

CGMS-XXXII  
PRC-WP-05  
Prepared by CMA  
Agenda Item: C.2

## **GEOSTATIONARY METEOROLOGICAL SATELLITE FY-2C**

### **Summary and purpose of paper**

To inform CGMS that China is continuing with FY-2 satellite program. FY-2C is to be launched in October 2004.

## **GEOSTATIONARY METEOROLOGICAL SATELLITE FY-2C**

### **1 Introduction**

The geo-stationary meteorological satellite FY-2C will replace FY-2B that was launched on June 25, 2000 and stationed at 105°E. It is planned to launch FY-2C in 2004.

The mission of FY-2C is similar to FY-2B:

- Acquiring visible, infrared and water vapor cloud images;
- Transmitting S-VISSR images and low resolution images;
- Data collection;
- Space environment monitoring.

### **2 Major improvement for FY-2C**

#### **2.1 The number of spectral channels of Visible and Infrared Spin Scan Radiometer (VISSR) increases from 3 to 5.**

- The infrared long wave window 10.5–12.5 $\mu\text{m}$  will be split into two channels: 10.3–11.3 $\mu\text{m}$  and 11.5–12.5 $\mu\text{m}$ , so as to improve the capability of detecting and calculating water vapor contents, to support semi-transparent ice cloud detecting, and to have a better accuracy of atmospheric absorption correction in order to improve sea temperature estimation.
- To increase the temperature resolution of the infrared channels and the signal/noise ratio of the visible channels, and to support the application of the split window.
- To have an additional 3.5–4.0 $\mu\text{m}$  mid-infrared window channel. As this channel is less affected by water vapor, when it combines with IR long wave window channel, more accurate surface temperature can be acquired. The channel is sensitive to warm temperature therefore it is helpful for detecting warm targets on surface. It is also used to obtain information of low-level cloud and fog. It helps to distinguish low-level cloud and ice and snow coverage.
- The data quantization level of the IR channel will be increased from 256 to 1024, the WV channel remains 256.

#### **2.2 Power supply of the satellite will be increased to support the eclipse management.**

**2.3 The S-Fax broadcasting function will be cancelled and the frequency of 1699.5 MHz will not be used.**

**2.4. WEFAX will be replaced by LRIT.**

LRIT transmission characteristics:

- Transmission frequency: 1691 MHz
- EIRP: 57.5 dbm
- Polarization: linear
- Data rate: 150 Kbps
- Bandwidth: 260 KHz
- Modulation: PCM/NRZ-M/BPSK
- Data coverage:
  - Full earth disc of normalized geo-projection (2200 lines \* 2200 pixels, 5 km resolution)
  - China sector area
  - Geo satellite products: SST, winds, and precipitation

LRIT format is in agreement with the standard protocol recommended by CCSDS. The paper for FY-2C LRIT format will be widely distributed once conversion to the English version is finished.

### **3. Transmission of VISSR**

S-VISSR transmission characteristics:

- Transmission frequency: 1687.5 MHz
- EIRP: 57.5 dbm
- Polarization: linear
- Data rate: 660 Kbps
- Bandwidth: 2 MHz
- Modulation: PCM/BPSK
- Data coverage: S-VISSR (5 channels)

The spin rate of FY-2C is changed from 100rpm (of FY-2A and 2B) to 98rpm in order to have enough time to transmit the raw data and S-VISSR in a cycle. The data format of S-VISSR is completely compatible with FY-2A and FY-2B. The MDUS user and SDUS user need not to do any change to receive the 3 channels of FY-2C directly. If users hope to get the whole 5 channels' data, they need only modify the processing software. The transmission of full disk image data takes 25.5 minute, rather than 25 minute.

FY-2C carries out two types of broadcast schedules. The Regular Schedule provides 24 full disc images every day plus 4 images for deriving wind products. Flood Season Schedule transmits full disc images in the early half hour; for the late half hour, a certain number of sector scan images in northern hemisphere is expected to be transmitted in total size of 1400 scan lines, taking 15 minutes time to scan.

**3.1 Spectral channels of VISSR are shown in table 1.**

Table 1. The spectral channels of VISSR

Channel	Wavelength ( $\mu\text{m}$ )	
	FY-2 A,B	FY-2 C
VIS	0.50 $\square$ 1.05	0.55 $\square$ 0.99
IR1	10.5 $\square$ 12.5	10.3 $\square$ 11.3
IR2		11.5 $\square$ 12.5
IR3		3.5 $\square$ 4.0
WV	6.3 $\square$ 7.6	6.3 $\square$ 7.6

### 3.2 Major characteristics of VIS channels are shown in table 2.

Table 2. The characteristics of VIS channels of VISSR

Item	Characteristics	
	FY-2 A, B	FY-2 C
Wavelength ( $\mu\text{m}$ )	0.50 $\square$ 1.05	0.55 $\square$ 0.99
FOV( $\mu\text{r}$ )	40	35
Space resolution (km)	1.44	1.25
Dynamic range	0 $\square$ 95%	0 $\square$ 98%
S/N	6.5 (2.5%)	1.5 (0.5%)
	43 (95%)	50 (95%)
Number of detectors	4 (main) + 4 (alternate)	4 (main) + 4 (alternate)
Quantization level	64	64
Calibration	Cool-space images and solar image to realize in-orbit calibration	Same as FY-2 A,B

### 3.3 Major characteristics of IR, WV channels are shown in table 3.

Table 3. The characteristics of IR, WV channels of VISSR

	FY-2 A,B		FY-2 C			
	IR	WV	IR1	IR2	IR3	WV
Wavelength( $\mu\text{m}$ )	10.5 $\square$ 12.5	6.3 $\square$ 7.6	10.3 $\square$ 11.3	11.5 $\square$ 12.5	3.5 $\square$ 4.0	6.3 $\square$ 7.6
FOV ( $\mu\text{r}$ )	160	160	140	140	140	140
Space resolution(km)	5.76	5.76	5	5	5	5
Dynamic range	180 $\square$ 330 K	190 $\square$ 290 K	180 $\square$ 330K			180 $\square$ 280K
Temperature resolution	0.6K	1.0K	0.4 $\square$ 0.2K	0.4 $\square$ 0.2k	0.5 $\square$ 0.3 $\square$	0.6 $\square$ 0.5 $\square$
Number of detectors	1(main)+1(alternate)	1(main)+1(alternate)	1(main)+1(alternate)	1(main)+1(alternate)	1(main)+1(alternate)	1(main)+1(alternate)
Quantization level	256	256	1024	1024	1024	256
Calibration	On board blackbody calibration, once every 3 disks		The ground calibration accuracy is 1K.Cool space and planet calibration is used for on-board calibration, once every 2 disks.			

