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Prepared by CMA
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The Future Plan of FY-2 Satellites

Summary and purpose of paper

To inform CGMS China will continue FY-2 satellite program. FY-2 B will be launched in 2000 and FY-2 C, D, E will be the 3 succeeding satellites.

The Future Plan of FY-2 Satellites

1 Introduction

China launched successfully its first geostationary meteorological satellite FY-2 A on June 10, 1997 and has acquired fairly good visible, infrared and water vapor images. The second satellite FY-2 B will be launched in the year 2000. The performance of FY-2 A is the same as FY-2 B. In order to meet the need for weather forecasting, China plans to develop the 3 succeeding satellites: FY-2 C, D, E making necessary improvements on the basis of the two experimental satellites FY-2 A and 2B. This plan will cause the transiting of Chinese geostationary meteorological satellite from experimental to operational.

The functions of FY-2 C, D, E are the same with those of FY-2 A, B:

- acquiring visible, infrared and water vapor cloud images;
- transmitting S-VISSR images and LRPT images;
- data collecting;
- space environment monitoring.

2 The major improvements for FY-2 C, D, E

2.1 The number of spectral channels of Visible and Infrared Spin Scan Radiometer (VISSR) will be increased from 3 to 5.

- The infrared long wave window $10.5\sim 12.5\ \mu\text{m}$ will be split into two channels: $10.3\sim 11.3\ \mu\text{m}$ and $11.5\sim 12.5\ \mu\text{m}$, so as to improve the detecting capacity of water vapor contents and carry on the calculation of water vapor contents, to support the detecting of semi-transparent ice cloud, to correct more accurately the effects of atmospheric absorption and then improve the retrieval accuracy of the sea temperature.
- To enhance the temperature resolution of the infrared channels and the ratio of signal/noise of the visible channels, and to support the application of the split window.
- To add a $3.5\sim 4.0\ \mu\text{m}$ mid-infrared window channel. Since the channel is less affected by water vapor contents, and if it combine with IR long wave window channel, then more accurate surface temperature can be acquired. The channel is sensitive to heat objects and is helpful for obtaining surface high heat source. It is also used to obtain low-level cloud and fog data, it is a good help to distinguish low-level cloud and ice and snow coverage.
- The quantizing level of the two IR long wave window channels and the mid-IR window channel will be increased from 256 to 1024 to make good use of the acquired temperature resolution.

2.2 The power supply of the satellite will be increased.

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

3. The specifications of VISSR of FY-2 C,D,E

3.1 The spectral channels of VISSR are shown in table 1.

Table 1.The spectral channels of VISSR

Channel	Wavelength (μ m)	
	FY-2 A,B	FY-2 C,D,E
VIS	0.50~1.05	0.50~0.75
IR1	10.5~12.5	19.3~11.3
IR2		11.5~12.5
IR3		3.5~4.0
WV	6.3~7.6	6.3~7.6

3.2 The 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,D,E
Wavelength (μ m)	0.50~1.05	0.50~0.75
FOV(μ r)	40	35
Space resolution (km)	1.44	1.25
Dynamic range	0~95%	0~98%
S/N	6.5 (2.5%) 43 (95%)	1.5 (0.5%) 50 (95%)
Number of detectors	4 (main) + 4 (alternate)	4 (main) + 4 (alternate)
Quantizing level	64	64
Calibration	cool-space images and solar image to realize in-orbit calibration	same as FY-2 A,B

3.3 The 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,D,E			
	IR	WV	IR1	IR2	IR3	WV
Wavelength(μ m)	10.5~12.5	6.3~7.6	10.3~11.3	11.5~12.5	3.5~4.0	6.3~7.6
FOV (μ r)	160	160	140	140	140	140
Space resolution(km)	5.76	5.76	5	5	5	5
Dynamic range	180~330K	190~290K	180~330K			180~280K
Temperature resolution	0.6K	1.0K	0.4~0.2K	0.4~0.2k	0.5~0.3 K	0.6~0.5 K
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)
Quantizing 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 are used for on-board calibration, once every 2 disks.			