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Prepared by CMA
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CURRENT STATUS OF FY-1 POLAR-ORBITING METEOROLOGICAL SATELLITES OF CHINA

Summary and purpose of paper

Currently CMA/NSMC operates two FY-1 polar-orbiting meteorological satellites, FY-1C and FY-1D, which were launched in May 1999 and May 2002, respectively. Both satellites have two years' designed lifetime. To make up for the attenuation of the observation instruments MVISR, calibration coefficients are updated every year using the measurement at the calibration fields.

CURRENT STATUS OF FY-1 POLAR-ORBETING METEOROLOGICAL SATELLITES OF CHINA

Launch Time

Currently, CMA/NSMC operates two polar-orbiting meteorological satellites, FY-1C and FY-1D. FY-1C was launched on 10 May 1999 and FY-1D was in May 2002. FY-1 satellites are three-axis stabilized, the satellite C and D were designed to operate for 2 years.

Orbit Characteristics

The major orbital characteristics of FY-1C/D at the present are shown in table 1.

Table 1. Orbit Parameters of FY-1C/Dsatellite

Satellite	Orbit	Altitude	Inclination	Eccentricity	Descending node
FY-1C	Sun-synchronous	862 km	98.79 ⁰	0.00188	6:25 am
FY-1D	Sun-synchronous	866 km	98.80 ⁰	<0.005	8:20 am

Instrument Payload

FY-1C/D carries a multi-channel visible and infrared scan radiometer (MVISR) that has 10 channels including 4 visible channels, 3 near IR channels, 1 short wave IR channel and 2 long wave IR channels. The wavelength of each channel and primary usage is shown in Table 2.

Table 2. MVISR channels and primary use

Channel	Wavelength (μm)	Primary Use
1	0.58-0.68	Daytime cloud, ice and snow, vegetation
2	0.84-0.89	Daytime cloud, vegetation, water vapor
3	3.55-3.95	Heat source, night cloud
4	103.-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	0.90-0.965	Water vapor

Transmission Mode

Real time picture transmission:

- CHRPT format: real-time transmission

Delayed picture transmission:

- GDPT format: daily global data coverage of 4 channels(0.58-0.68 μ m,0.84-89 μ m,10.3-11.3 μ m,11.5-12.5 μ m) with 3.3 km spatial resolution.
- LDPT format: pre-selected local-area data coverage of 10 channels with 1.1 km spatial-resolution at nadir.

Status of Operation

FY-1C has been operating for more than 5 years, exceeding the two-year design lifetime. During its operation, FY-1C has sent back a large number of images useful for meteorological and environment monitoring purposes. Though the satellite is still functioning, some MVISR channels have attenuated inevitably after long time flight. It is planned to make another adjustment to the instrument this summer.

FY-1D is functioning for over two years.

MVISR Adjusted Calibration Coefficients

Updated calibration coefficients for MVISR instruments are given in tables 3 and 4.

Table 3. Calibration Coefficients for MVISR on FY-1D

Channel	Slope	Intercept
1	8.930 E-02	-1.0719
2	9.980 E-02	-1.1972
6	8.310 E-02	-2.4113
7	4.230 E-02	-0.5498
8	6.310 E-02	-0.757
9	8.170 E-02	-1.0624
10	8.920 E-02	-1.2486

Table 4. Calibration Coefficients for MVISR on FY-1C

Channel	Slope	Intercept
1	0.0959	-1.0552
2	0.1142	-1.3704
6	0.0645	-0.8384
7	0.2199	-3.0787
8	0.2205	-2.6460
9	0.0758	-0.9091
10	0.1163	-1.5122

Calibration coefficients for MVISR on FY-1D and FY-1C are adjusted with the measurements at the calibration site and this work is performed every year. New coefficients for the year 2004 will be available in a later time.