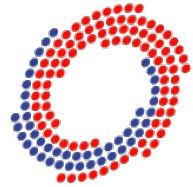




Vietnam Academy of Science and Technology
VIETNAM NATIONAL SPACE CENTER (VNSC)



**28TH
APRSAF**
ASIA-PACIFIC REGIONAL
SPACE AGENCY FORUM
VIETNAM

Higher Education via small satellite R&D projects



*Dr. Le Xuan Huy
Vice Director General*

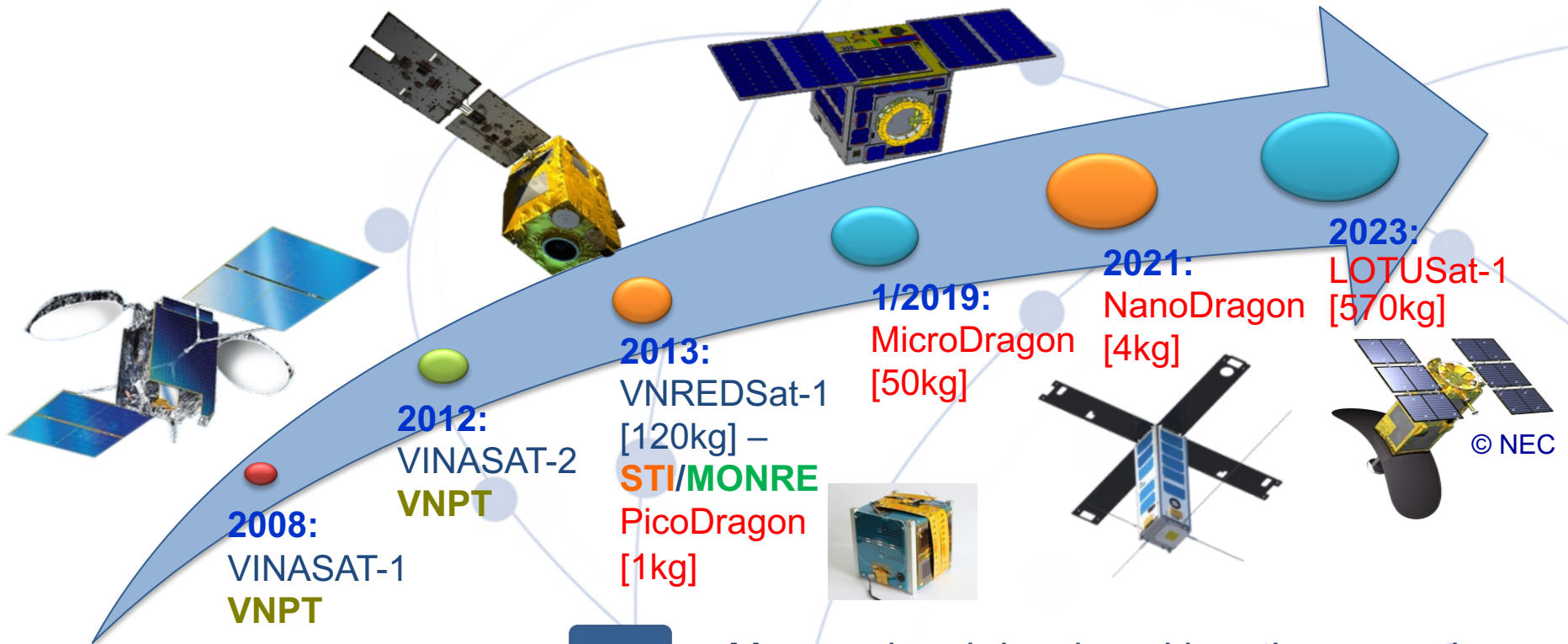
November 15, 2022

1. Strategy for development and application of space science and technology towards 2030 (approved on February 4th, 2021)

The strategy's overall goal is to widely apply achievements of space science and technology; selectively invest in some areas related to national defence, security, and management of natural resources and the environment; and improve the country's scientific and technological capacity.

2. National remote sensing development strategy by 2030 with a vision towards 2040 (approved on February 1st, 2019)

By 2030, Vietnam will master manufacture technology of RS satellites, receiving station system, processing of RS data, RS satellite stations,...; build systems to collect and process of national RS data in favor of socio-economic development, national defense and security



2008:
VINASAT-1
VNPT

2012:
VINASAT-2
VNPT

2013:
VNREDSat-1
[120kg] –
STI/MONRE
PicoDragon
[1kg]

1/2019:
MicroDragon
[50kg]

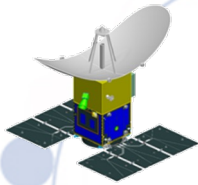
2021:
NanoDragon
[4kg]

2023:
LOTUSat-1
[570kg]

© NEC



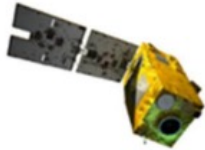
Managed and developed by other agencies
Managed and developed by VNSC



Vietnam
Space
Center

- R & D Center, AIT Center
- Mission Data Utilization Center
- Satellite Operation Center
- LOTUSat-1 SAR Satellite

VNESC



- VNREDSat-1 Satellite
- VNREDSat-1 Operation Center

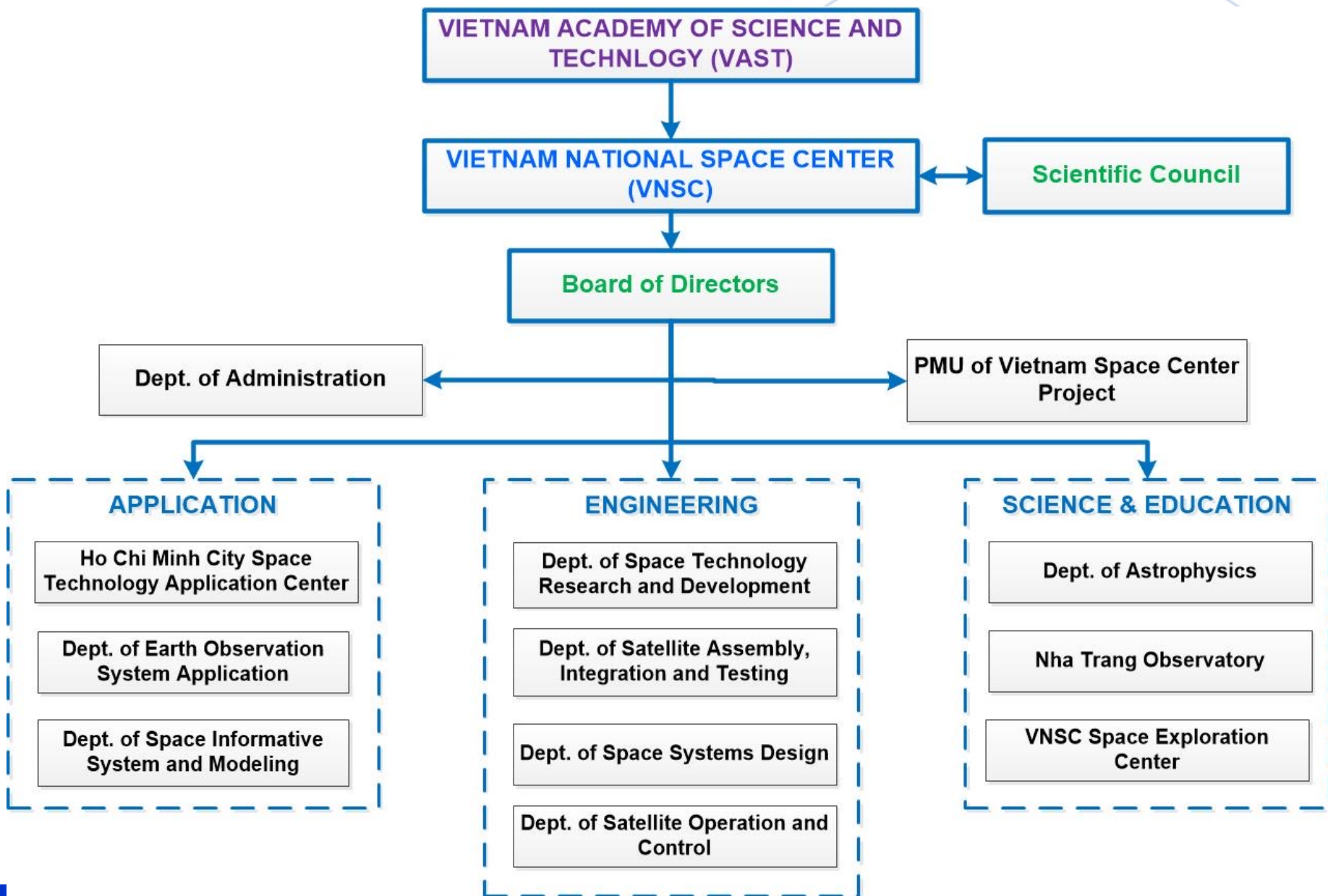
STI

MONRE National Remote Sensing Center

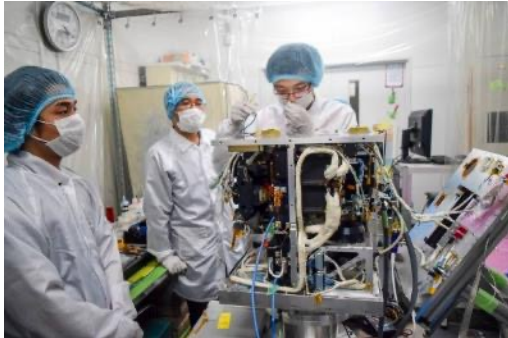
2008

2013

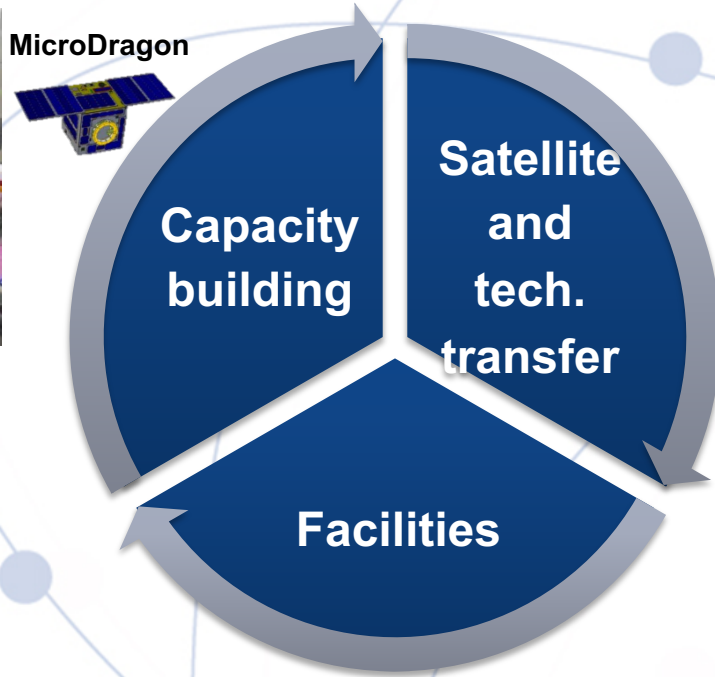
2018



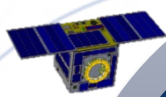
PROJECT FOR DISASTER AND CLIMATE CHANGE COUNTERMEASURES USING EARTH OBSERVATION SATELLITE



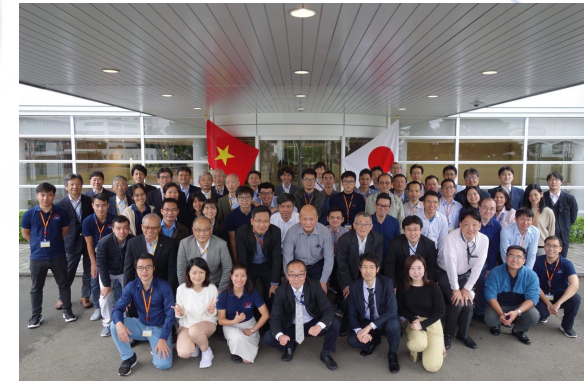
Capacity Building for Satellite Development (over 100 staffs)



MicroDragon



**LOTUSat-1 (570 kg)
SAR payload**



Infrastructure in Ha Noi, Nha Trang and HCM City



AIT facilities for small satellites up to 180kg

HOA LAC CAMPUS



Equipment and software are invested to enable the design, assembly, integration and testing of 180kg-class satellites



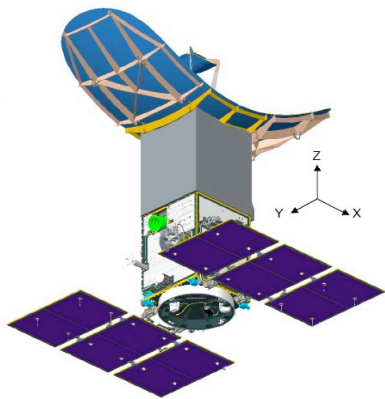
Vacuum chamber



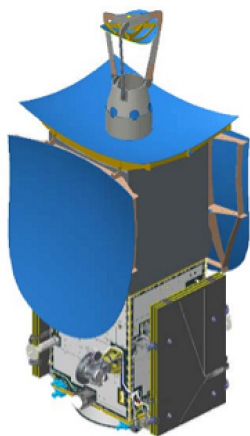
Vibration Machine



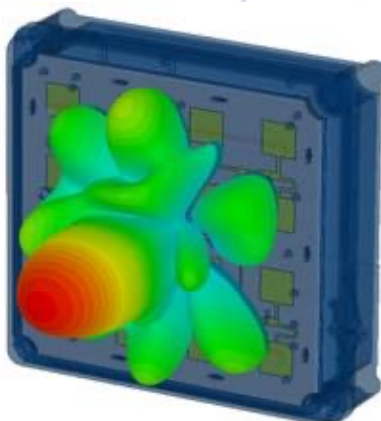
Mass property measurement



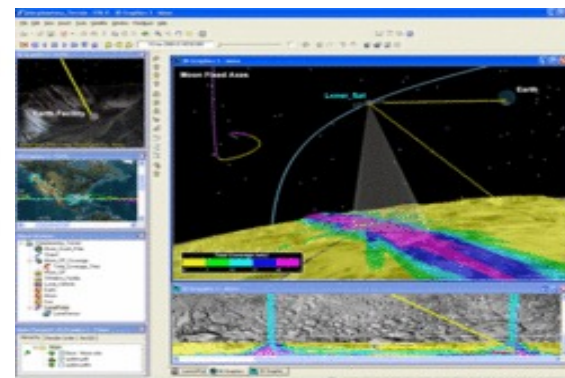
CAE software



CAD/CAM software

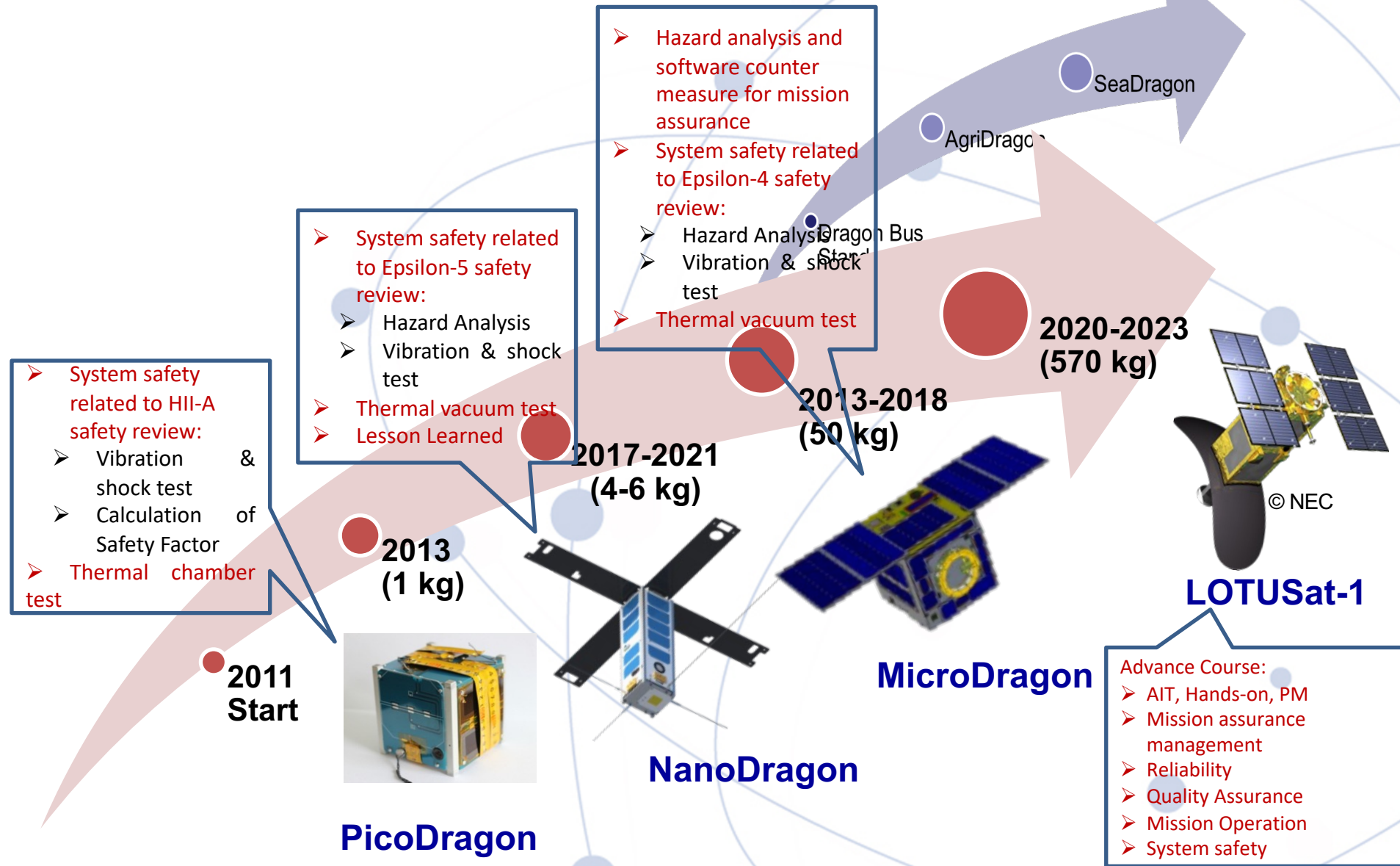


Antenna design software

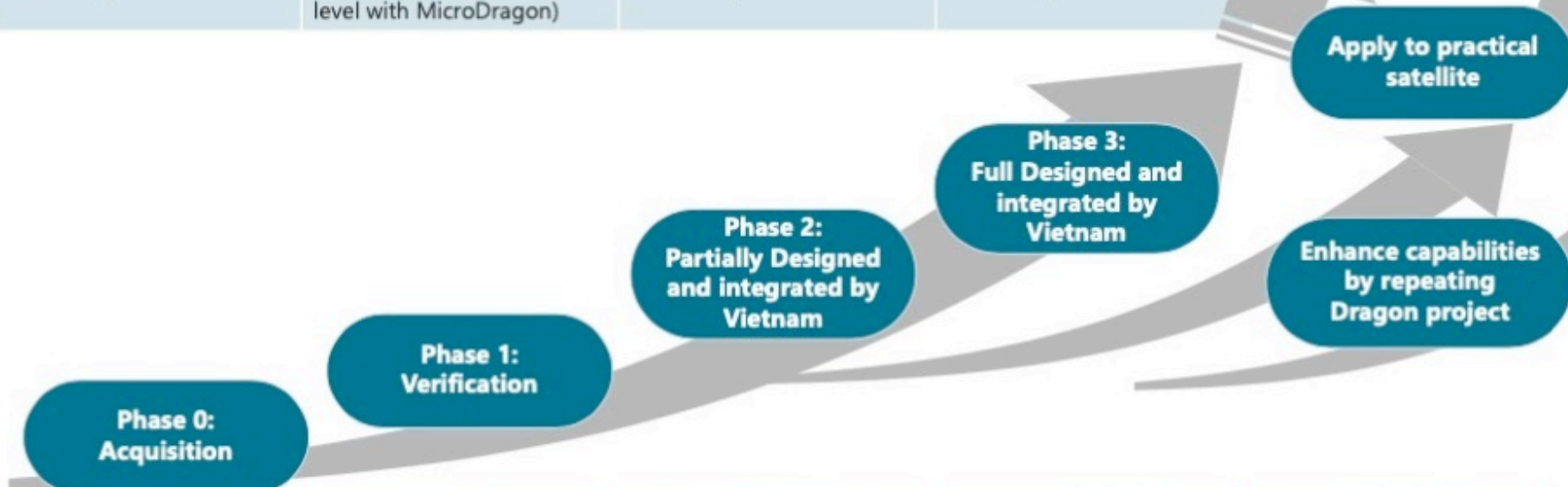


Orbit design software (STK)

Satellite Development Projects in VNSC



2016-2020	2021-2025	2026-2030	2031-2035	2036-2040
MicroDragon Demo:50kg	**Dragon Demo:50-100kg (similar level with MicroDragon)	**Dragon 150-300kg	**Dragon 150-300kg	



Category	2021-2025	2026-2030	2031-2035	2036-2040
Sat System Design	-	Partial (cw foreign company)	Full	Enhance each capabilities
Procurement Requirement Design	Limited	Partial	Full	
Manufacturing Assembly/Integration	Partial	Full	Full	
Manufacturing Parts/Component *SW = Software *HW = Hardware	SW (Limited), HW (Limited) Ex) Wire harness, Data processing software ...	SW (Partial), HW (Partial) Identify strategic components	SW (almost full), HW (Partial) including strategic components	

National Space Policy

National and Regional Agenda (Disaster, Environment, Agriculture, Land Management, Civil & National Security)

Mission Requirements

Practical Satellite Series

Future Sat ...

Sat-Next

Advanced Model with Enhanced Cap. Develop.

LOTUSat-1

SAR: Advanced model with capacity development for project management

VNREDSat-1

Pioneer of practical satellite in Vietnam



Share Know-How



Technology Demonstration Satellite Series

Pico Dragon

Nano Dragon

Micro Dragon

Micro Dragon-2

Dragon-Next

Capacity development for System Design and AIT

Dragon Standard Bus

Demonstration of Domestic Components



Data Platform

Imagery data accumulation, distribution and exchange



Analytical and value-adding services for expansion of SAR imagery utilization

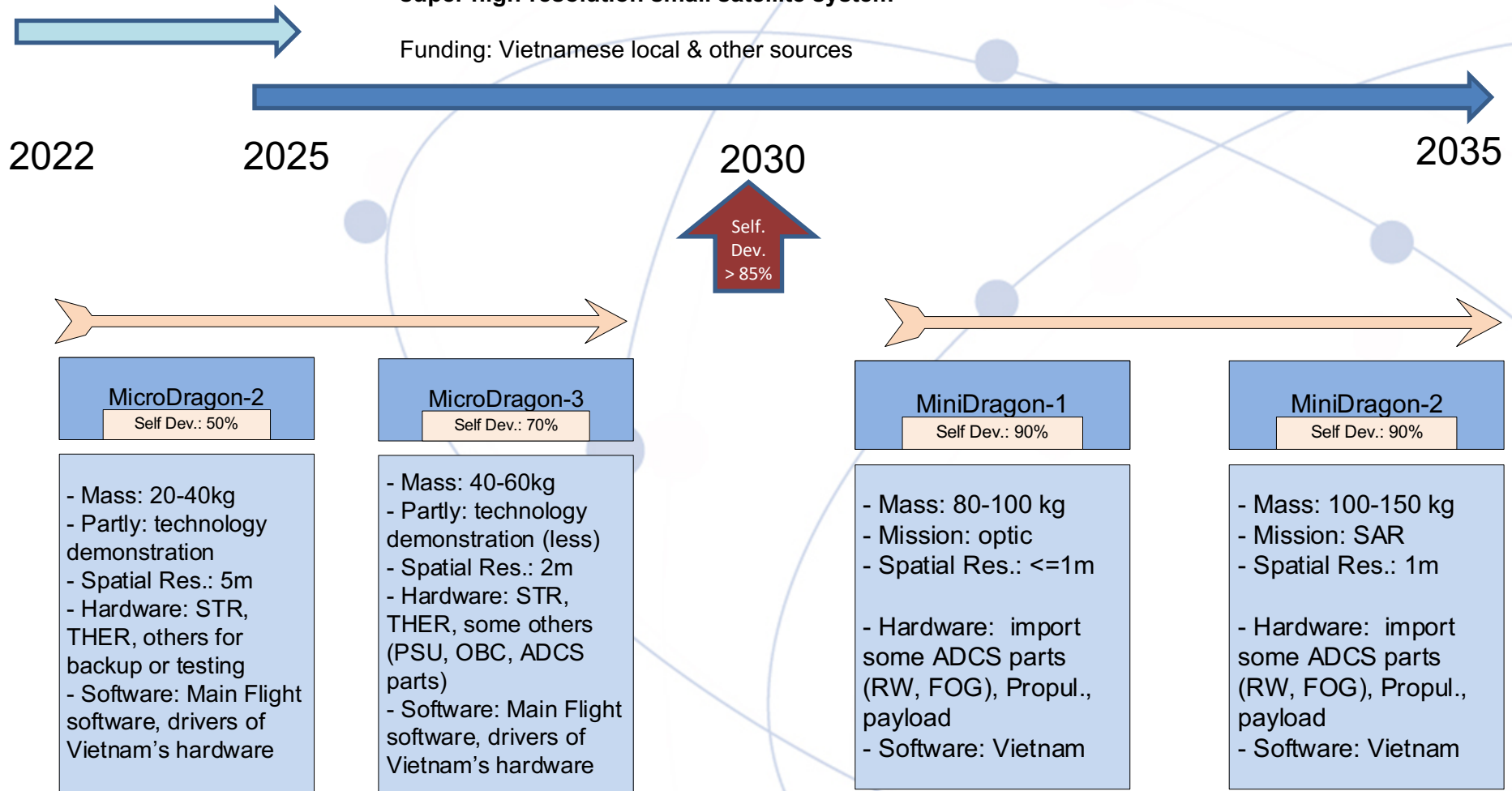
Academic Society for Space Development and Remote Sensing

Phase I: Technology Development

Funding: Vietnamese local 542197

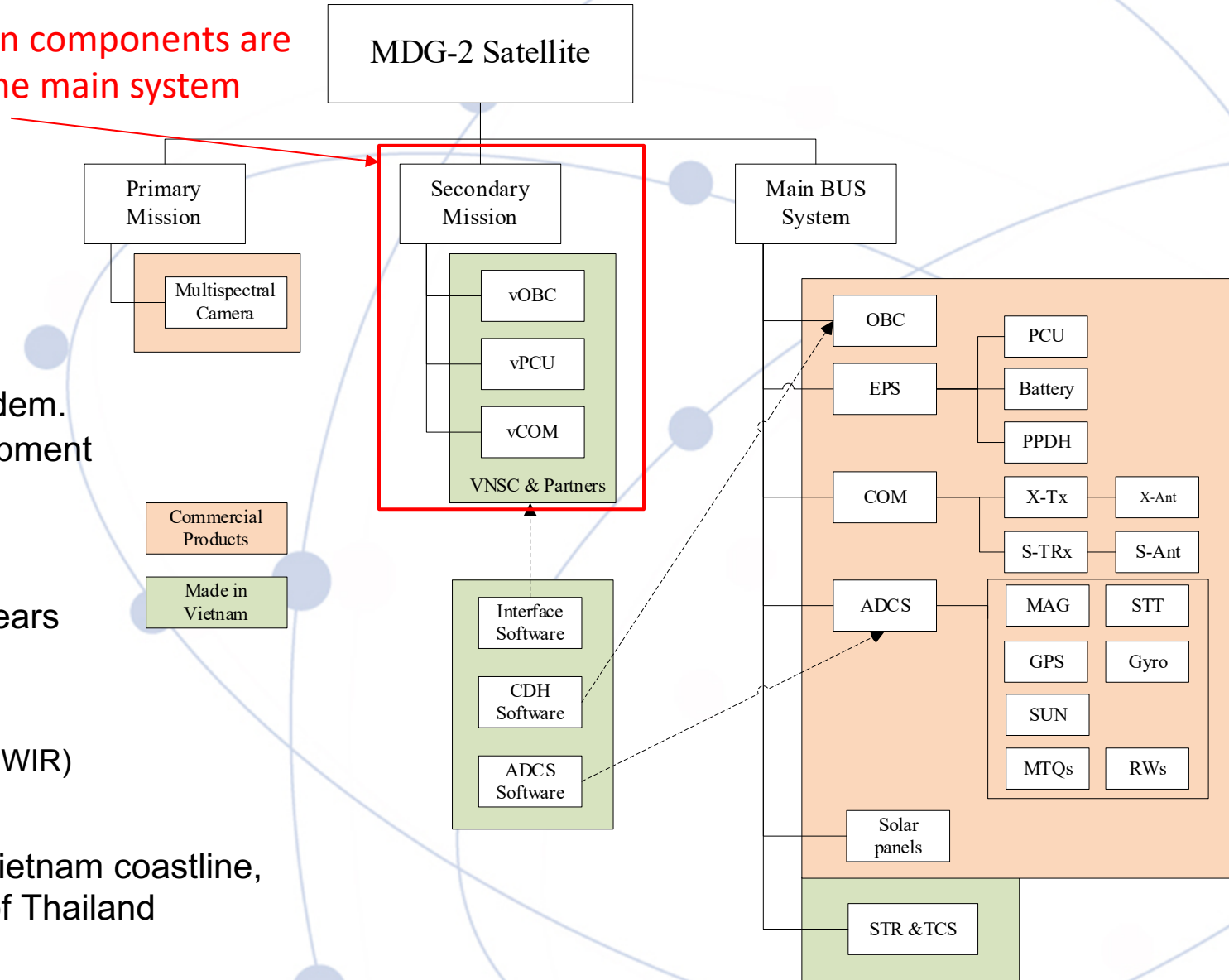
Phase II: Project on improving national earth observation capacity based on high and super high-resolution small satellite system

Funding: Vietnamese local & other sources



MicroDragon-2 General Configuration

Secondary mission components are separated from the main system



MicroDragon-2

Mission: EO + tech. dem.
 Bus: Vietnam development
 Mass: 30-60kg
 Orbit: SSO ~ 550km
 R&D: 3 years
 Mission Lifetime: 3 years

Potential EO mission:
 - Ocean colour (NIR, SWIR)

Area of Interest: Vietnam coastline,
 Vietnam Sea, gulf of Thailand



Basic course 36 master in 5 Japanese Universities



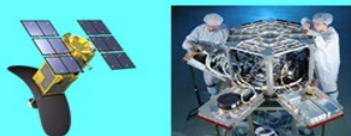
**MicroDragon
(50 kg)**

Successful launch and receive data on Jan. 18, 2019



Advance course

Space Segment



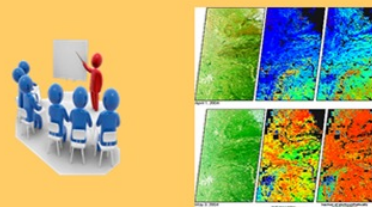
- Project Management
- Satellite technologies
 - ✓ Mission Design
 - ✓ AIT
 - ✓ Launch
- Support Technologies
 - ✓ Design and manufacture Subsystem

Ground Segment



- Ground Station Technologies
 - ✓ Bus system operation
 - ✓ Mission control
 - ✓ TLM control
- On-orbit operations
 - ✓ Mission management

Users Segment



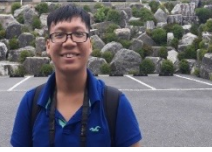
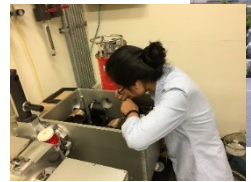
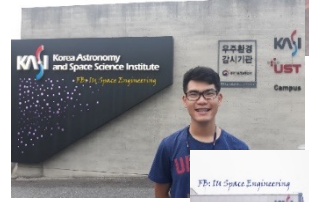
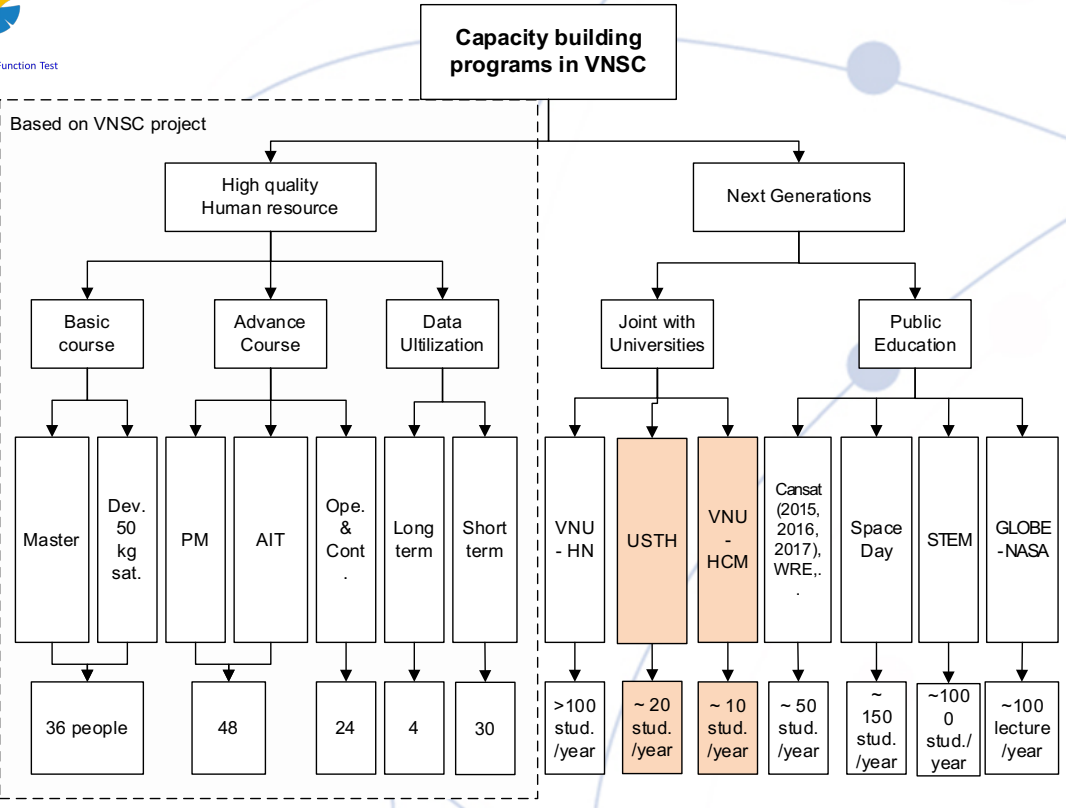
- Data utilization technologies
 - ✓ GIS
 - ✓ Remote sensing
 - ✓ GNSS
- Ground networks system



**LOTUSat-1
(570 kg)**

Via Vietnam Space Center Project

- Mission (Imagers using LCTF)
- Mission (S&F) - ADCS
- Integration - Electrical & Function Test
- Structure & Thermal - Environment Tests
- Launch Service (Innovative Satellite Technology Demonstration Program)
- Project M - Bus Devel - Rocket IF



Internship - partners

MASTER SPACE
Earth Observation - Astrophysics - Satellite technologies

The only master degree in space sciences in Vietnam
Space: a high priority in Vietnam for the next decade

- The Space Sciences
- Business From space
- Satellite technologies



Space Day



Optical Telescopes



STEM Day



CanSat Competition



Planetariums



GLOBE P



Education course



Public Outreach Space Sci. and Tech. Museum



1. Vietnam Strategy of space science and technology development and application to 2030” was approved on February 4, 2021;
2. It’s clear a demand on high quality human resources in Space Engineering in Vietnam;
3. International cooperation and technology transfer from developed countries is the key for the fast development;
4. Vietnam needs improving human capacities and creating space industry ecosystem for sustainable development.



Thank you for your attention!