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Operation of MTSAT-1R

This paper reports on the operational status in the initial phase of MTSAT-1R, and the termination of GMS-5 operation.

Operation of MTSAT-1R

1. MTSAT-1R operation

1.1 Status of MTSAT-1R since launch

The Multi-Functional Transport Satellite-1R (MTSAT-1R) was launched by the H-IIA Launch Vehicle No.7 at 0925 UTC on 26 February 2005 from the Tanegashima Space Center.

After MTSAT-1R was put into a geosynchronous orbit and stationed at 145 degrees east, In-Orbit Test (IOT) for the bus and the meteorological function was performed by Space Systems Loral (SS/L), the manufacturer of the satellite. During the IOT, the first test images in the visible and infrared channels were obtained on 24 March 2005.

A drift maneuver to relocate MTSAT-1R from the IOT location (145 degrees east) to the operational location (140 degrees east) was performed on 26 April 2005. At the same time, a drift maneuver to relocate GMS-5 from the operational location (140 degrees east) to the back-up location (120 degrees east) was also performed.

The meteorological communication service, such as Data Collection Platform (DCP) data relay and Weather Facsimile (WEFAX) broadcast, both of which had been performed by GMS-5 even while the meteorological observation service for the Western Pacific region had been performed by GOES-9, was transferred to MTSAT-1R on 28 April 2005.

JMA started test dissemination of imagery obtained by MTSAT-1R via the satellite at 0232 UTC on 31 May 2005. The test dissemination of the High Rate Information Transmission (HRIT) and the High Resolution Imager Data (HiRID) for Medium-scale Data Utilization Station (MDUS) users, and the test dissemination of the Low Rate Information Transmission (LRIT) for Small-scale Data Utilization Station (SDUS) users were started. Furthermore, distribution of HRIT data to the registered National Meteorological and Hydrological Services (NMHSs) via landline was also started.

JMA started the formal operation of MTSAT-1R at 0232 UTC on 28 June 2005, namely, full operational distribution of imagery obtained by MTSAT-1R, including WEFAX service using MTSAT-1R data.

MTSAT-1R observes 24 full disk images, 24 northern hemisphere images, and 8 south hemisphere images a day.

1.2 Spacecraft control

MTSAT-1R location in orbit will be kept within the following range around the nominal location:

E-W: ±0.1 degrees N-S: ±0.1 degrees

The following table shows North-South and East-West Station-Keeping maneuvers that have been executed after the start of the formal operation of MTSAT-1R to date in order to keep the satellite in the above range.

Summary of maneuvers

North-South Station-Keeping maneuver	22 July, 12 August in 2005
East-West Station-Keeping maneuver	25 July, 16 August, 26 August, 8 September, 5 October in 2005

1.3 Eclipse operation

(1) Sun Avoidance (SA) / Eclipse Operation

MTSAT-1R has been under the SA/Autumn Eclipse operation mode since 15 August 2005 in which following scheduled observations are canceled.

Observation schedule of SA/Eclipse operation period

Observation name	F14	N14	F15	N15	F16
Observation starting time (UTC)	1332	1359	1432	1459	1532
15 August - 27 August		canceled	canceled	canceled	
28 August - 17 September	canceled	canceled	canceled	canceled	canceled
18 September - 26 October	canceled	canceled	canceled	canceled	
27 October - 30 October		canceled	canceled		

1.4 Dissemination performance

JMA disseminates satellite imagery observed by MTSAT-1R in the formats of HRIT, HiRID, LRIT and WEFAX via satellite and also distributes satellite imagery (IR1: 10.3 - 11.3 micrometer) in the HRIT format via landline. Dissemination performances after the transition to the formal operation are summarized in the following tables.

HRIT dissemination performance

	PLANS	OUTPUTS	PERFORMANCE
June 2005	161	159	98.8 %
July 2005	1736	1731	99.8 %
August 2005	1677	1669	99.5 %
September 2005	1543	1526	98.9 %

HiRID dissemination performance

	PLANS	OUTPUTS	PERFORMANCE
June 2005	161	158	98.1 %
July 2005	1736	1732	99.8 %
August 2005	1677	1672	99.7 %
September 2005	1543	1526	98.9 %

LRIT dissemination performance

	PLANS	OUTPUTS	PERFORMANCE
June 2005	207	204	98.6 %
July 2005	2232	2222	99.6 %
August 2005	2148	2138	99.5 %
September 2005	1946	1920	98.7 %

WEFAX dissemination performance

	PLANS	OUTPUTS	PERFORMANCE
June 2005	250	248	99.2 %
July 2005	2728	2708	99.3 %
August 2005	2610	2596	99.5 %
September 2005	2366	2353	99.5 %

HRIT (via land-line) distribution performance

	PLANS	OUTPUTS	PERFORMANCE
June 2005	552	551	99.8 %
July 2005	5952	5927	99.6 %
August 2005	5752	5722	99.6 %
September 2005	5144	5076	98.7 %

*PLANS: the number of imagery planned to be disseminated
*OUTPUTS: the number of imagery disseminated
*PERFORMANCE: OUTPUTS/PLANS

1.5 Solar flare effect

There were no abrupt decreases of the power caused by the large-scale solar flares in September 2005.

2 Termination of GMS-5 operation

2.1 Termination of operation

The GMS-5 drift maneuver for handover of the satellite operation to MTSAT-1R was performed on 26 April by the Japan Aerospace Exploration Agency (JAXA). After drifting

westward, GMS-5 was stationed at 120 degrees east on 19 May 2005.

The meteorological communication services were handed over from GMS-5 to MTSAT-1R on 28 April, and DCP data relay and WEFAX broadcast via GMS-5 terminated.

GMS-5 deorbit maneuver was performed on 17 and 18 July 2005 by JAXA.

Also by the commands from JAXA, shutdown operation for GMS-5 was performed, GMS-5 ended its signal transmission at 0200 UTC on 21 July 2005.

2.2 Spacecraft control

The history of GMS-5 maneuvers after the last meeting is as follows.

Summary of maneuvers (from May 2004 through July 2005)

East-West Station-Keeping maneuver	13 May, 1 July, 19 August, 13 October, 7 December in 2004 2 February, 24 March, 9 June* in 2005
Spin rate control	20 May, 25 November in 2004 9 February, 25 May* in 2005
Attitude control	20 May, 21 June, 3 August in 2004 25 May* in 2005
Others	(Station-change started) 26 April 2005 (Station change stopped) 13 and 19 May 2005 (Deorbit) 17 and 18 July 2005

* orbit in 120 degrees east

2.3 Eclipse operation

The history of GMS-5 eclipse operation after the last meeting is as follows.

Eclipse operation (from May 2004 through July 2005)

Earth eclipse	22 August - 7 October in 2004 16 February - 3 April in 2005