

CGMS-XXVII
PRC-WP-03
Prepared by CMA
Agenda Item: C1

The Future Plan of Chinese Polar Orbiting Meteorological Satellites

Summary and purpose of paper

To inform CGMS China plans to launch FY-1 D in 2001 and the second generation of polar orbiting satellite is now in concept design phase.

The Future Plan of Chinese Polar Orbiting Meteorological Satellites

Meteorological satellite program in China consists of two major systems: polar orbiting and geostationary satellites. The main objectives of the programs are to establish, with combination of polar and geostationary orbitors, a comprehensive operational meteorological satellite systems as well as the data application systems, in order to meet the needs on various aspects in China, and enhance the ability to participate international collaboration.

1 China's First Generation of Polar Orbiting Meteorological Satellites: FY-1

China's first generation of polar orbiting meteorological satellite system FY-1, consists of four satellites FY-1A, B, C and D, as well as the corresponding ground data acquisition, processing and application systems.

FY-1A and FY-1B have been launched respectively in 1988 and 1990. FY-1C was launched successfully on May 10, 1999 and FY-1D is scheduled to be launch in 2001. These two satellites are developed on the basis of FY-1A and FY-1B. Besides the efforts to improve the reliability of the satellites, there are some changes on imaging instruments and data transmission as follows:

- The number of channels of the Visible and Infrared Radiometers are increased to ten, which enables the more powerful observations to the land and oceans.
- The on board data storage capacity is increased to 300 minutes (60 minutes on FY-1A/B). This means that besides the real time received CHRPT data within the Beijing, Guangzhou and Urumqi three ground station acquisition areas, we can receive global coverage data of four selected channels with reduced resolution (4 km) for one time each day (defined as Delayed Global Picture Transmission, DGPT).
- The FY-1C and FY-1D High Resolution Picture Transmission is also similar to NOAA/HRPT, except the data transmission rate. It is considered that the system which receives and processes NOAA/HRPT nowadays can also receive and process the FY-1 data with an updating as few as possible. The data transmission rate is double of that of current NOAA/HRPT, i.e., the data transmission is 1.3308 Mbps.
- The design life of FY-1C/D is two years.
- There is no APT in FY-1C and FY-1D.

The channel features of the main payload on FY-1C and FY-1D: Multi-channel Visible and Infrared Radiometers are indicated in table 1.

The Multi-channel Visible and IR Scan Radiometer (MVISR) includes 4 VIS channels, 3 near IR channels, 1 short wave IR channel and 2 long wave IR channels. The instantaneous field of view of the MVISR is 1.2 mrad, which makes 1.1 km resolution at the sub-satellite

point.

Table 1. The channel characteristics of radiometers onboard FY-1C and FY-1D

Channel	Wavelength(μm)	Primary Use
1	0.58-0.68	Daytime cloud, ice and snow, vegetation
2	0.84-0.89	Daytime cloud, vegetation
3	3.55-3.95	Heat source, night cloud
4	10.3-11.3	SST, day/night cloud
5	11.5-12.5	SST, day/night cloud
6	1.58-1.64	Soil moisture, ice/snow distinguishing
7	0.43-0.48	Ocean color
8	0.48-0.53	Ocean color
9	0.53-0.58	Ocean color
10	0.90-0.985	Water vapor

2. Considerations on Development of FY-3 Series

2.1 General Considerations

FY-3 series, the second generation of Chinese polar orbiting meteorological satellites, is now in concept design phase and it is expected to be launched after 2003. The main mission of FY-3 are:

- To provide global sounding of 3-dimensional thermal and moisture structures of the atmosphere, cloud and precipitation parameters to support global numerical weather prediction
- To provide global imaging to monitor large scale meteorological and/or hydrological disasters and biosphere environment anomaly
- To provide important geophysical parameters to support researches on global change and climate monitoring.
- To perform data collection and transmission

2.2 Considerations on the Payloads of FY-3

To achieve above-mentioned objectives, a meteorological core payload with eight main instruments as well as two complementary instruments are considered as follows:

- The Imaging Mission:

VIRR	Visible and Infrared Radiometer
MODIS	Moderate Resolution Visible and Infrared Imaging spectroradiometer
MWRI	Microwave Radiation Imager

- The Sounding Mission :

IRAS	InfraRed Atmospheric Sounder
MIRS	Multichannel InfraRed Atmospheric Sounder (stage-II)
MWTS	MicroWave atmospheric Temperature Sounder
MWHS	MicroWave atmospheric Humidity Sounder (stage-II)
SBUV/TOS	Solar backscatter Ultraviolet/Total Ozone Sounder

- The complementary Mission :

ERBU	Earth Radiation Budget Unit
SEM	Space Environment Monitor

The ground segment will be upgraded accordingly.