

CURRENT STATUS OF FY-2A AND FY-2B

Summary and purpose of paper

This paper describes the launching, checking-out, image analysis, and operation of FY-2B. The current status of FY-2A is given, too.

CURRENT STATUS OF FY-2A AND FY-2B

1. Current Status of FY-2 B Geostationary Satellite

1.1 Launching, location and receiving telemetry data on ground system

On June 25, 2000 the second Chinese geostationary meteorological satellite FY-2B was launched successfully with Long-March 3 vehicle at Xichang Satellite Launching Center.

On July 3, FY-2B was stationed at 105⁰E over equator, then the de-spin subsystem was switched on, the rotating speed of satellite was adjusted to 100 rpm, and S-band telecommand and telemetry subsystems were switched on. One hour later, the ground system received the telemetry data, the Space Environment Monitor was turned on to start exploring space environment. The CDAS of FY-2B ground system sent telecommand for satellite self-testing, all instructions worked correctly. By then, the most of the engineering control task had been done and the subsequent FY-2B satellite checking-out began.

On July 5, UHF transmitter was switched on and the DCP link test had been done.

1.2 Acquiring Visible, IR and WV images

On July 4, the temperature of the primary and secondary radiation cooler was found too high. To ensure proper work of IR, WV sensor, the cover of radiation cooler of the radiator was thrown away earlier than it was scheduled. After that, the temperature of radiation cooler began to decrease.

On July 6, the first FY-2B visible image was acquired and S-VISSR image was generated by IAS subsystem of CDAS (Fig.1). S-VISSR data was transmitted by satellite and was received by CDAS and SOCC down link at the same time.

On July 16, the heating and de-contaminating process of the primary and secondary radiation cooler was completed. For the three days after that, the temperature of radiation cooler was decreasing gradually. On July 19, the temperature reached the pre-defined value.

On July 20, the first IR and WV images were acquired (Fig.2, Fig.3). All functions of FY-2B satellite, including image acquiring, data broadcasting, data collecting and Turn Around Ranging of checking-out and space environment monitoring, have been realized.

1.3 Satellite checking-out and operational control

Since July 3, when FY-2B have been stationed at 105°E, the end to end system test was started between satellite and ground segment. The results of the checking-out showed that all the specifications keep the same as they were tested at the launch site before blasting off, thus to have met the design specification (or better than).

By August 8, a total of 768 telecommand have been sent by S-band control system, all were executed correctly. All the telemetry data processed at CDAS, SOCC, DPC were correct. 435 images have been obtained, and the S-VISSR images generated by IAS were transmitted to users via FY-2B satellite, the images were received successfully at user stations.

All operational control for the payload of FY-2B satellite was implemented correctly, such as single line scanning, partial area scanning and the second position scanning and so on.

On July 9, telecommand for visible channel gain adjustment were sent to FY-2B satellite to enlarge the channel's dynamic range from 8 to 14 for V1 and V3 and from 8 to 13 for V2 and V4. The output range for the channels was increased from 0~40 to 0~57, the consistency of 4 channels was also improved.

1.4 Image quality

Since July 19, a lot of FY-2B S-VISSR images have been acquired. The equipment of satellite and ground system has been working well. S-VISSR IR, WV, VIS images are good, the dynamic ranges of detectors are reasonable. Fig.4 shows the dynamic ranges of FY-2B and IR and WV channels. The dynamic range of VIS channel is better than FY-2A's.

FY-2B still has some problems to be solved. For example, there are still stray lights in visible image as in FY-2A. It is even more serious than FY-2A's. The maximum gray level of the stray lights is about 13 and it was only 7 in FY-2A visible image. The IR and WV images of FY-2B also have the same problem but there are little stray lights in FY-2A IR and WV images. The reason of generating stray lights is being investigated.

1.5 FY-2B quasi operation and operational schedule

Since FY-2B satellite was located at 105°E, 24-hour quasi-operational experiments have been run for many times according to "FY-2B Satellite Operational Schedule". During these experiments, the earth images were acquired in every first half-hour, as well as another 4 images for wind measuring. Turn around ranging was made 4 times a day automatically.

So far, most of the whole ground system works well. Some work is needed to address specific problems.

It is expected that from Oct 1, 2000 FY-2B will begin 24-hours quasi-operation according to "FY-2B Satellite Operational Schedule". By the time all the MDUS (Medium Data Using Station) can receive S-VISSR and WEFAX images transmitted from FY-2B.

It is expected that from Jan 1, 2001 FY-2B will go into operation according to "FY-2B Satellite Operational Schedule". The whole ground system will be commanded and scheduled by SOCC to operate automatically to acquire VIS, IR, WV images, after being registered at the IAS subsystem of CDAS, the S-VISSR images will be generated and be transmitted to users.

FY-2B Satellite Operational Schedule:

- It is scheduled to acquire Earth images at every first half-hour, thus having 28 Earth images a day. Among them 4 images are for wind measuring. It broadcasts WEFAX images 16 times and has Turn Around Ranging 4 times every day except when satellite is doing orbit, or attitude control or equipment test;

- The whole ground system operation breaks from 01:00 UTC to 03:45 UTC every Tuesday for system maintenance;
- Some equipment in the satellite must be switched off during autumn and spring eclipse period (92 days per year) due to the limitation of energy. Therefore the number of images acquired will be reduced from 28 to 25 and WEFAX broadcasting from 16 to 14, but no changes with Turn Around Ranging and system maintenance.

2. Current Status of FY-2A Satellite

2.1 FY-2A satellite launching and part time operation

The first Chinese geostationary meteorological satellite FY-2A was launched on 10 June 1997. On 17 June, 1997 FY-2A was successfully located at 105°E.

Since 1 January 1998 when FY-2A satellite was in operation, imagery have been acquired and transmitted to users after satellite checking-out. The operation was interrupted on 8 April due to the defect of satellite de-spin subsystem. Since 6 July 1998, FY-2A has been working on part time fashion.

2.2 FY-2A satellite current status

On 26 April, 2000 before FY-2B was launched, FY-2A was moved to the backup position of 86.5°E successfully as expected. Telemetry and imagery were good.

During FY-2B checking out, the check out for FY-2A was made on 27 July 2000 again. The results showed that after 3 years in orbit the FY-2A satellite system is still working just like that in 1997 when it was launched.

On 27 July 2000, FY-2A satellite was switched from the on board system A to the system B successfully, then the system B was checked out thoroughly. The results showed the system B works as well as system A.

In general, the FY-2A satellite still works except for the S-band antenna that can not keep pointing at the earth for long because of the defect of de-spin subsystem. FY-2A imagery maintains the same quality as 3 years ago.

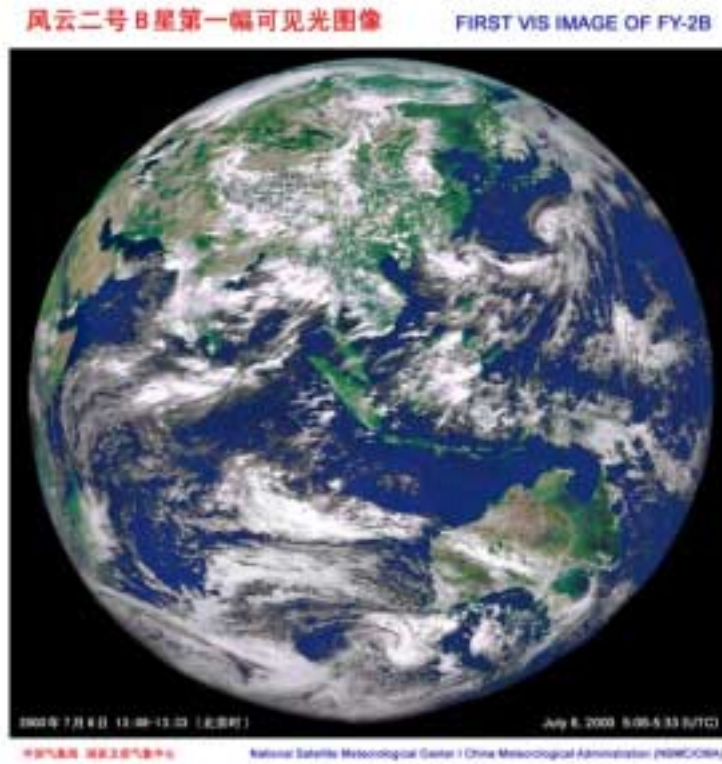


Fig. 1 The first FY-2B VIS image

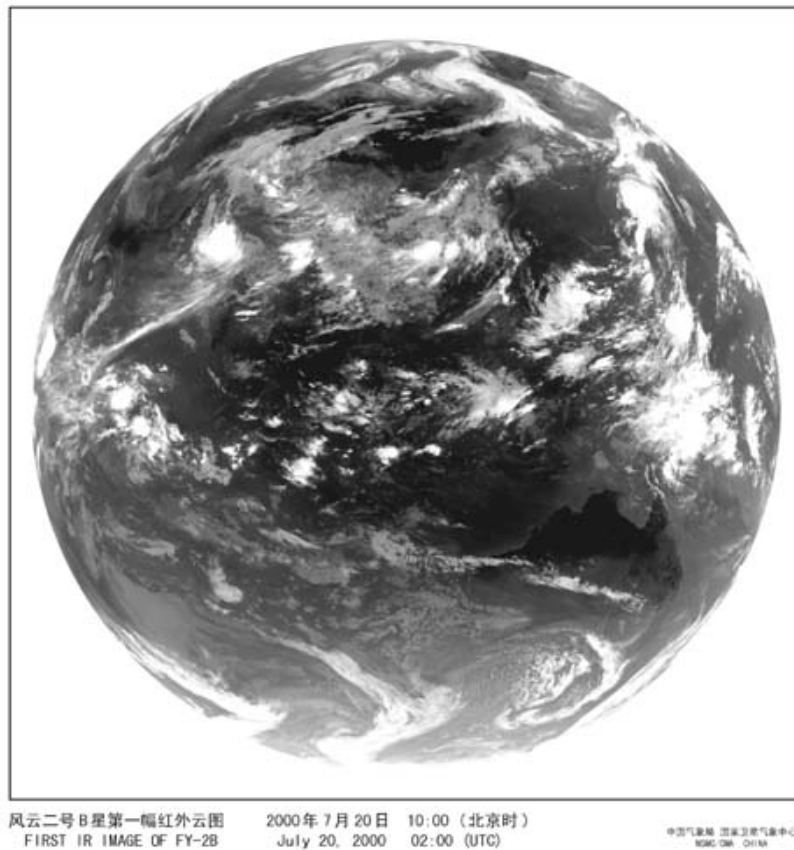


Fig.2 The first FY-2B IR image

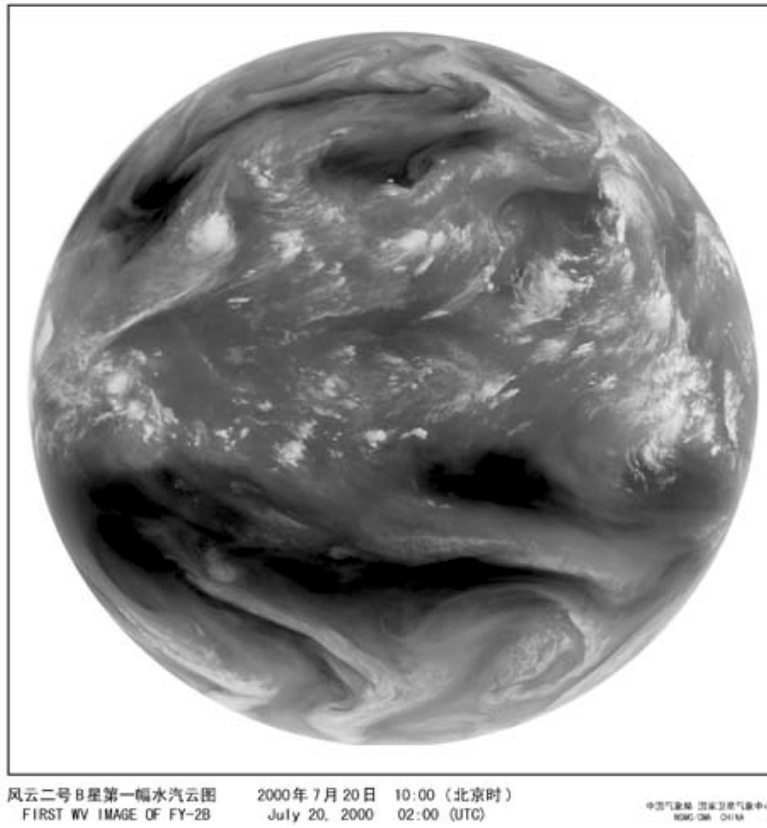


Fig.3 The first FY-2B WV image

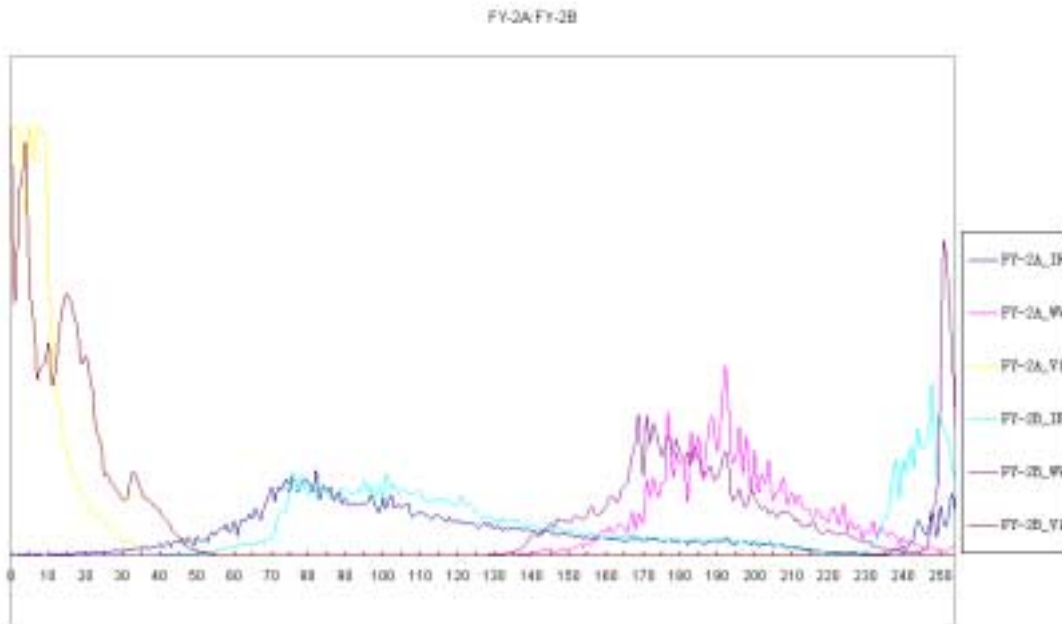


Fig. 4 FY-2A and FY-2B channels' histograms