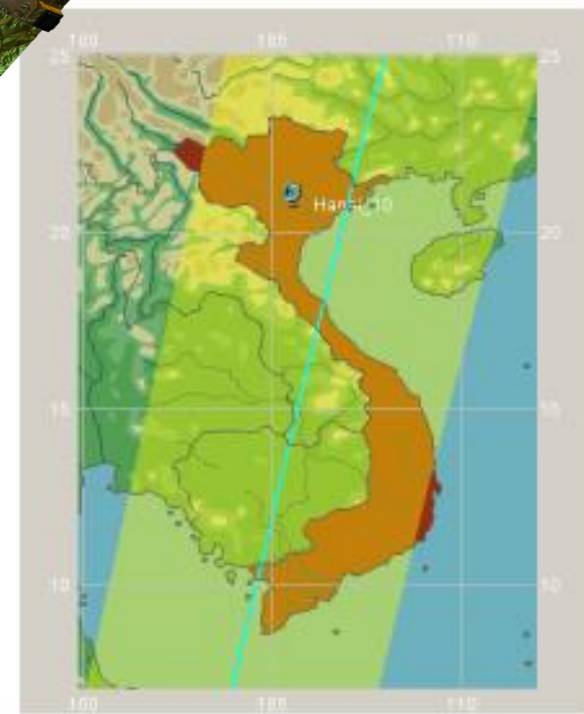
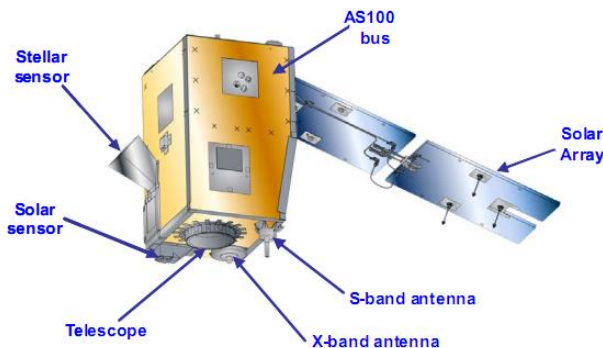
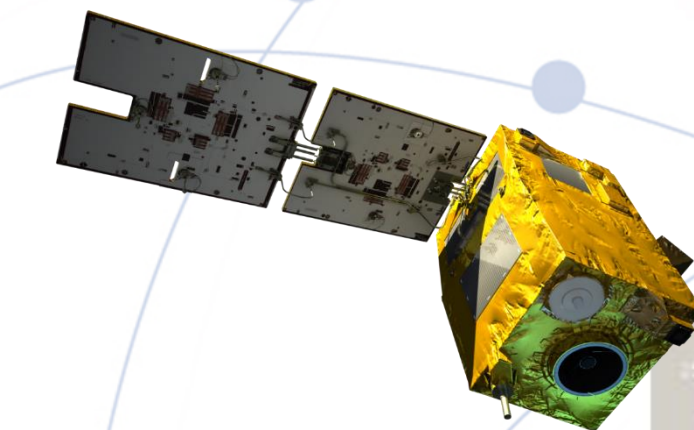
2021:
LOTUSat 1



EO Satellite Projects

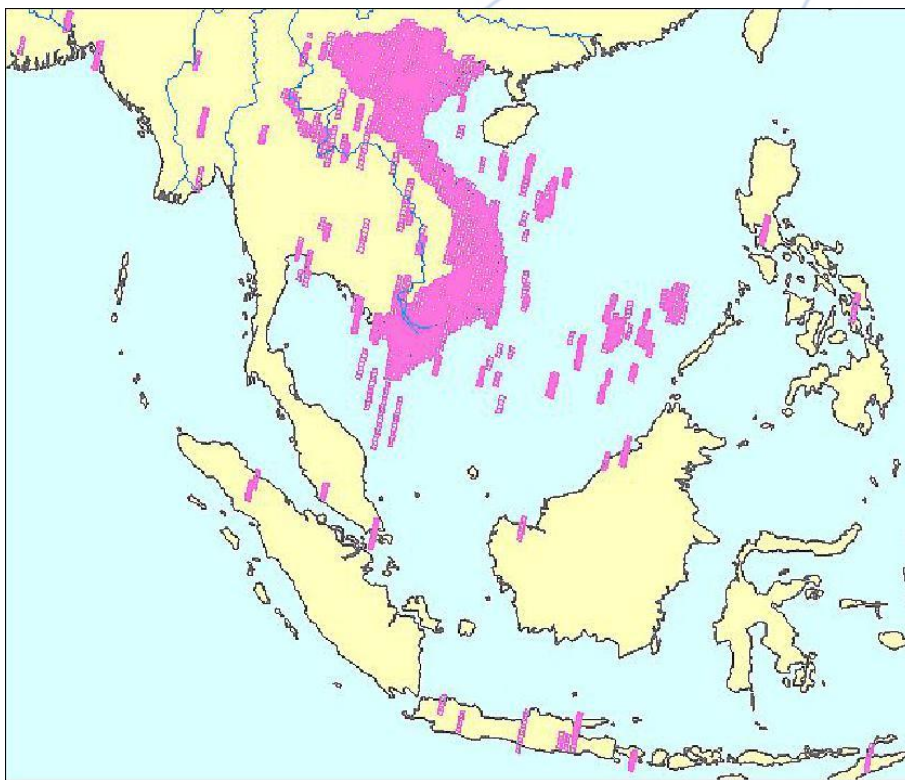
- VNREDSat 1

- The 1st optical earth-observation satellite of Vietnam
- Mission: Earth observation in PAN and 4 MS bands (Blue, Green, Red, near Infrared)
- Revisit time: 3 days
- Orbit characteristics: SSO, 680 km altitude
- Local time of ascending node : 10:30 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



Projects and Programs

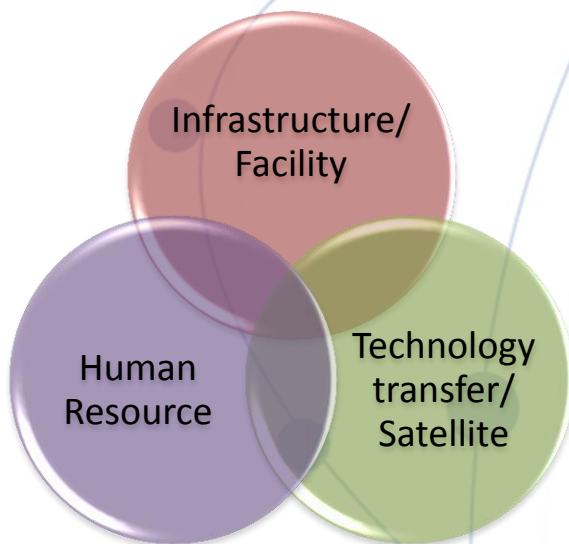
- VNREDSat 1



Acquisition of VNREDSat 1 after 1 year



EO Satellite Projects



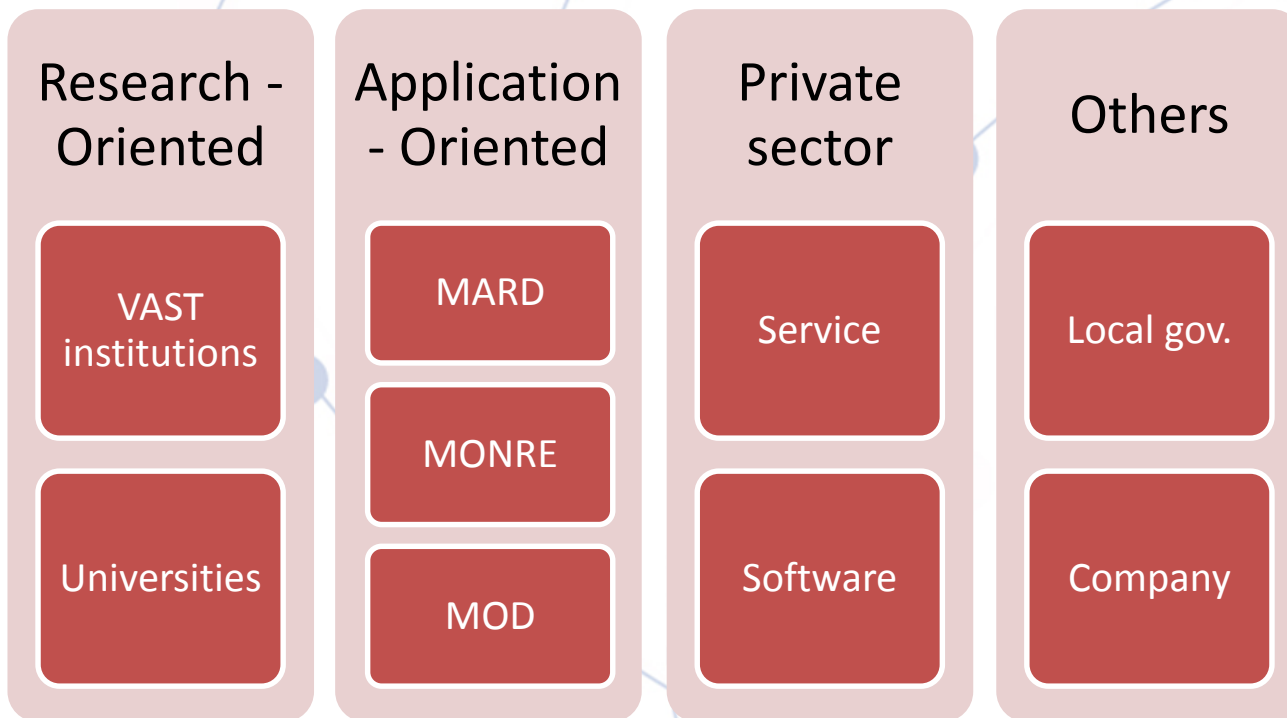
Management Center and S/C
Control Center



Public Education Center

EO Applications

- Organizations



EO Applications

- VAST's institutions

VNSC
(Vietnam
National
Space
Center)

STI (Space
Technology
Institute)

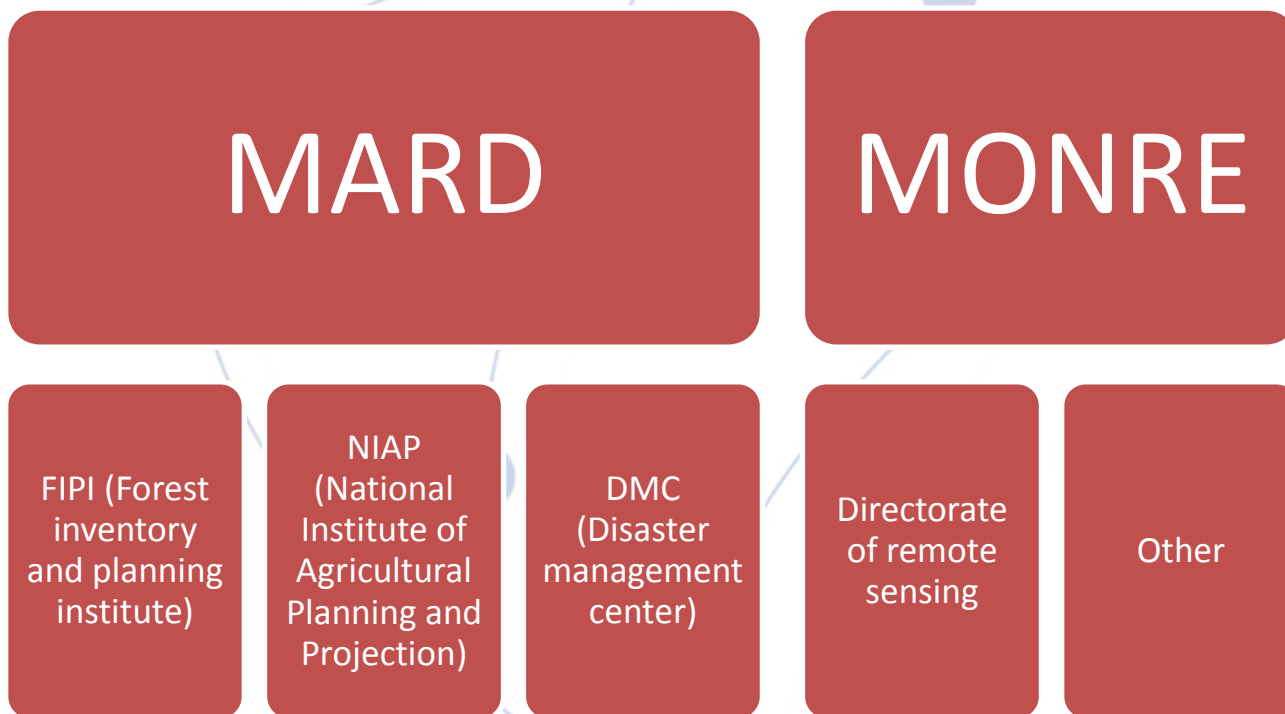
Institute of
Geo-
Sciences

Institute of
Geography

Institute of
Physic

Others

EO Applications



EO Applications

- Applications
 - Forest monitoring: by FIPI and FPD
 - Land use/ Land cover mapping: by MONRE
 - Others: Environment, Planning, Agriculture, Disaster management, Water management
- Some characters:
 - More research than operational
 - Small user than big (and stable) user
 - Project depended

EO data used in Vietnam

- Source of Data:
 - Free and open data: Sentinel, Landsat
 - Commercial satellite data: SPOT
 - Vietnam's satellite: VNREDSat 1
 - Others
- Some characters:
 - More optical than radar
 - More free data than commercial data
 - More specific than general in application approach

Government Investment

- Program on Space Science and Technology
 - Start 2008
 - Phase 1: 2008 – 2011: 19 research project, ~1.5 mil USD
 - Phase 2: 2012-2015: 12 , 1.8 mil USD
 - Phase 3: 2017-2020: ~40, ~4 mil USD

Space Science

Space Technology

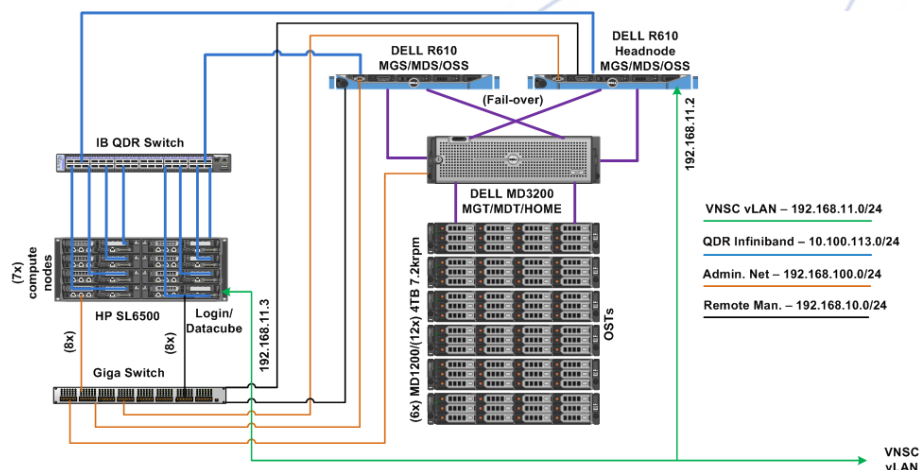
EO application



Vietnam Data Cube

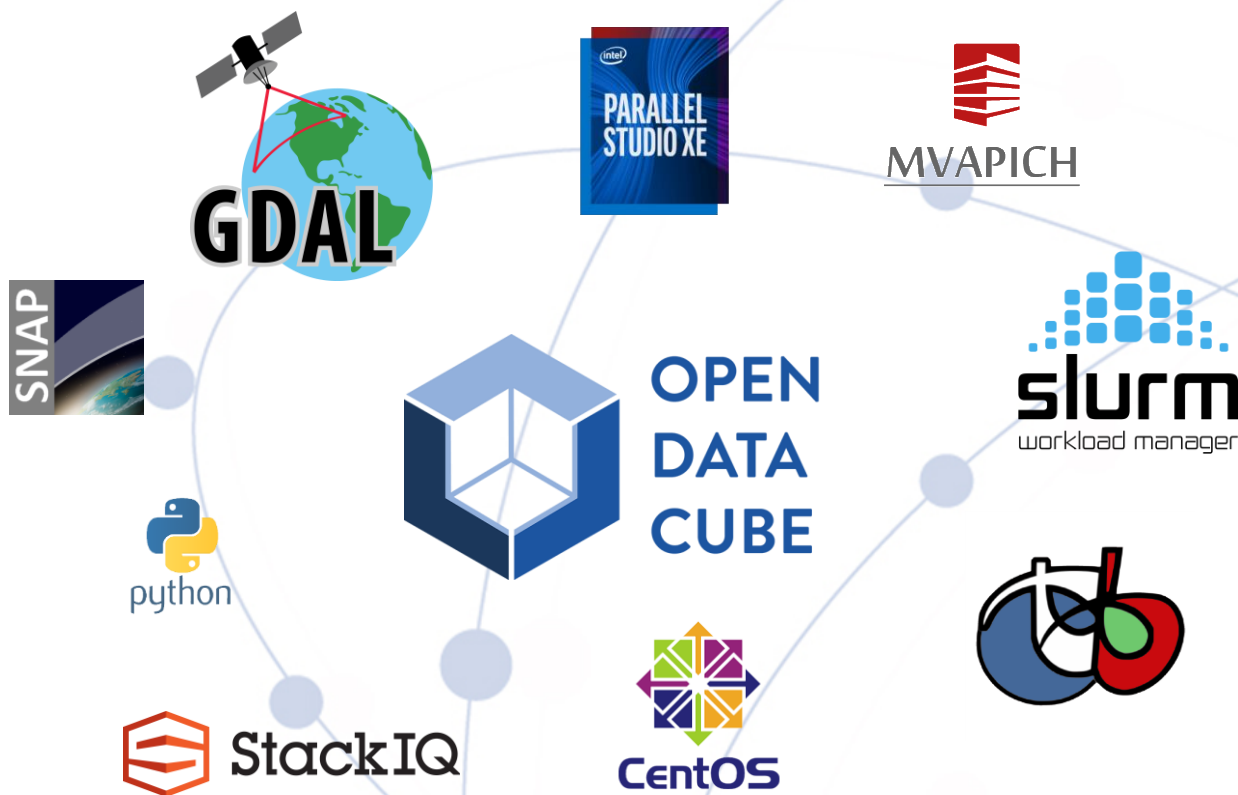


Vietnam Data Cube



1 head node, 1 login node, 7 compute nodes (each: 16 core 2.2GHz, 64GB RAM), 40Gb/s Infiniband Interconnect network
 Full redundant parallel storage - LustreFS: 195TB, max read/write speed: 1.9GB/s
 Total storage capacity (including work, home, local): ~ 220TB
 Can be expanded to hundreds of compute nodes, hundreds of TBs of storage

Vietnam Data Cube



Software environment

- Packed with Software dedicated to Datacube and Satellite data analysis
- Support both operations and research tasks
- Parallel computing environment, support tens to 100 concurrent users
- Analysis time on the order of seconds or minutes

Vietnam Data Cube

- Data
 - Optical data: Landsat; Sentinel-2
 - Radar data: JERS; Sentinel 1A & 1B; ALOS/PALSAR
- Source of Data: USGS (Landsat); ESA (Sentinel); JAXA (ALOS and JERS)
- Still in collection progress
- ARD available for test sites
- Free and Open (data from JAXA is free of charge for governmental user)



