



CGMS-34, CNSA-WP-01

Prepared by CNSA

Agenda Item: B.3&C.3

Discussed in Plenary

## **Status and Future of Chinese Space borne Earth Observing System**

China has developed its space borne observing system, which plays an important role in the nationwide land resources survey, ecological construction and environmental protection. To date, the system comprises FY-series satellites, CBERS series satellites, HY-1 satellites and environment and disaster small satellite constellation. To meet the growing demands, Chinese Earth observing system will have a remarkably improvement the next 5 years.

## **1 INTRODUCTION**

It has been 50 years since China embarked on the development of its space technology. For half a century, China has worked independently and made eye-catching achievements. As one of the principles of the development of China's space technology, maintaining and serving the country's overall development strategy and meeting the needs of the state are always upheld. During the period, space borne remote sensing technology and applications have been constantly expanded.

## **2 EARTH OBSERVING SATELLITES AND THE DEVELOPMENT PLAN**

### **2.1 The Current Status of Chinese Space Earth Observing System**

China began to use domestic and foreign remote-sensing satellites in the early 1970s, and eventually carried out studies, development and promotion of satellite remote-sensing application technology, which has been widely applied in meteorology, mining, surveying, agriculture, forestry, water conservancy, oceanography, seismology and urban planning. To date, China has developed FY-series, CBERS series, HY-1 satellites and environment and disaster small satellite constellation, which constitutes the Chinese earth observing system.

#### **2.1.1 Status of FY-series satellites (Skipped)**

#### **2.1.2 Status of CBERS series satellites**

The CBERS series satellites include CBERS 01&02, CBERS 02B and CBERS 3&4. They are developed by China and Brazil jointly. Their mission is providing images of mid-spatial resolution to the Chinese and Brazilian remote sensing community continually. Main applications are related to agriculture, forestry, geology, Natural Disaster Management, hydrology, coastal mapping et al. Main payloads are Multi-spectral Camera, Infrared Scanner Camera, Wide Field Imager Camera. Orbit altitude is 778 km, descending mode is 10:30 AM. In order to take maximum advantage of the resources, CBERS series satellites preferably employ the same spectral bands.

CBERS 02 have been operated from October 2003 and CBERS02B satellite will be launched in 2007, as the continuity of CBERS02. CBERS03 / 04 are developed in phase C, there are four payloads, the spatial resolution will be 5 meter for the requirements of observing land resource. CBERS 03 will be launched in 2009. During the development of CBERS series satellites, China and Brazil have been extending the remote sensing data service for global users.

### 2.1.3 Status of HY-1B satellite

HY-1B satellite is developed for the continuing operation of HY-1A satellite. Its mission is to observe ocean colour and sea surface temperature. Its orbit altitude is 798km, descending mode is 10:30AM $\pm$ 30 min, it deploys two payloads: ocean colour and temperature scanner and 4 bands CCD imager.

### 2.1.4 Status of Environment and Disaster Small Satellite Constellation

The environment and disaster small satellite constellation is planned to be composed of four optical satellites and four microwave satellite. The first stage of constellation (HJ-1) includes two optical satellites and one SAR satellite. Its mission is to provide better information for environment and disaster with high repeat frequency, moderate spatial resolution images. HJ-1 will be launched in 2007-2008. The main configuration is as follows:

The orbit altitude of optical satellites is 650Km, there are 3 kind of payloads: CCD camera, hyper-spectral camera and IR camera. HJ-1A deploys CCD camera and hyper-spectral camera, HJ-1B deploys CCD camera and IR camera. Their descending mode is 10:30am, HJ-1A and HJ-1B will be deployed in the same orbit plane with 180 degree phase. The revisit period of the visible and near infrared multi-spectral data is 48h, the infrared camera and hyper-spectral imager is 96 hours.

The orbit altitude of SAR satellite (HJ-C) is 500Km, descending mode is 6:00am. It deploys S-band SAR which polarization status is vertical send and vertical receive (VV), the spatial resolution is 20m and the breadth is 100km (4 views). Revisit period is 96 hours.

## 2.2 The Development of the Coming Years

In next five years, China will start and implement a high-resolution Earth observation system by developing new-type sun synchronous orbit and geostationary-orbit meteorological satellites, oceanic satellites, Earth resources satellites, small satellites for environmental protection and disaster mitigation monitoring and forecasting, and starting the research of the technologies of new-type remote-sensing satellites, including stereo mapping satellites. The goal is to form an all-weather, 24-hour, multi-spectral, differential-resolution Earth observation system for stable operation, and achieve stereoscopy and dynamic monitoring of the land, atmosphere and sea.

As the main tasks, the remote sensing community continues to make the overall plan for the development of the satellite remote-sensing ground system, and the application system, to integrate and improve the present satellite remote-sensing ground system, establish and

improve a national satellite remote-sensing data centre, and to set up and improve supporting facilities for quantitative application, including a remote-sensing satellite radiation calibration station, and preliminarily materialize the common sharing of remote-sensing data to serve the public good, to set up a satellite environmental application institute and a satellite disaster-mitigation institute, forming several important application systems; and to make breakthroughs in major satellite remote-sensing application fields.

### **3 CONCLUSIONS**

China has developed a space borne Earth observing system, which plays an important role in the nationwide land resources survey, ecological construction and environmental protection. To meet the growing demands, Chinese Earth observing system will have a remarkably improve during the next 5 years.