SATELLITE SERVICES AND REGULATORY FRAMEWORK

Legian Bali, Indonesia, 6 – 8 September 2016

ARFM

REGULATORY FRAMEWORK

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National Law:

- **Law on radio frequencies of Viet Nam (**The national assembly: no: 42/2009/QH12):
  - **Article 6:** The specialized management agency in charge of radio frequencies (ARFM).
  - **Chapter VI:** International registration and coordination in radio frequencies and satellite orbits
  - ✓ **Article 41:** Organizations that use radio frequencies **shall participate** in the international registration or coordination in radio frequencies and satellite orbits

LAW ON RADIO FREQUENCIES

- International registration and coordination in radio frequencies and satellite orbits for satellite systems
  - **Complying with the regulations of ITU**

LAW ON RADIO FREQUENCIES

- Responsibilities of Administration (MIC)
  - ✓ **Examine the validity of dossiers; Register with ITU.**
  - ✓ **Organize the coordination with radio frequency administrations of other countries**
  - ✓ **Approve the coordination results of Vietnam satellite operators with foreign satellite operators**

LAW ON RADIO FREQUENCIES

- Responsibilities of organizations
  - ✓ **Directly coordinate with foreign organizations when so permitted by the MIC**
  - ✓ **Take part in the coordination with administrations of other countries**
  - ✓ **Pay the radio frequency and satellite orbit registration fee**
  - ✓ **Take necessary measures to handle harmful interference with other satellite systems**
  - ✓ **Guarantee national interests and comply with regulations of the ITU**

STRATEGY FOR RESEARCH AND APPLICATION

Strategy for Research and Application on Space Technology in Vietnam until 2020

1. Establish and improve national policy and legal framework for research and applications of space technology
   - ✓ International treaties on outer space
   - ✓ Laws, practices and standards related to space technology

2. Develop infrastructures for space technology
   - ✓ Communication satellite projects
   - ✓ Small earth observation satellite projects
   - ✓ Space centers

Strategy for Research and Application on Space Technology in Vietnam until 2020

3. Conduct space science and space technology research
   - ✓ Conduct space science research and public education.
   - ✓ Master small satellite technology
   - ✓ Research into related advanced technologies

4. Enhance utilization of space technology applications
   - ✓ Environmental monitoring, disaster mitigation, climate change countermeasure, etc.
   - ✓ Agriculture, fishery, oil industry, etc.
   - ✓ Transportation, navigation

WRC-15 OUTCOMES AND IMPACT

ADDITIONAL PRIMARY ALLOCATIONS TO FSS

- **Region 3: 300MHz for Ku Uplink: 14.5-14.8 GHz: countries listed in Resolution PLEN/2 (WRC-15): Australia, Cambodia, China, Japan, Lao P.D.R., Pakistan, Papua New Guinea, Thailand and Viet Nam.**

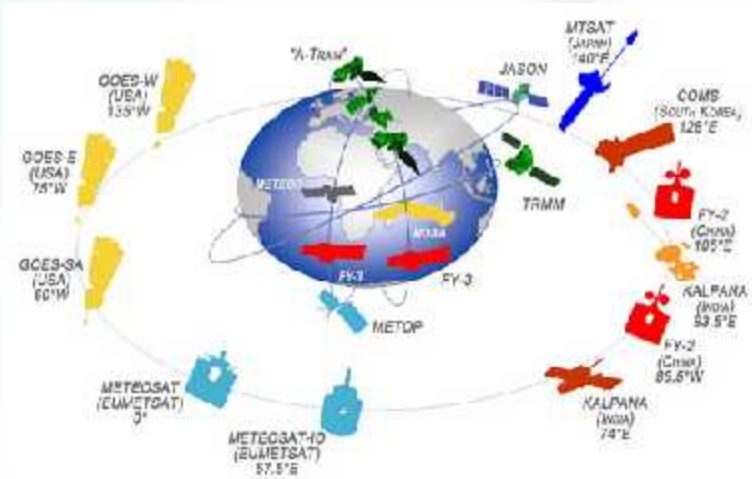
Cross – border coordination is required for the additional Ku band

ADDITIONAL FREQUENCY BAND FOR EESS

- Around 1200 earth observation satellites are operating in the World

9.2-9.3 GHz	9.3-9.5 GHz	9.5-9.8 GHz	9.8-9.9 GHz	9.9-10.4 GHz

WRC-15 allocated 600 MHz for Earth observation satellite



ADDITIONAL FREQUENCY BAND FOR EESS

IMPLEMENTATION AND ACTION

- **Sharing study between the EESS and terrestrial service in 9 GHz**
- **Plan the band 9.2 – 9.3 and 9.9 – 10.4 GHz for EESS in some specific areas**
- **Re-farming the band 9.2 – 9.3 and 9.9 – 10.4 GHz following the Plan**

CANCELATION OF API FOR SATELLITE NETWORK SUBJECT TO COORDINATION

PUBLICATION

CREAT API

CRC SUBMISSION

WITHDRAWING DURING 15 DAYS

ITU BUREAU

CRC PROCESSING

API mechanism will continues until 1/7/2016. New procedure will be effective on 1/1/2017

SATELLITE PROCEDURE

IMPLEMENTATION AND ACTION

- **Modify internal registration and coordination process for satellite network filling**
- **Develop the relevant software**

ESIMS IN THE RADIO REGULATIONS

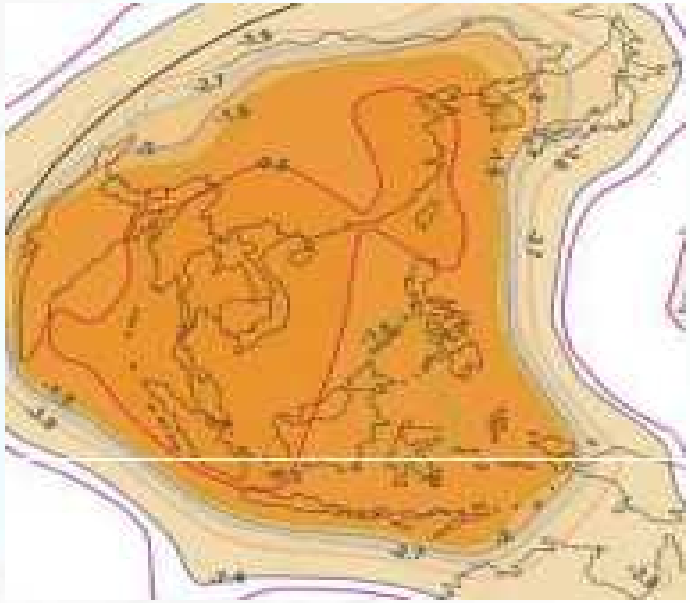
(RR 5.527A for GSO FSS Ka-band 19.7 – 20.2/29.5-30.0 GHz)

Study on regulatory and licensing for Earth station in Motion

C-BANDS

- **Large geographic coverage with a single beam:**
  - ✓ Reach across entire continents and oceans
  - ✓ Making vital and cost-effective for businesses and applications
  - ✓ Enabling broadcasters to reach more people

Reliable in Harsh weather



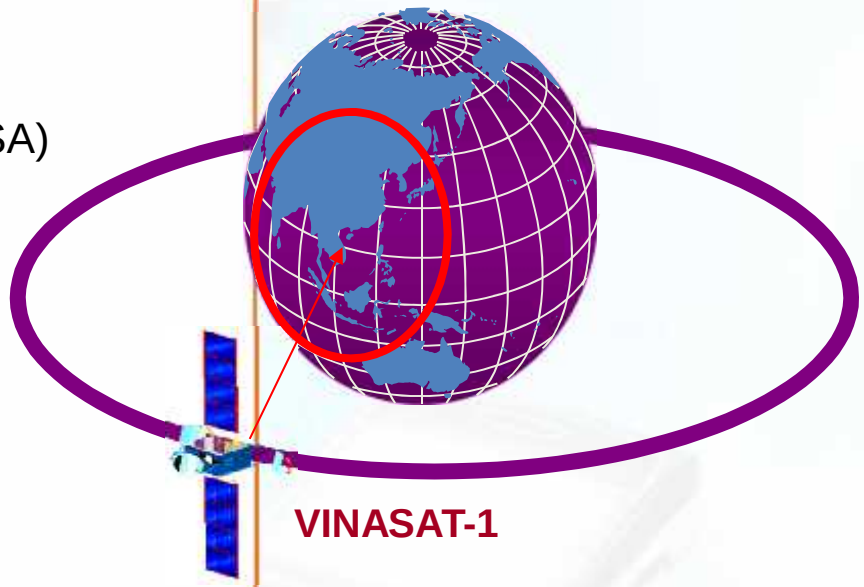
5G trial has been implemented indoor in C-band. As a result, it may impact to FSS operation.

TELECOMMUNICATION SATELLITE

VINASAT-1

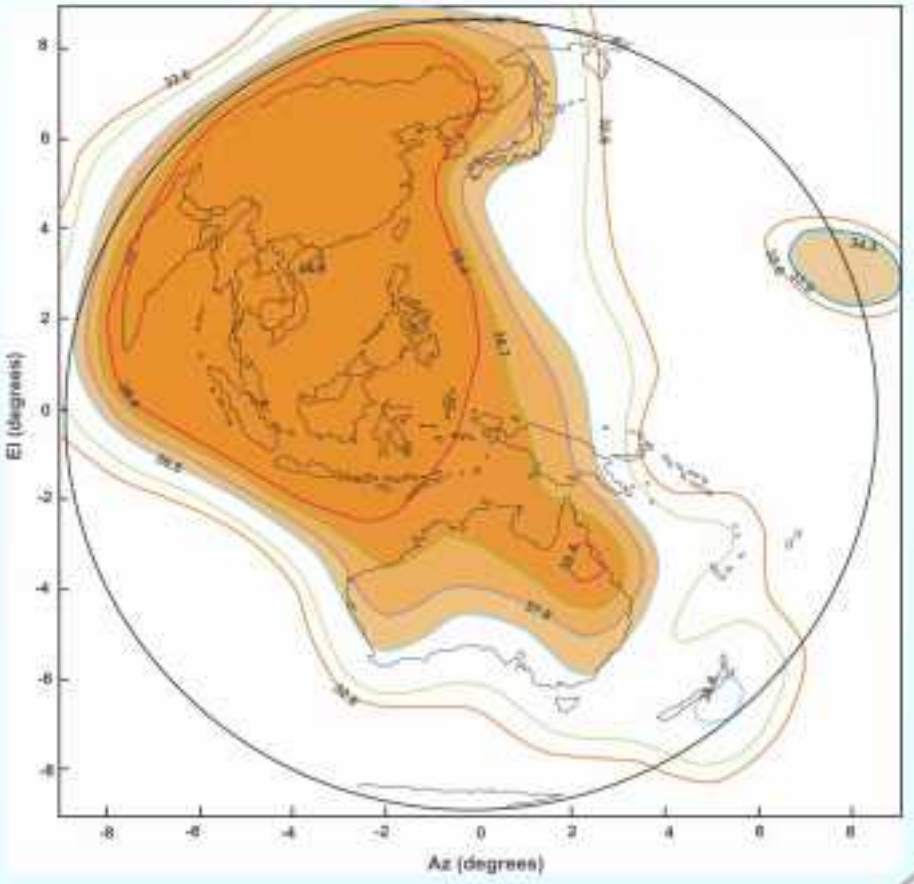
Essential Information

- Satellite name: VINASAT-1
- Manufacturer: Lockheed Martin (USA)
- Launch date: 18/4/2008
- Launcher: Ariane V (France)
- Orbit location: 132E
- Launch mass: 2,6 tons
- Lifespan: 15 – 20 years
- Transponders: 08 C band and 12 Ku band



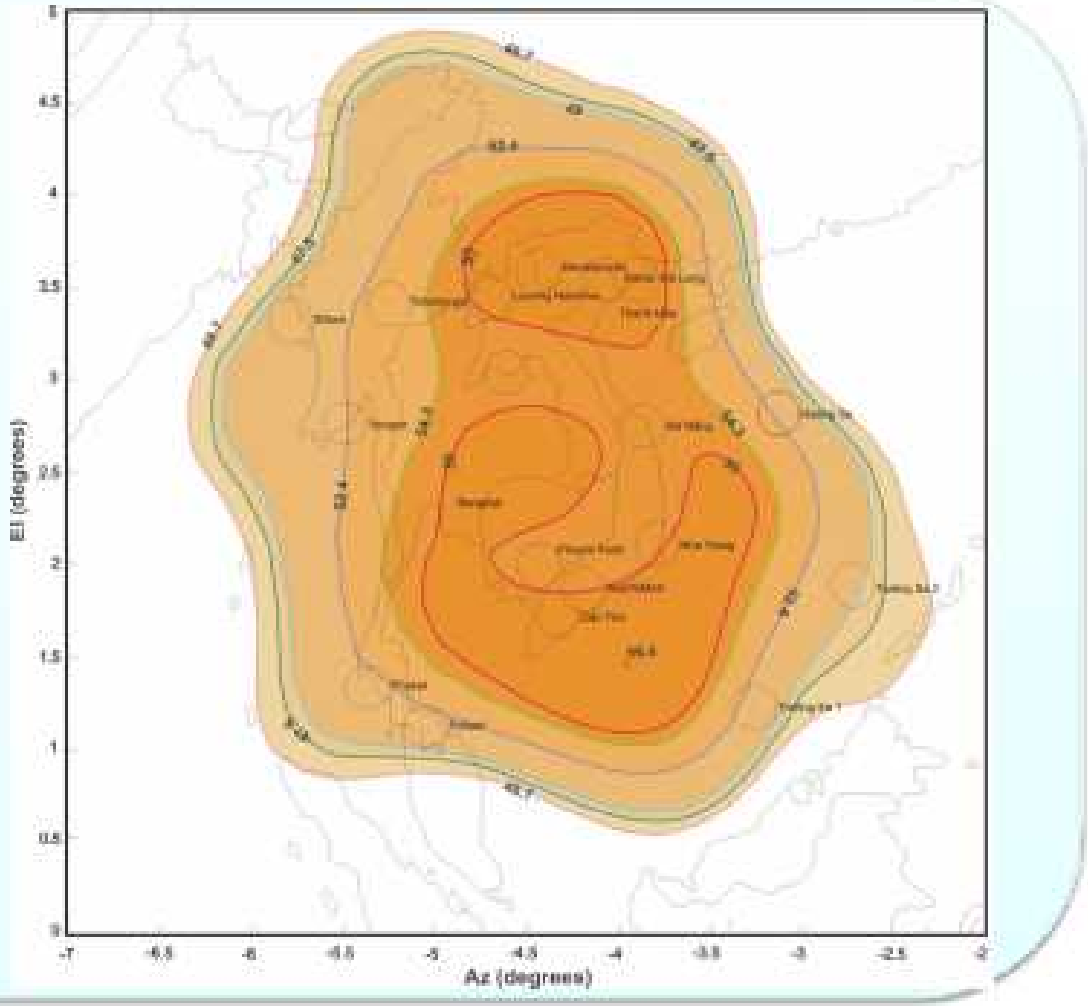
VINASAT-1 EIRP in C-band

City	EIRP (dBW)
Hanoi	45.3
Hochiminh	45.3
Bangkok	45.1
Yangon	44.6
Taipei	40.2
Hongkong	43.5
Jakarta	40.7
Shanghai	39.6
Karachi	38
Tokyo	35.8
Sydney	35.5
Honolulu	33.4



VINASAT-1 EIRP in Ku-band

Thành phố	EIRP (dBW)
Hanoi	55.5
Danang	54.3
Hochiminh City	54.2
Phnom Penh	54.2
Vientiane	54.2
Bangknk	54.2
Hoang Sa	49.1
Truong Sa 1	48.3
Sittwe	48.6
Yangon	51.4
Pattani	48.6
Phuket	50.5
Louang Namthon	54.5



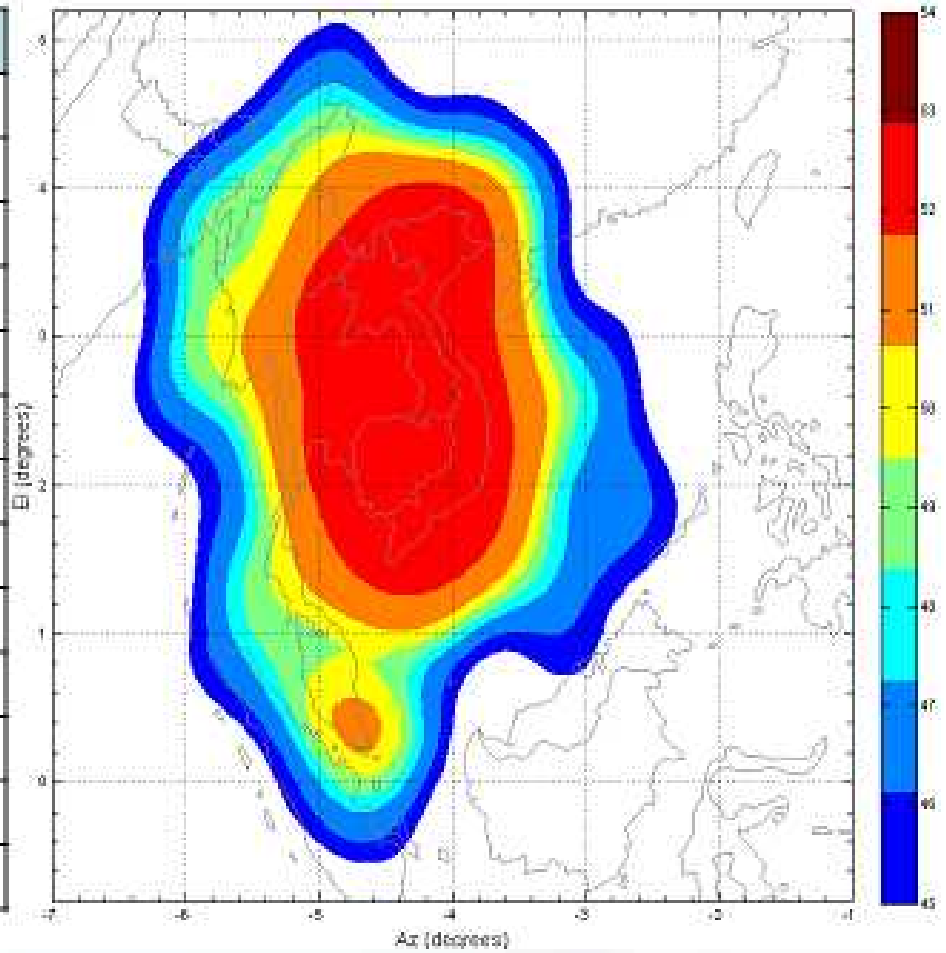
VINASAT-2

Essential Information

Orbital location	:	131.8 E
Coverage	:	Vietnam, Lao, Cambodia, Thailand, Myanmar Singapore and a part of Malaysia
Launch date	:	15 May 2012
Launch Vehicle	:	Ariane 5 - ECA
Life time	:	15 years
Spacecraft Type	:	A2100
No. of Transponder	:	24
Transponder Bandwidth	:	36MHz and 54MHz
Max EIRP	:	57 dBW
Max G/T	:	10.5 dB/K

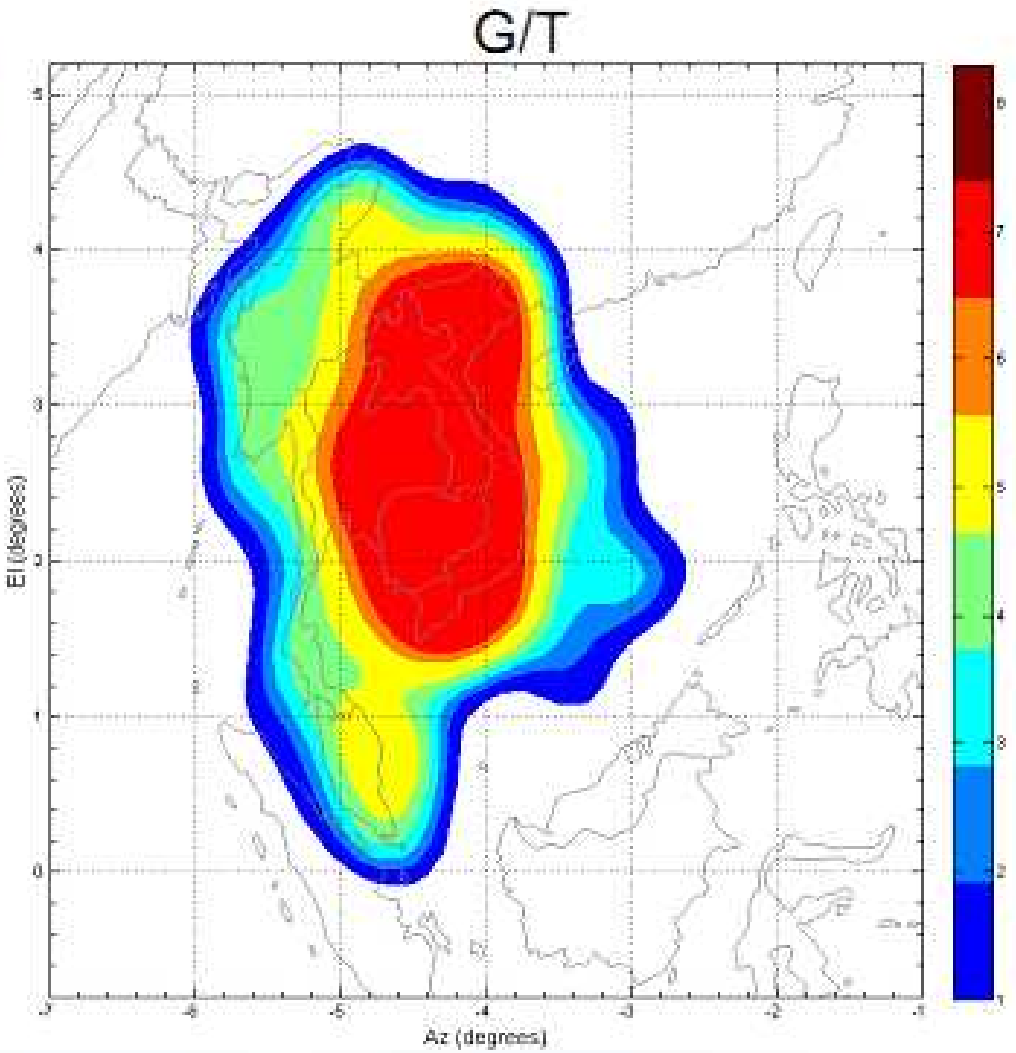
VINASAT-2 EIRP

City	EIRP (dBW)
Hanoi	55.3
Danang	55.2
Hochiminh City	56
Phnom Penh	56.75
Vientiane	55.9
Bangkok	54.4
Hoang Sa	48.7
Truong Sa 1	47.6
Sittwe	50.2
Yangon	51.5
Pattani	50.8
Kuala_Lumpor	50.3
Singapore	51.6

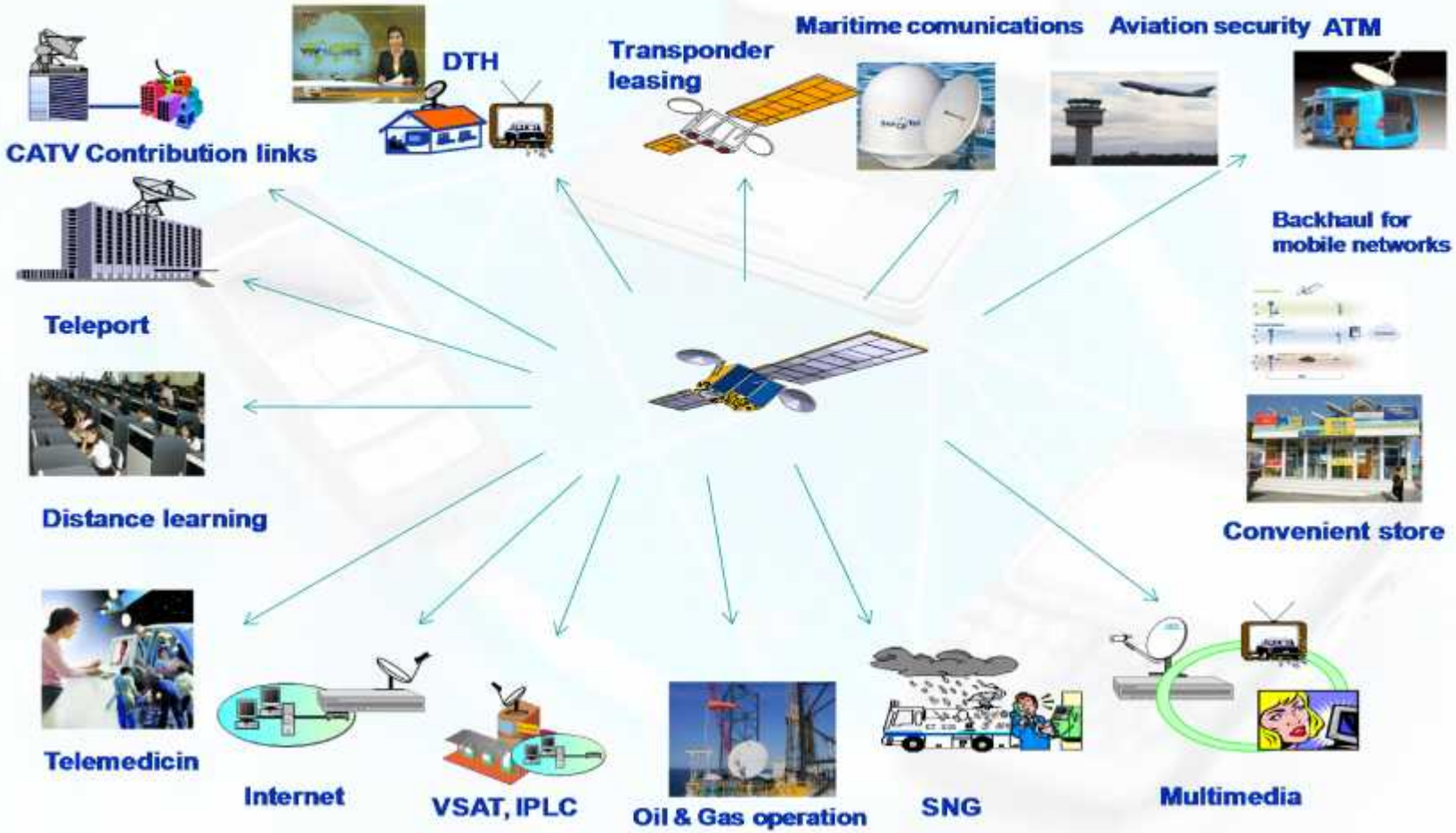


VINASAT-2 G/T

City	G/T (dB/K)
Hanoi	10
Danang	8.1
Hochiminh City	10.5
Phnom Penh	9.9
Vientiane	9.8
Bangkok	8.3
Hoang Sa	1.14
Truong Sa 1	0.2
Sittwe	3.6
Yangon	5.4
Pattani	5.9
Kuala_Lumpor	4.2
Singapore	4.5



TELECOMUNICATION SATELLITES



EARTH OBSERVATION SATELLITE

VNREDSat-1

Optical sensor satellites launched on 7 /3/2013

Orbital parameters	
Reference system	Geocentric
Regime	Sun-synchronous
Perigee	690 kilometres (430 mi)[1]
Apogee	690 kilometres (430 mi)[1]
Inclination	98.16 degrees[1]
Period	98.43 minutes[1]
Epoch	25 January 2015, 05:27:58 UTC[1]

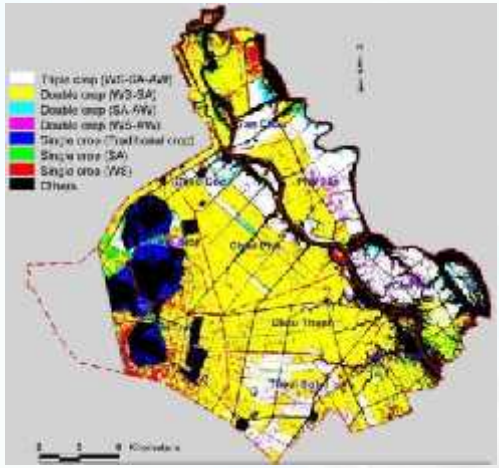
Parameters	Values
Size	600mm x 570mm x 500mm
Mass	120 kg
Orbit	Sun-synchronous 680 km
Mission	Earth observation
Image sensor	PAN + Multispectral
Lifetime	5 years

Basic parameters of VNREDSat-1

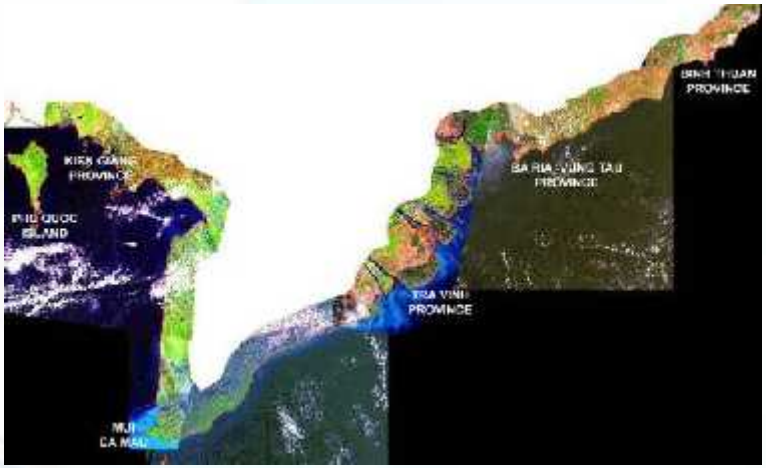
First image taken by VNREDSat-1

Space applications

(VAST/VNSC)



Rice crop monitoring in An Giang



Coastal zone erosion management

Forest mapping and monitoring in Tay Nguyen

EARTH OBSERVATION SATELLITES

- **VNREDSAT-2: 2020**
- **LOTUSAT-1: 2017 (Radar)**
- **LOTUSAT-2: 2022 (Radar)**

SCIENCE SATELLITE

PicoDragon

"The first made-in-Vietnam" satellite successfully operate in orbit

PicoDragon deployment from ISS

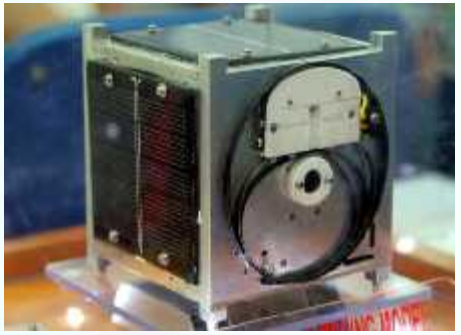
Parameters	Values
Size	100 x 100 x 113.5 mm
Mass	1 kg
Life time	**3 months** *(19 Nov. 2013 – 28 Feb. 2014)*
Orbit	410 km
Payload	- CMOS camera - 3-axis angular rate sensor

VNSC Ground station after receiving the signal

SCIENCE SATELLITE

FUTURE PROJECT

- **MICRODRAGON (50KG)**
  2014 – 2018



NANO DRAGON (6 – 10kg)
2017 – 2019
(Technical support from Japan)

Thanks for your attention

ARFM