CGMS-XXXI- JMA-WP-022
–Prepared by JMA

–Agenda Item: B.2

–Discussed in Plenary

Status of Geostationary Meteorological Satellite

This paper reports on the status of Geostationary Meteorological Satellite-5 (GMS-5).
CGMS Members are invited to take note ~~of this document~~.
~~No action is required.~~

Status of Geostationary Meteorological Satellite

1. .Introduction

GMS-5, which was launched on 18 March 1995, has been operated at 140E degree on the geostationary orbit after it started operation onsince 21 June 1995, and the period of operation is far beyond exceeding its designed lifetime of 5 years.

Discontinuation of the VISSR Observation
Although the VISSR observation was discontinued in on 22 May 2003 as the back-up operation , andwith GOES-9 startedtook over the role. After then, GMS-5 has been steadily performing reduced role of relayingdisseminating WEFAX data produced from the GOES-9 observations data at MSC, and relaying of DCP data.

2. Current Status of GMS-5

Current Status of GMS-5

2. 32.1 VISSR

In order to avoid the risk of the expected high motor-torque of scanning mirror caused by the growth of lubricant build-up at the motor roller bearing, JMA had conducted countermeasures such as reductions of observation frame, changes of some Full Disk observations to Northern Hemisphere observations in June 2000 and July 2001. These countermeasures and careful VISSR operations had successfully controledcontrolled the lubricant build-up under safe level until the beginning of the back-up operation.
Since the discontinuation of the VISSR observation, the scanning mirror has been stationed at a fixed point and there has been no sign of degradation of the lubricant build-up around that point. Lubricant build-up at the motor roller bearing of the scanning mirror has grown extremely high around the south limit of the observation frame due to the prolonged VISSR operation. In order to cope with this problem, we started reduced frame operation in June 2000, i.e., to cancel the southernmost part of each observation frame. On July 2001, we were obliged to execute another reduction of observation frame in the southernmost part too. That is, on that day, 12 of 28 observations of the day were changed from the (reduced) full disk observation to the Northern half disk observation, except for the 3-hourly observation and the observations for AMV extraction. This measure was done to alleviate the motor torque of the scan mirror that had grown too high at the southernmost part of the observation frame. Subsequently, special VISSR operations had been conducted continuously to smooth down the lubricant build-up carefully and systematically until the discontinuation of GMS-5 observation on 22 May 2003. Owing to these measures, the lubricant build-up has not grown substantially. After the discontinuation, the scanning mirror has been stationed at a fixed point and there has been no sign of degradation of the lubricant build-up around that point.

32.2 Remaining Propellant

The temporal changetime sequences of the remaining propellant onboard the spacecraft is shown in Attachment-1, and the temporal change of the orbital inclination of the spacecraftGMS-5 is are shown in Attachment-1 and 2 respectively. The amount of the remaining propellant is about 7.87 kg as of 28 July 2003, and the valueit is not enough to afford normal station keeping operation of the spacecraft especially for North-South maneuvering in terms of station keeping until the start of the operation of MTSAT-1R. For this reason, North-South maneuvers that consumes considerable amount of propellant. Therefore, the North-South maneuvering have has not been executed after since 23 October 2001. . TSince then the orbital inclination has been increasing continuously, and the magnitude was as large as 2.23 degrees as of 28 August 2003. On the other hand, we have executedThe maneuvering operations for the East-West maneuverspositionposition, Spin spin rate maneuvers and Aattitude maneuvers that consume relatively small amount of propellanthave been normally conducted.

32.3 Solar Array Panel Power

The temporal changetime sequence of the solar array panel power of GMS-5 is shown in Attachment-3. Abrupt decreases of the solar array panel power of the spacecraft caused by solar flares has have not been found in the past year. Solar array panel power at boreal summer solstices of 2003 shows decrease bywas about 1.42 % from lower than that of the preceding year. In spite of this decreasing trend, the solar array of GMS-5 has kept sufficient level of power with some margin over the operational minimum requirement (load power).

The solar array panel power at the boreal summer solstice of 2004 is predicted (assumed or estimated? 同じ意味なら predicted よりも calculated の方がbetter) to be 282 (W) at the boreal summer solstice of 2004. Provided that excessive decrease of the power caused by e.g. large-scale solar flares do not happen, it It is expected that the power level will remain sufficient for operation for a few years to come, except for the case that any excessive decrease of the power caused by large-scale solar flares will break out.

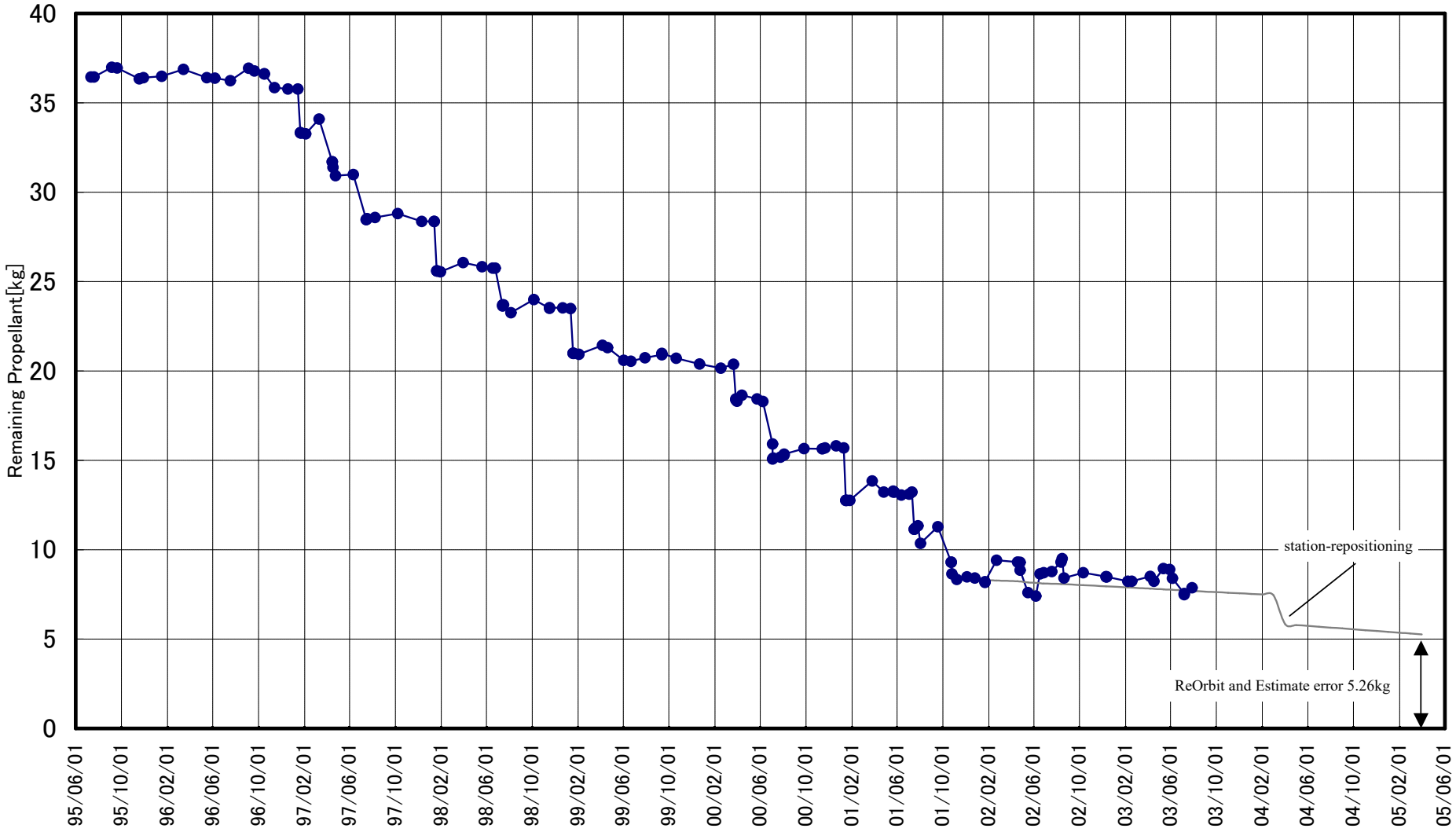
32.4 Other Iinstrument

As of 31 August 2003, all the instruments on board GMS-5 other than VISSR are satisfactorily functioning.

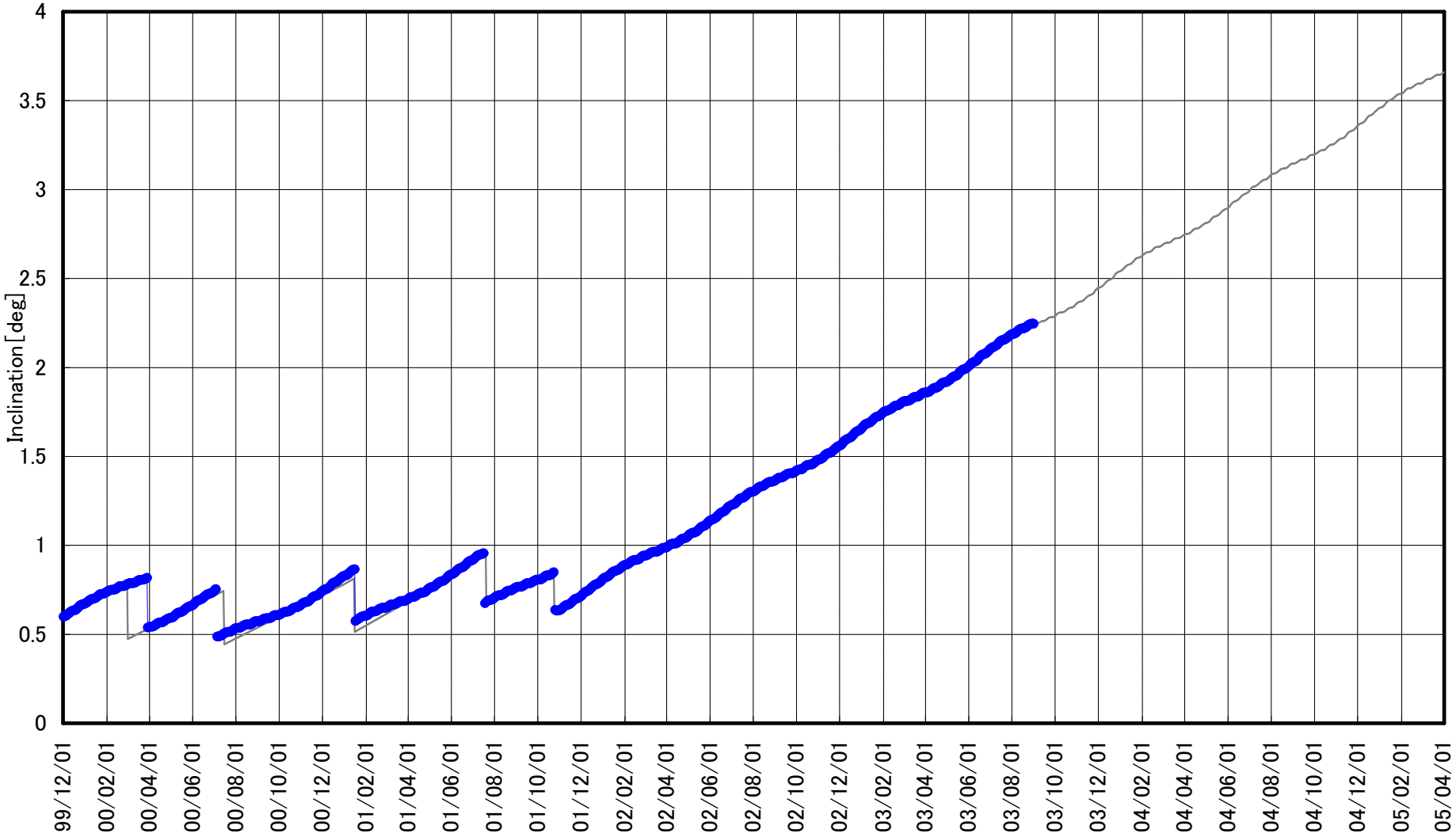
3. The history of the GMS-5 operations

3. The History of GMS-5 Operation

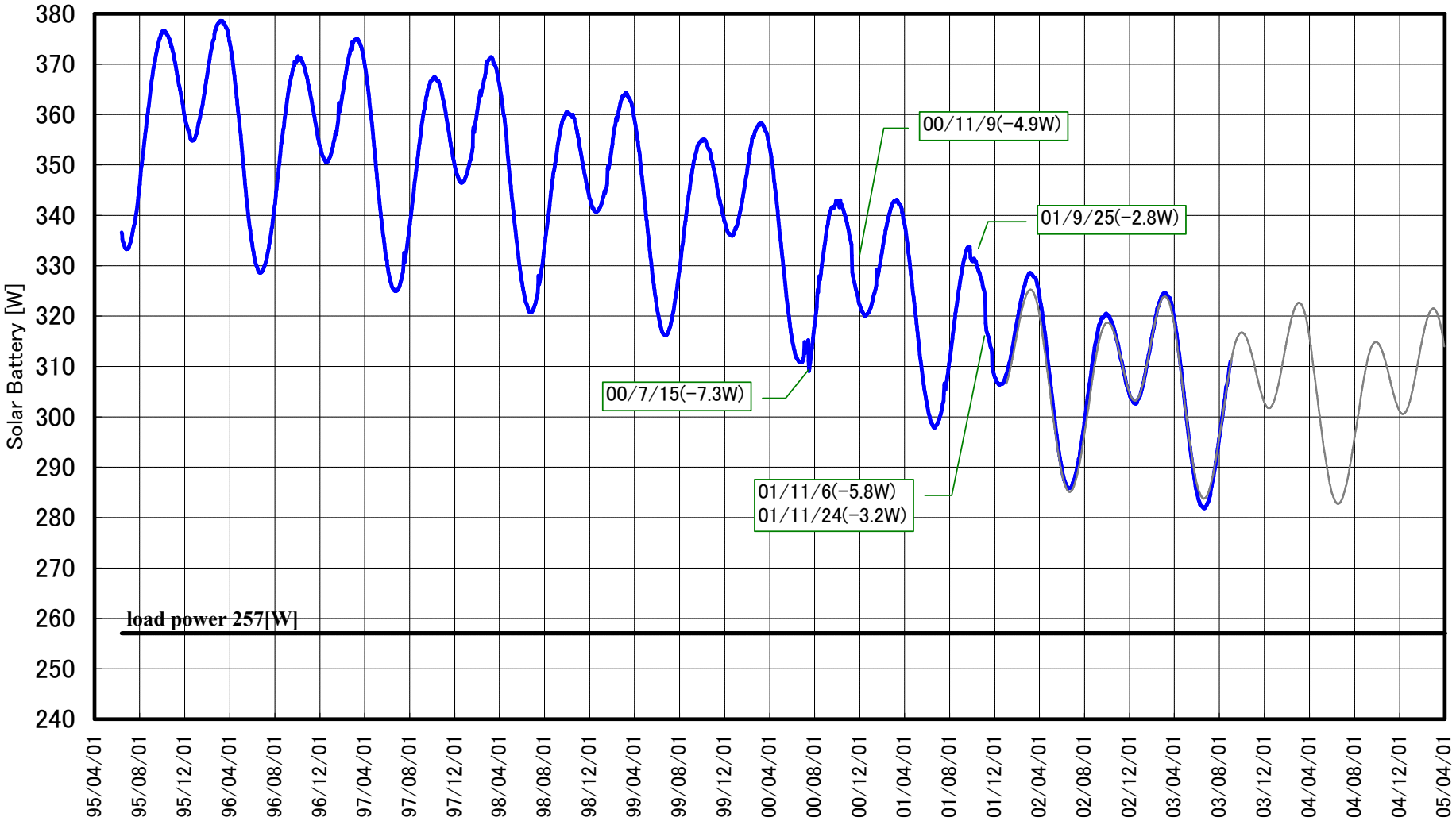
The history of the GMS-5 operations since January 2002 is shown in Attachment-4.



Time Sequence~~Temporal Change~~ of Remaining Propellant onboard GMS-5



~~Temporal Change~~ **Time Sequence of the Orbit Inclination of GMS-5**



Time Sequence ~~Temporal Change~~ of the Solar Array Panel Power of GMS-5

Summary of GMS-5 Operation

1. Summary of observation

(From January through December 2002)

2002	ROUTINE OBSERVATIONS	OMISSIONS	CANCELLATIONS	SPECIAL OBSERVATIONS
Jan.	861	7	0	2
Feb.	771	13	0	0
Mar.	799	69	0	16
Apr.	821	18	1	0
May.	864	4	0	8
Jun.	834	6	0	8
Jul.	867	1	0	54
Aug.	856	2	0	38
Sep.	779	0	0	32
Oct.	835	2	0	18
Nov.	840	0	0	14
Dec.	856	11	1	11

(From January through May 2003)

2003	ROUTINE OBSERVATIONS	OMISSIONS	CANCELLATIONS	SPECIAL OBSERVATIONS
Jan.	867	1	0	4
Feb.	765	0	0	0
Mar.	802	0	0	0
Apr.	825	0	1	30
May.	590	0	0	2

ROUTINE OBSERVATION

- Number of Completed Routine Observation

OMISSIONS

- Number of Canceled Observations by Eclipse, test, maneuver, or maintenance

CANCELLATIONS

- Number of Canceled Observations caused by troubles in ground sub-systems or trouble of computer system

SPECIAL OBSERVATION

- Number of Typhoon observation or observations for special purpose

2. Summary of maneuvers

Maneuvers performed between January and December 2002 were as follows,

East-West maneuvers: 21 February, 18 April, 17 June, 15 August, 10 October, 12 December.

Spin rate maneuvers: 21 January, 25 April, 20 August, 10 December

Attitude maneuvers: 21 January, 25 April, 16 May, 6 June, 27 June, 18 July, 12 August, 10 December

Maneuvers performed between January and December were as follows,

East-West maneuvers: 6 February, 7 April, 5 May

Spin rate maneuvers: 17 February

Attitude maneuvers: 17 April, 12 May, 29 May

The orbital inclination angle was 2.23degrees as of 28 August 2003.

3. Eclipse operation

Eclipse operations performed between January and December 2002 were as follow,

Earth eclipse: between 23 February and 9 April

between 27 August and 12 October

Lunar eclipse: 13 January, 11 June, 10 July

Eclipse operations performed between January and June 2003 were as follows,

Earth eclipse: between 21 February and 7 April

Lunar eclipse: 31 May