



CGMS-42 CNSA-WP-01  
Prepared by CNSA  
Agenda Item: D.2  
Discussed in Plenary

## **CNSA REPORT ON THE STATUS OF CURRENT AND FUTURE SATELLITE SYSTEMS**

### Executive summary

China National Space Administration (CNSA) currently operates FY operational satellite system and 4 R&D satellite systems, including HY, HJ, ZY, and GF series satellite. China will keep launching several satellite systems in near future. This report introduces the status of CNSA's in-orbit satellite system and the status of future satellites in developing.

## **The status of current and future CNSA Earth observing system**

### **1 INTRODUCTION**

CNSA is devoting to construct an Earth observing system (EOS) for continuously and stably observing the Earth from the space, including meteorology series satellites, ocean series satellites, resource series satellites, and environment and disaster small satellite constellation (HJ) series. Currently, CNSA is making great efforts to enhance the ground receiving and processing system of EOS, to improve the EOS serving capability so as to push operational services forward. CNSA is also boosting actively the international communications and servings of satellite dataset. The datasets and products of CEOS have been used in diversities of applications, such as mineral and resource, land use, environment protection, ecosystem control, flood and drought monitoring, city management, et al.

### **2 THE STATUS OF CURRENT SATELLITE SYSTEMS**

Currently, the on-orbit functionally operating satellites of CNSA includes FY-3A, FY-3B, HY-1B, HY-2, HJ-1A, HJ-1B, HJ-1C, ZY-3, and GF-1. The brief descriptions of each mission are as follow:

#### **2.1 FY Series Satellites**

FY-Series has become operational meteorological satellites and serve as one of important members of the global operational meteorological satellite system. FY-3A/B were launched successfully on May 27<sup>th</sup> 2008 and November 5<sup>th</sup> 2010, respectively. Both satellites are running stably on orbit. The detailed information can be found in documents provided by CMA .

#### **2.2 HY Series Satellites**

HY series includes ocean colour satellite (HY-1) and Ocean Dynamics environmental satellite (HY-2).

The HY-1 satellite was equipped with two payloads: ocean colour and temperature scanner and 4-band CCD imager, mainly used for monitoring ocean colour, sea surface temperature, and sea ice. HY-1A/B were launched on May 15<sup>th</sup> 2002 and April 11<sup>th</sup>2007,



respectively from Taiyuan Satellite Launching Centre. HY-1A satellite stopped working on March 30<sup>th</sup> 2004. HY-1B satellite works functionally and stably in orbit.

Ocean Dynamics environmental satellite program (HY-2), equipped with Microwave Radar Altimeter, Microwave scatter meter, and Microwave Radiometer, was mainly used to detect marine Dynamics status, including ocean surface wind, ocean surface height, the effective wave height, sea surface temperature, and other important parameters. HY-2 was successfully launched on August 16<sup>th</sup>, 2011 from Taiyuan Satellite Launching Centre. After the satellite experienced the measurement evaluation, HY-2 satellite runs well and has some typical applications. The sensor calibration and validation also has been performed in 2013. The detailed description can be seen CNSA-WP-02.

### **2.3 ZY Series satellites**

The ZY series satellite was developed jointly by China and Brazil with the name of CBERS. Three CBERS satellites, CBERS01/02/02B, were launched successfully in 1999, 2003, and 2007. Currently, all these three satellites finished their mission but their measurements have been still used in many application areas. The launch of CBERS03 was failed due to the deadly reasons of launch vehicle.

ZY-3 is a high-resolution three-dimensional mapping satellite, which has 4 payloads whose images can be used for mapping and resources survey, such as producing 1:50000 and 1:25000 scale topographic maps. ZY-3 was launched on January 9<sup>th</sup> 2012 from Taiyuan Satellite Launching Centre. It works well on-orbit and provides high quality measurements which have been applied into diversity application areas.

### **2.4 Environment and Disaster Small Satellite Constellation**

The environment and disaster small satellite constellation is composed of several optical satellites and microwave SAR satellites. The first stage of the constellation, named HJ-1 programme includes two optical satellites and one SAR satellite, for environment monitoring, ecosystem protecting, and disaster detecting with high spatial and temporal resolutions.

HJ-1A/B were launched on Sep. 6<sup>th</sup> 2008 from Taiyuan Satellite Launching Centre. HJ-1A is equipped with a CCD camera and a hyper-spectral camera while HJ-1B is equipped with a CCD camera and an IR camera. The 30-m nadir IFOV and the 700-



enable two satellites to perform globally observation in every two days. After launched, HJ-1 obtained a lot of research achievements in data evaluation and operational applications. The measurement of HJ-1 has been used in the operational running system of environment protection and monitor. Both HJ-1A and HJ-1B passed their nominal design life of 3 years and are experiencing aging.

HJ-1C was launched on Nov. 19<sup>th</sup> 2012 from Taiyuan Satellite Launching Centre. It is a S-band SAR small satellite, providing 5-m and 20-m spatial resolution with different swath width. HJ-1C has finished the on-orbit test.

## **2.5 GF Series satellites**

GF-1 is the first satellite of the GF high spatial resolution Series for Earth observing the Earth. It was launch on Apr. 26<sup>th</sup> 2013 from Jiuquan Satellite Launching Centre. GF-1 is capable of achieving 2-m panchromatic image, 8-m multispectral image with 60-km swath, as well as 16-m moderate resolution multispectral measurements with a swath as large as 800-km. GF-1 is running well in orbit and has wide applications. The detailed description can be seen CNSA-WP-03.

## **3 FUTURE SATELLITE SYSTEMS**

### **3.1 FY-4 satellite**

FY-4 is the second generation of geo-stationary meteorogological satellite in China, which is planned to be launched in 2015. The detailed description can be found in working papers provided by CMA .

### **3.2 CFOSAT satellite**

CFOSAT is developing jointly by China and France for ocean dynamic environment monitoring. Satellite will be equipped with a directional wave spectrum form SWIM and a microwave scatterrometer SCAT. The development stage of CFOSAT is at PHASE C and its launch time is preset at the end of 2014.

### **3.3 CBERS-04 satellites**

CBERS-04 is the next generation of CBERS 01/02. CBERS-04 is equipped with high resolution camera, IR camera, and wide-filed camera, providing 5-meter panchromatic measurement, 10/20-meter multi-spectral measurement, 40/80-meter



infrared measurement, and 73-meter multi-spectral measurement with wide-field swath.

The launch schedule of CBERS-04 is in 2014.

### **3.4 GF series satellite**

The development of GF series satellite is going on smoothly. The detailed description can be seen CNSA-WP-03.

## **4 CONCLUSIONS**

China Earth observation satellite system is playing an important role in the national development, environmental protection, disaster detection and so on. CNSA currently works at the transition stage of changing R&D satellite to operating satellite. A set of R&D satellites are gradually converting into operational mode after experiencing on-orbit tests. With CGMS this excellent platform, CNSA is very glad to communicate and share our experiences with others. CNSA is devoted to explore new EOS technology and sensors, and make more contributions for the optimization of global EOS.