Contribution to global Earth observation from satellites

- JAXA's Earth Observation strategy -

April 16, 2008

Makoto Kajii

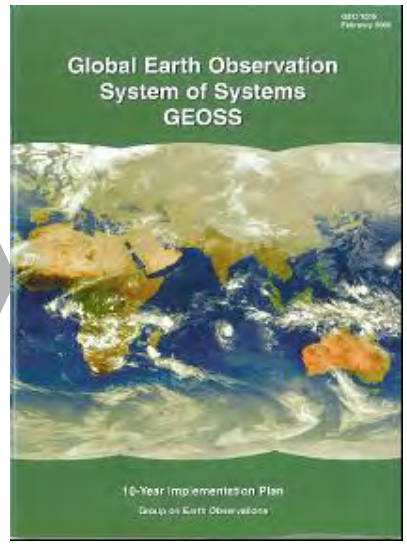
Japan Aerospace Exploration Agency

Earth Observation Summits and GEOSS

1st EO Summit
July 2003
@Washington,DC

2nd EO Summit
April 2004
@Tokyo

3rd EO Summit
February 2005
@Bruxelles



GEOSS 10 Year
Implmentation Plan

A Global Earth Observation System of Systems (GEOSS)

Committee on Earth Observation Satellites (CEOS)

Objectives

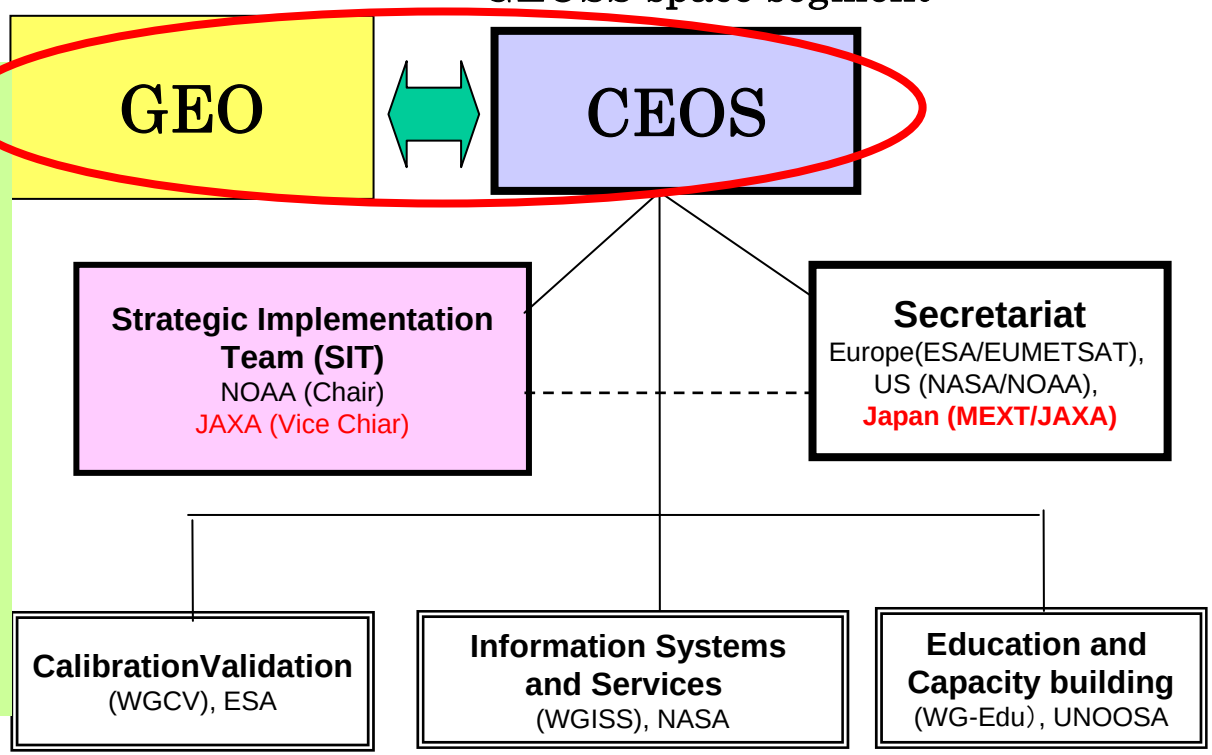
- International coordination of Earth observation satellites
- Standardization of data and products
- Exchange of policy and technical information

Activities

- 27 space agencies and 21 user organizations participate since establishment in 1984
- 2008 Chair: CSIR (South Africa)
- Plenary and 3 WGs
- SIT for planning and implementing GEOSS space segment

Building of GEOSS space-segment

- CEOS virtual constellations
  - Precipitation
  - Sea surface topography
  - Land imaging
  - Atmospheric composition
- Information system
- Calibration and validation

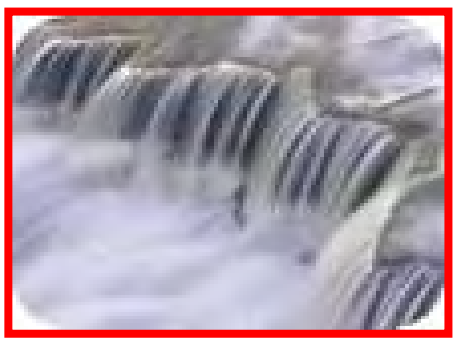


Japan's Basic Strategy for Earth Observation

Council for Science & Technology Policy (March 2006)

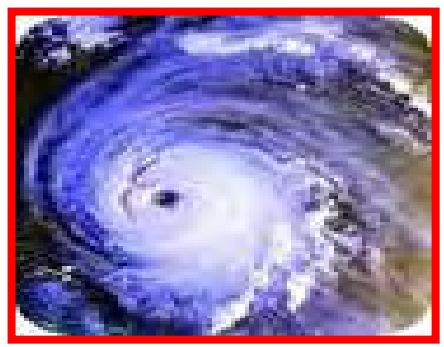
- Needs for an integral observation by satellites, ships, buoys, ground stations and so on,
- Establishment of an integral observation system from the user's point of view,
- **One of the tools for policy making,**
- **Contribution to GEOSS particularly on following three Societal Benefit Areas**

Water



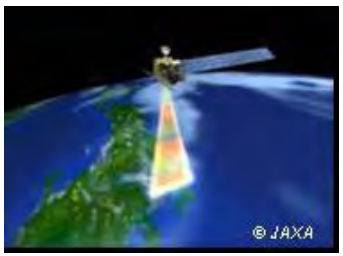
Climate

Disaster



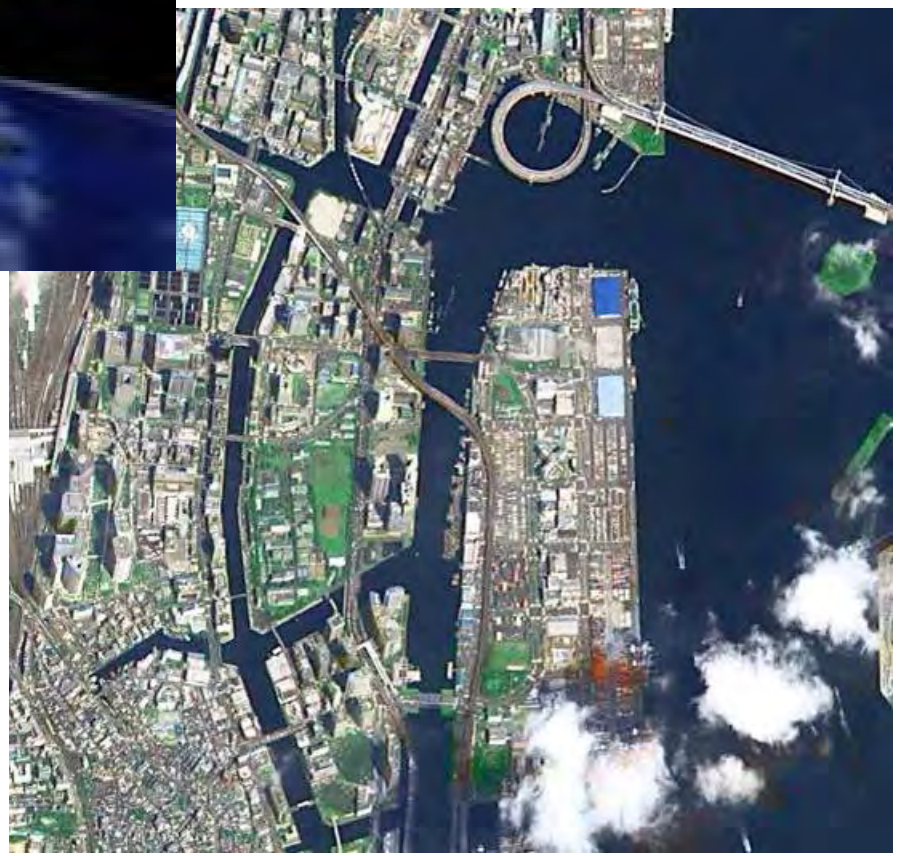
Advanced Land Observing Satellite (ALOS)
launched on January 24th, 2006

- **Disaster monitoring**
- **Cartography**
- **Regional observation**
- **Resources surveying**

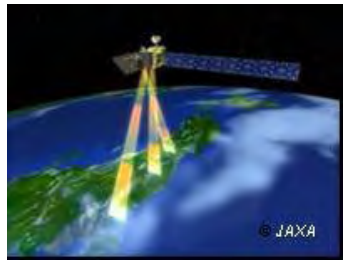


AVNIR-2

Advanced Visible and Near Infrared Radiometer type 2

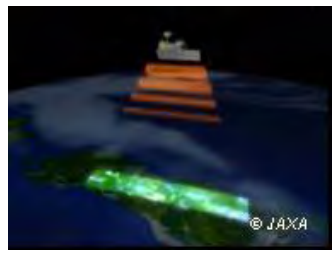


ALOS Pansharpen (PRISM/AVNIR-2) image over Tokyo observed on August 29, 2006



PRISM

Panchromatic Remote sensing Instrument for Stereo Mapping



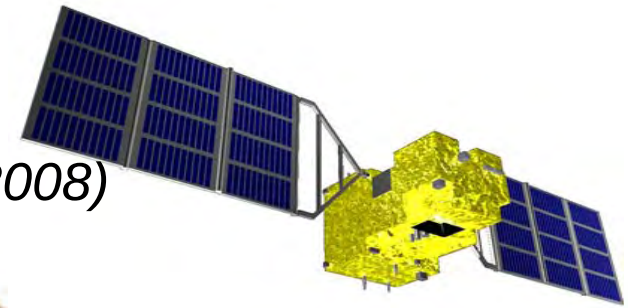
PALSAR

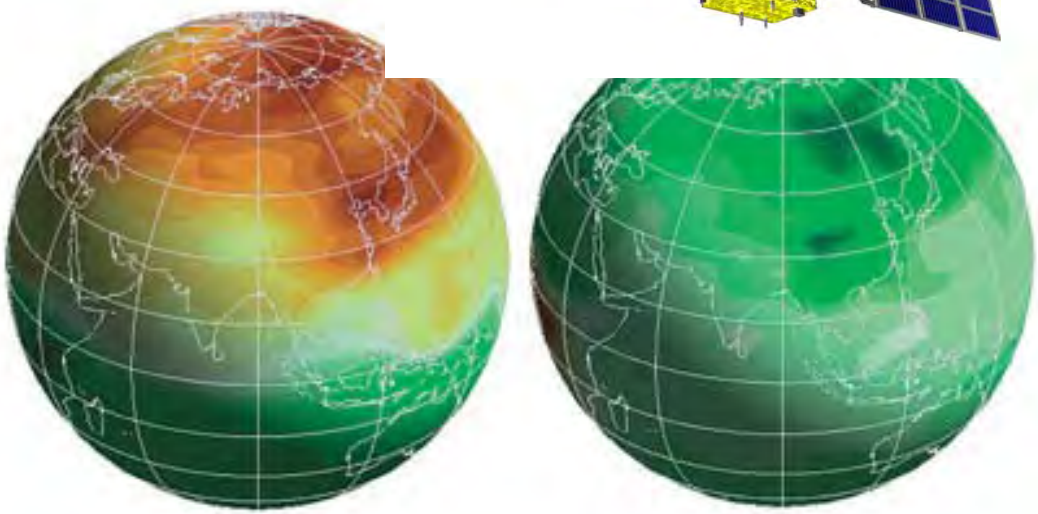
Phased Array type L-band Synthetic Aperture Radar

Supporting adaptation to climate change
Greenhouse Gases Observing Satellite <GOSAT>

GOSAT enables global (with 56,000 sample points) and frequent (every 3 days) monitoring of CO2 and CH4 column density.

(launch in JFY2008)

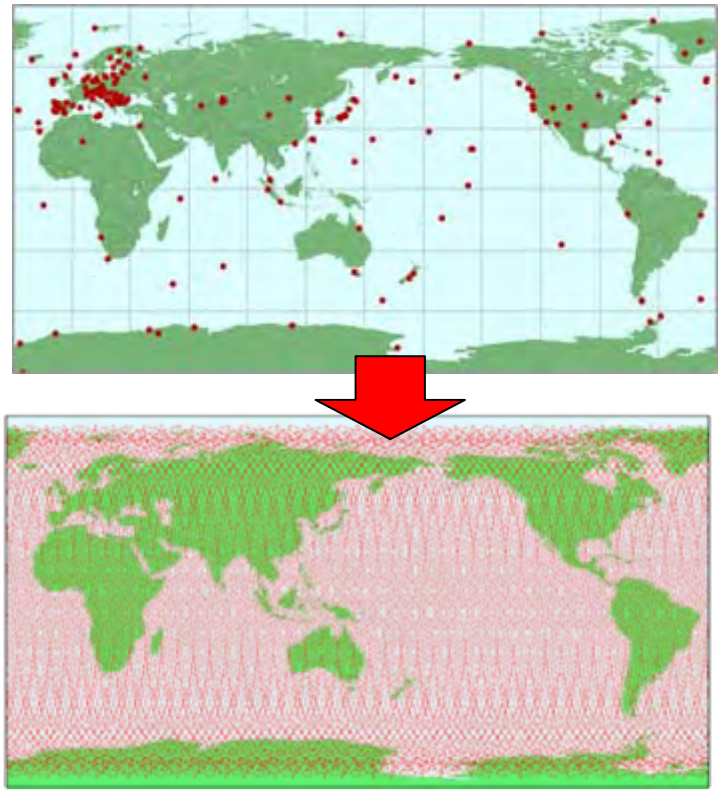




Simulated CO2 distribution as observed by GOSAT

by National Institute for Environmental Studies

Current Ground-based Observation Points (256pts (as of April 2008)) *Provided by WMO WDCGG*

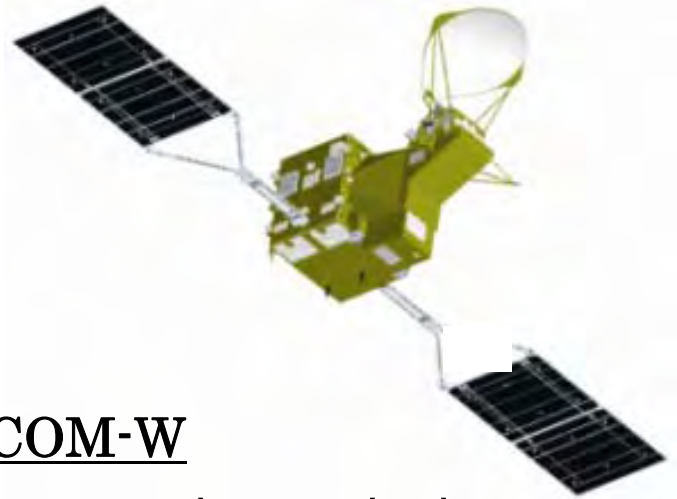


Increase of Observation Points using GOSAT (56,000pts)

Global Change Observation Mission (GCOM)

Main Mission

- Establish and demonstrate the global and long-term Earth observing system (contribute to GEOSS)
- Contribute to improving climate change prediction in concert with climate model research institutions

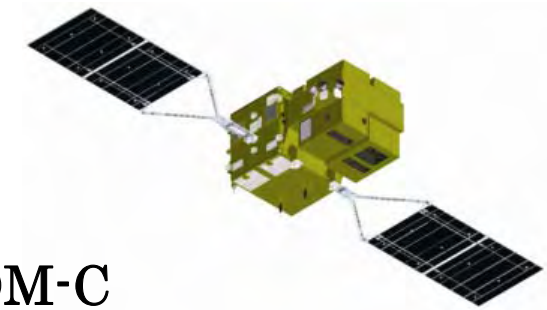


GCOM-W

Sensor: Advanced Microwave Scanning Radiometer (AMSR-2)

Phase: under development

Launch: 2011



GCOM-C

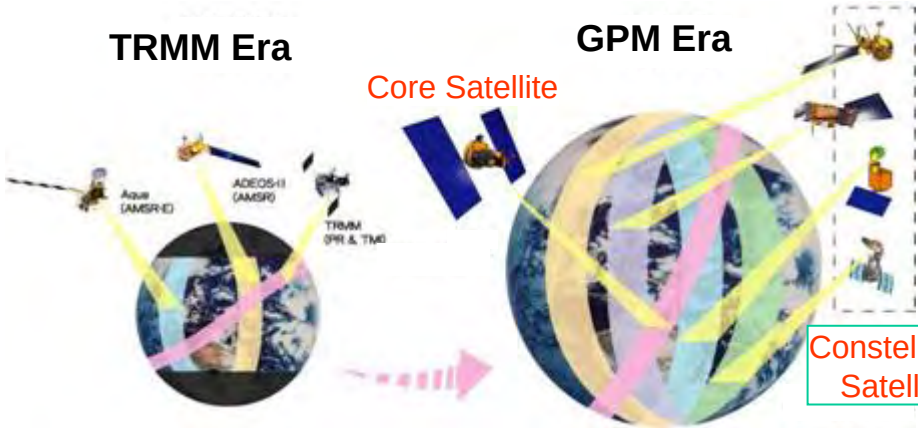
Sensor: Multi-spectral Sensor

Phase: under study

Launch: TBD

Global Precipitation Measurement <GPM>

GPM is a follow-on and expanded mission of the current on-going TRMM



Core Satellite

Dual-frequency precipitation radar (DPR)
Microwave radiometer (GMI)

- **Precipitation with high precision**
- **Discrimination between rain and snow**

(launch in 2013)

8 Constellation Satellites

Microwave radiometer

- **Global precipitation every 3 hours**

(launch around 2013)

- **Improve the accuracy of both long-term and short-term weather forecasts**
- **Improve water resource management in river control and irrigation systems for agriculture**

Earth CARE/CPR

Climate monitoring of earth radiation, cloud and aerosol
Cooperation between ESA and Japan

Mission

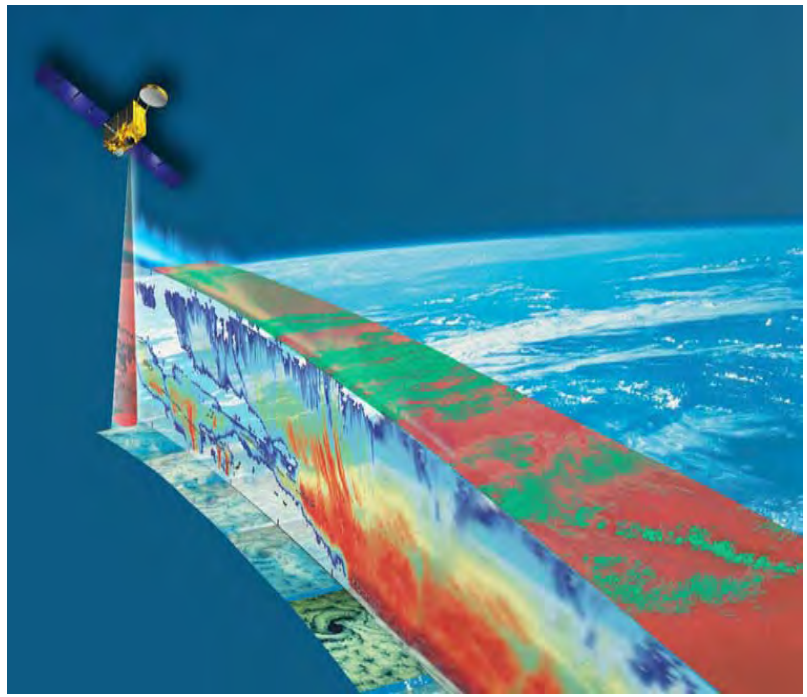
- ✧ Vertical profile of clouds, aerosol
- ✧ Interaction between clouds and aerosol
- ✧ Cloud stability and precipitation

Instrument

CPR (cloud Profile Radar) by JAXA
LIDAR (Laser Radar)
MSI (Multi-Spectral Imager)
BBR (Broad Band Radiometer)
FTS (Fourier transform Spectrometer)

Launch target

JFY2013



Framework of Sentinel Asia

Voluntary and best-efforts-basis initiative by participating organizations

Space Community

APRSAF*

Content

Satellite Image

Promotion of Utilization

Capacity Building

* Asian-Pacific Regional Space Agency Forum

International Community

UN / ESCAP UN / OOSA
ASEAN AIT etc.

International Cooperation

Joint Project Team (JPT)

59 organizations
(51 agencies from 20 countries and 8 int'l organizations)

Digital Earth / Web-GIS Community

Digital Asia

Information Sharing Platform

Web-GIS
Data / Meta Data Management

Content

Digital Map
Social / Economic Data
Satellite Image

Disaster Reduction Community

ADRC**
Member Countries

Content

Disaster Information

Utilization (User)

** Asian Disaster Reduction Center

Concept of Sentinel Asia STEP2

Observation

Space Agency

Earth Observation Satellite

Value-added Information

Disaster Information

Communication Satellite

Transmission

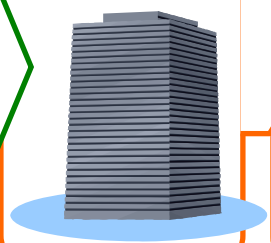
Sharing (Web)

Utilization

Disaster Management Organization

User Expansion

Governmental Organization (ADRC members)



Local Governmental Organization

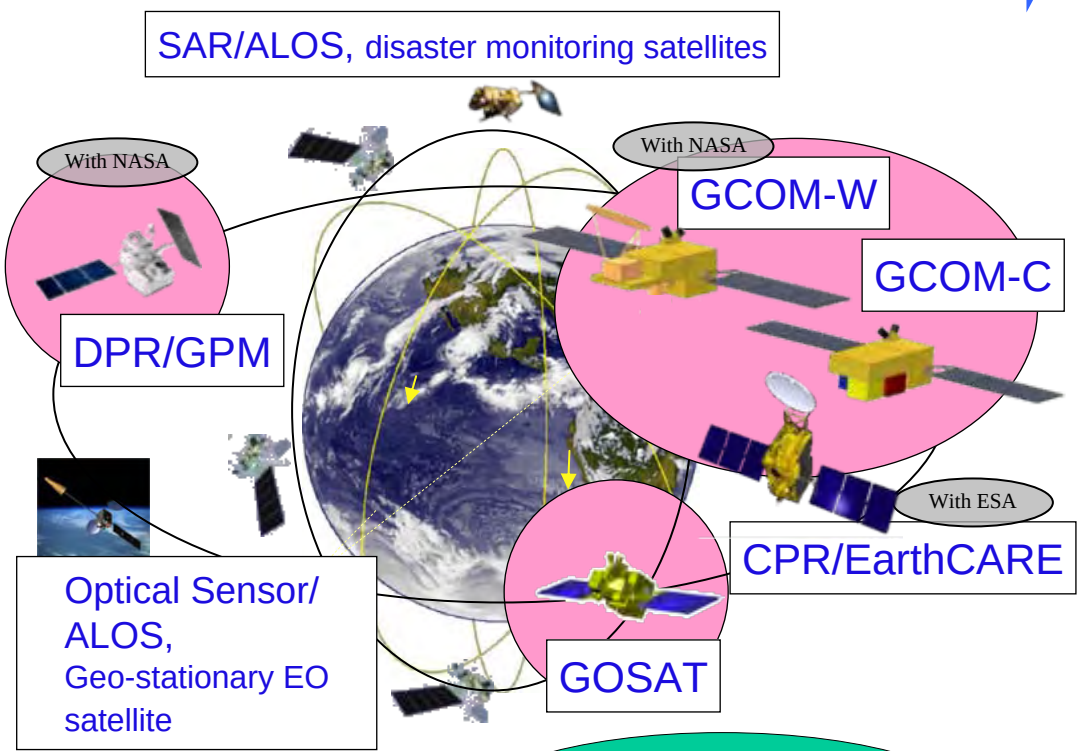
End User

Human Network

Capacity Building・Outreach

JAXA Earth Observation Program

To develop and operate an Earth Observation System for GEOSS



Sentinel Asia

Disaster Charter

Water SBA	**Dual-frequency Precipitation Radar (GPM)**
	AMSR2(GCOM-W)
	Scatterometer (GCOM-W)
Climate SBA	**SGLI (GCOM-C)**
	Cloud Profiling Radar (EarthCARE)
	Greenhouse Gas Observation Sensor (GOSAT)
Disaster SBA	**SAR(ALOS, disaster monitoring satellites), Optical Sensor (ALOS, Geo-stationary EO satellite)**

End of Presentation

Thank you