

# **Developing Conception of China National High Resolution Earth Observation Data Grid for Public Service**

The Earth Observation System and Data Center , CNSA  
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# Outlines



- **Introduction**
- **The New Generation Earth Observation (EO) System**
- **Data Grid for Public Service**
- **International Cooperation**



# ■ Introduction



# Introduction



## Purpose of China's EO System

According to the white paper of China's Space Activities in 2011

- Utilize outer space peacefully
- Enhance innovation capability in science and technology
- Accelerate the development of economy and society
- Serve the sustainable development of humankind



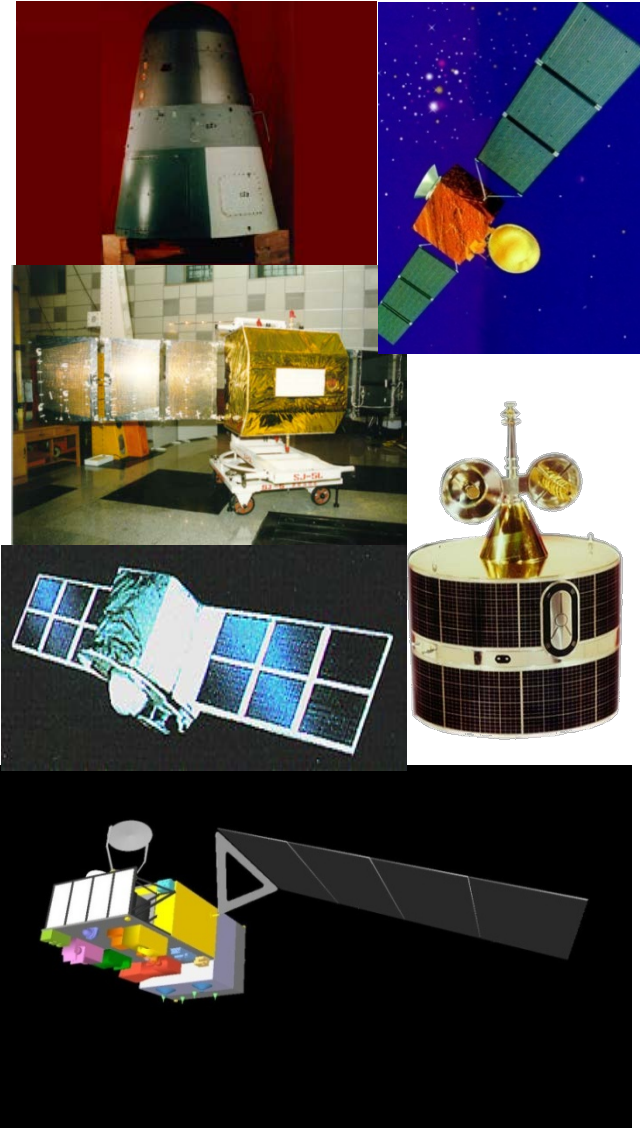
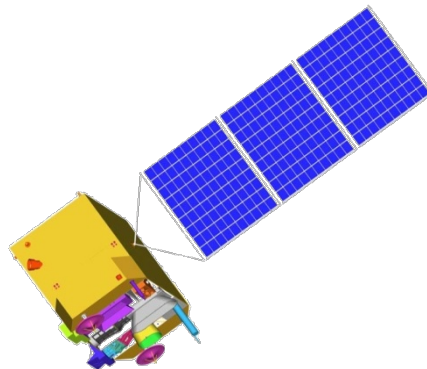


# Introduction



## Development Overview of EO system

- Meteorological satellite series (FY1/2/3/4)
- Resources satellite series (CBERS-01/02/03/04, ZY-1-02C/ZY-3)
- Oceanic satellite series (HY-1A/1B/HY-2)
- Disaster mitigation satellite constellation (HJ-1A/1B/HJ-2)





# ■ The New Generation EO System





# The New Generation of EO System



## **Goal of the new generation EO system**

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- Construct an advanced earth observation system with the coverage of the global land, ocean and atmosphere;
- Achieve all-weather, all-day and global coverage EO data acquiring capability; provide global application service in the fields of agriculture, disaster mitigation, resource and environment, as well as public security, etc.
- Meet the requirements of sustainable development of economy and society, as well as promote international cooperation.



# The New Generation of EO System



## System Composition

- Space-based System
- Airborne System
- Ground system
- Application System

high spatial resolution

high spectral resolution

high temporal resolution







# The New Generation of EO System



## Space-based system



- Several satellites with various orbits and various spectrum ranging from visible to microwave;
- Satellites launched by LM launch vehicles;
- Spatial resolution greater than 1.2m; spectral resolution reaching nanometer level, and swath ranging from 10km to 100km, with attitude maneuvering capability.



# The New Generation of EO System



## Airborne system

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- Consist of air flight platform, airborne earth observation instrument and data processing system;
- Develop three types of earth observation equipments, including Optical, LASERs and SAR;
- Spatial resolution greater than 0.1m, and spectrum resolution better 1nm.



# The New Generation of EO System



## **Ground system**

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- **Consist of three operational systems: data receiving, data processing, data management and task scheduling system; and three kinds of supporting infrastructure: data receiving, calibration and public platform;**
- **Responsible for mission planning, data receiving and processing, data distribution and massive data management;**
- **Available for data sharing and efficient operation.**



# The New Generation of EO System



## **Application system**

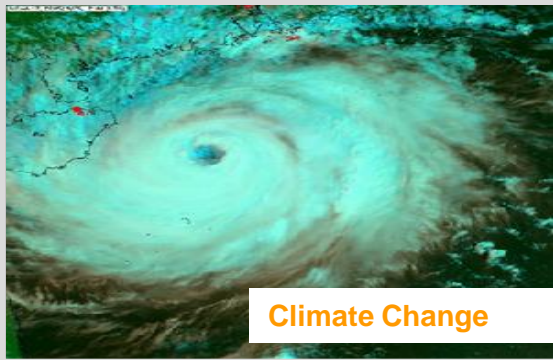
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- **Consist of applied technology center subsystem and typical application subsystem;**
- **Responsible for transferring earth observation data into application information and knowledge, and providing application services;**
- **Establish a comprehensive application and service system with multi-source data to meet the domestic and international users' requirements.**

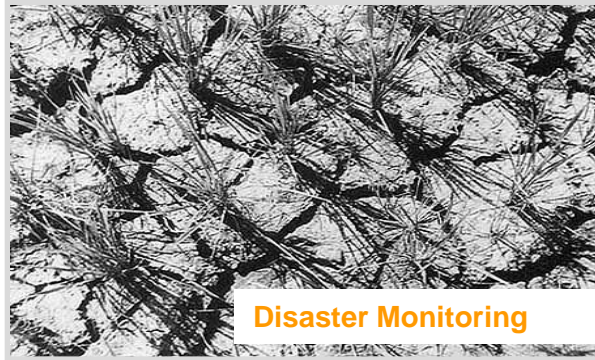




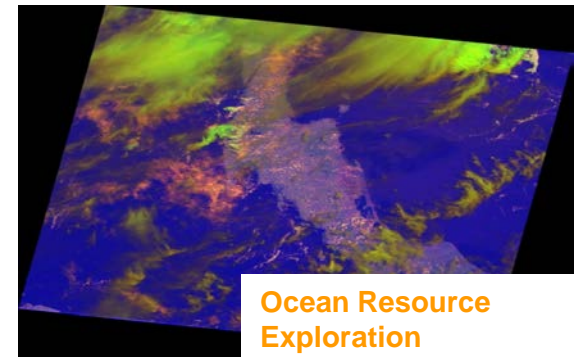
# The New Generation of EO System



Climate Change



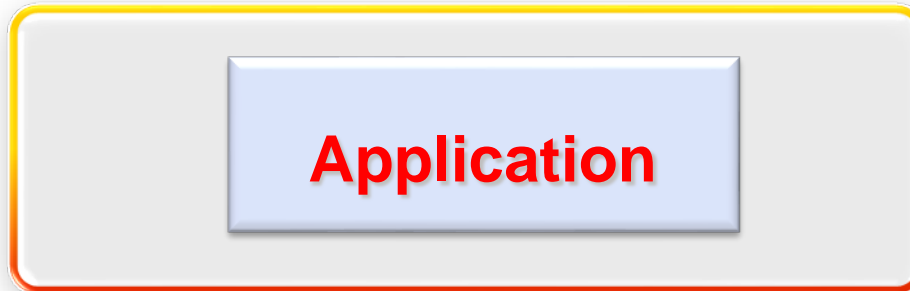
Disaster Monitoring



Ocean Resource Exploration



Mineral Survey



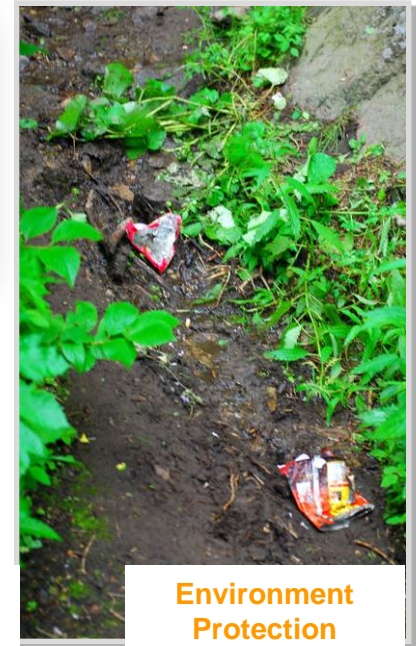
Application



Pollution Monitoring



Urban Fine Management



Environment Protection





## ■ Data Grid for Public Service



# Data Grid for Public Service



## The Earth Observation System and Data Center, CNSA

- The data center is organized into a coalition including 6 key members and over 30 national ministries or state bureaus.
  - Centre for Major National Project, State Administration of Science, Technology and Industry for National Defense
  - China Centre for Resources Satellite Data and Application
  - Centre for Earth Observation and Digital Earth of Chinese Academy of Sciences
  - National Satellite Meteorological Center
  - National Satellite Center for Marine Applications



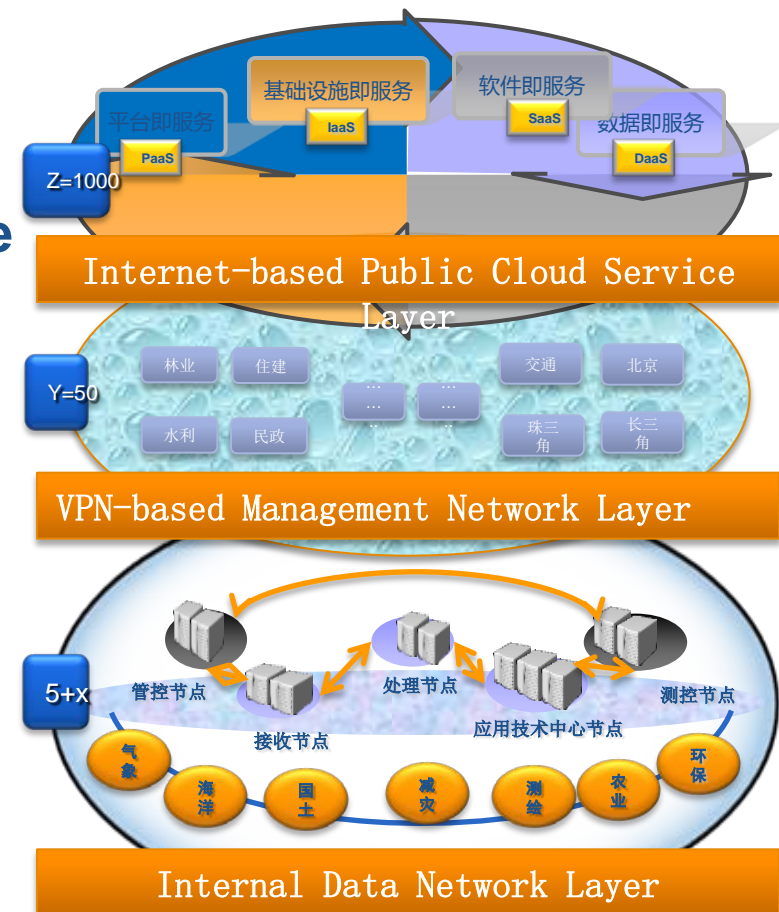


# Data Grid for Public Service



## Goals of Data Grid for Public Service

- To build the national spatial data infrastructure to promote data sharing and reuse across multiple institutes and domains
- To facilitate public data service and data integration.
- To coordinate fast data transfer and production for emergency response.



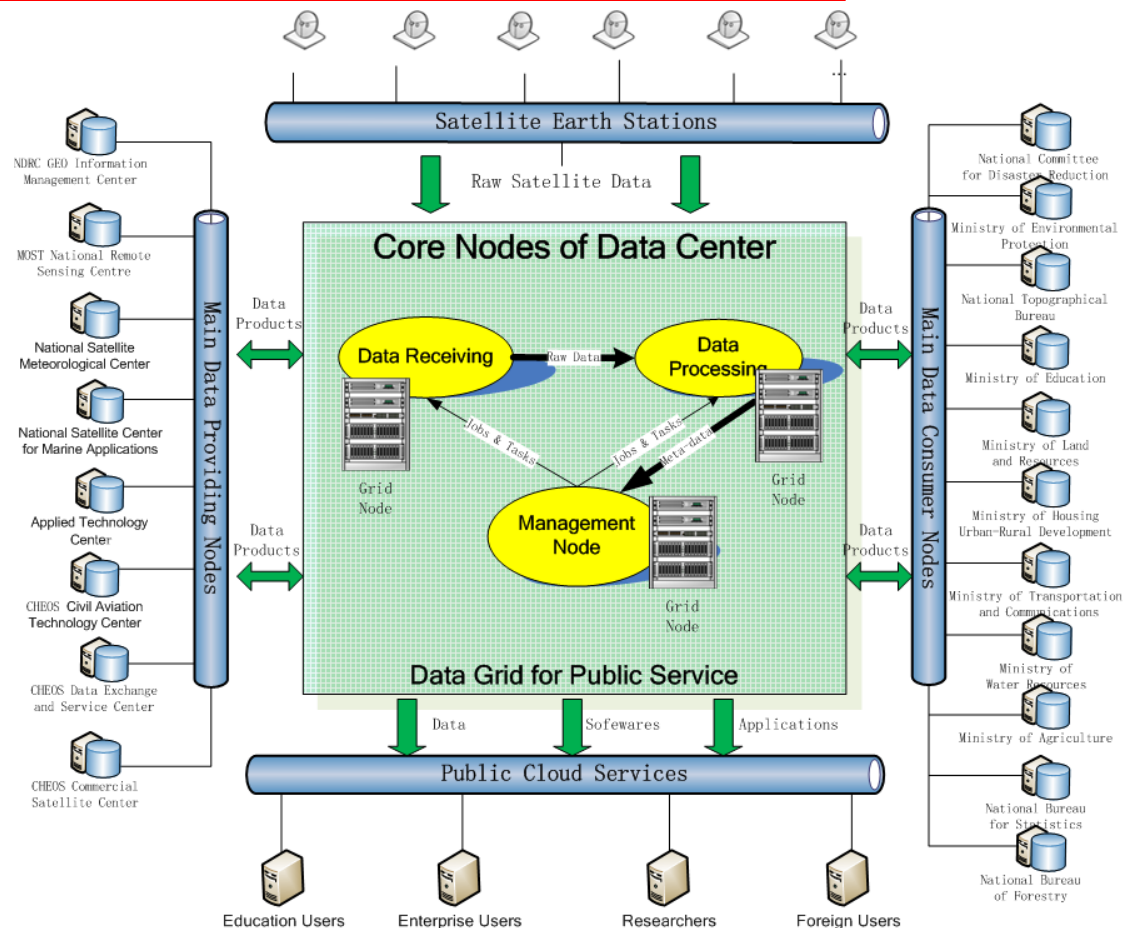


# Data Grid for Public Service



## Structure of Data Grid for Public Service

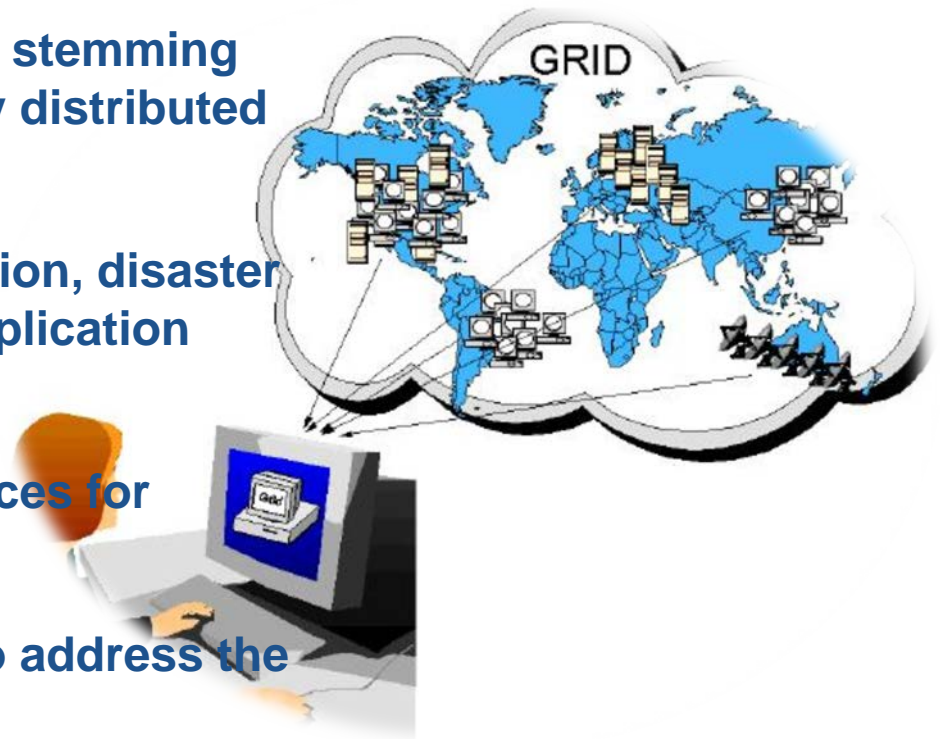
- 3 core nodes
  - Data Receiving
  - Data Processing
  - Management Node
- 8 main data providing nodes
- Tens of main data consumer nodes
- 4 types of public users





## Application in Disaster Mitigation(1/2)

- The Data Grid could enables
  - Rapid utilization of disaster data stemming from a number of geographically distributed data sources.
  - Fast disaster information collection, disaster data mitigation, and disaster application delivering.
  - On demand and integrated services for emergency decision,
  - Quality control of key process to address the monitoring and early warning.

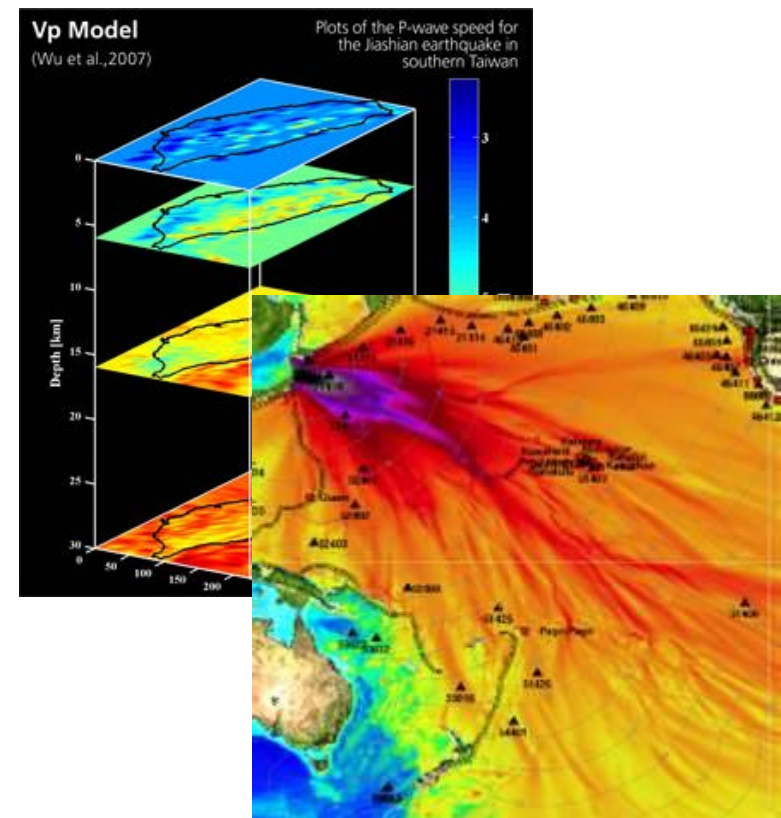






## Application in Disaster Mitigation (2/2)

- The Data Grid could
  - Provide elastic computation capability for large-scale simulation-based disaster researches.
  - Serve as coordination platform for collaborative scientific researches.
  - Enable efficient coordination of military and civilian data.
  - Promote international data sharing and collaboration.





## ■ International Cooperation



# International Cooperation



## Principles of International Cooperation

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The international cooperation in China's new generation Earth Observation System complies with the principles as described in the white paper of *China's Space Activities in 2011*. The following are given priority to:

- Reinforcing space cooperation with the developing countries, and veluing space cooperation with the developed countries
- Carrying out multi-level and multi-form international cooperation
- Conducting commercial cooperation actively and pragmatically



## **International Cooperation**

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### **Multilateral Cooperation:**

- **UN-SPIDER**
- **CHARTER**
- **GEO**

### **Bilateral Cooperation:**

- **ESA, Russia, Brazil, Thailand, South Africa, etc.**



## International Cooperation



# **International Cooperation**

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Earth Observation System & Data Center of CNSA is willing to cooperate with the governments and space agencies all over the world on the basis of principle of peaceful utilization of outer space, and actively participate in the international space cooperation, and try our best to promote the development of space industry, thus contribute more to the scientific and technical progress and the lofty cause of human peace and development.





**Thanks for your attention !**