

STATUS OF COMMUNICATION, OCEAN AND METEOROLOGICAL SATELLITE (COMS) Meteorological Imager (MI)

This document is the current status of Communication, Ocean and Meteorological Satellite (COMS), the first Korean geostationary meteorological satellite which has been operating at a longitude of 128.2°E since April 1st, 2011. COMS meteorological mission is performed by MI (Meteorological Imager) with one visible channel and four infrared channels. Korea Meteorological Administration (KMA) has the competence for MI operation and data distribution.

This paper presents the current status and future plan of COMS MI operation and data service.

1. Introduction

COMS (Communication, Ocean, and Meteorological Satellite), the first Korean geostationary meteorological satellite, was launched successfully on June 27th, 2010 and has been operating at a longitude of 128.2°E since April 1st, 2011. COMS meteorological mission is performed by MI (Meteorological Imager) with one visible channel and four infrared channels (Table 1).

We have tuned radiometric and geometric parameters during the In-Orbit Test and all the radiometric and geometric performances are within the specification. The COMS MI observation data are disseminated to M/SDUS (Medium/Small Scale Data Utilization Stations) users acquisition in H/LRIT (High/Low Rate Information Transmission) formats within 15 min. after data. Also, we provide high quality COMS MI level 1B data through land-based network via NMSC (National Meteorological Satellite Center) website (<http://nmsc.kma.go.kr/jsp/homepage/eng/main.do>) and FTP. And some MI meteorological level 2 products such as cloud detection, sea surface temperature, fog, dust detection also are available on the website and more level 2 data service will be posted in near future.

In this report, we introduce the current status and future plans of COMS MI operation performance and data services.

Table 1. The channels of COMS

Channel	Wavelength (μm)	Spatial Resolution (km)
VIS	0.675	1 x 1
SWIR	3.75	4 x 4
WV	6.75	4 x 4
IR1	10.8	4 x 4
IR2	12.0	4 x 4

VIS : Visible

SWIR : Shortwave Infrared

WV : Water Vapor

IR : Infrared

2. Current status of MI operation

The meteorological mission and data service of COMS has begun since 00UTC on 1st April 2011. Normally COMS MI measurement has two different observation modes: Full Disk (FD) and Extended Northern Hemisphere (ENH). And COMS MI produces FD imagery every 3 hours and ENH imagery every 15 minutes. (Fig. 1)

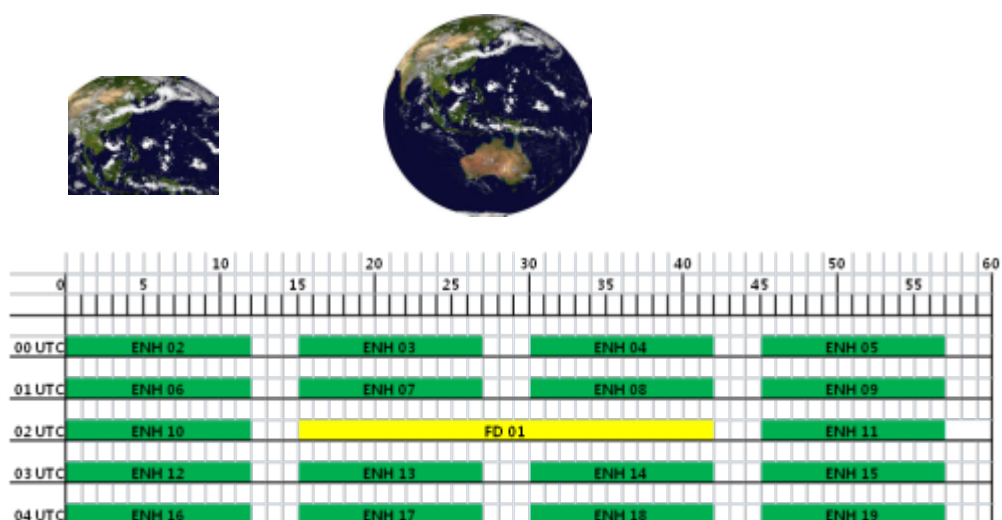


Fig. 1. COMS MI observation modes and schedule

2.1 MI Radiometric and Geometric Performances

KMA monitor the MI radiometric performances of visible channel by albedo monitor and moon observation and of infrared channel by blackbody calibration and space look, dark image observation, respectively. The radiance values of each visible/infrared channel detectors have shown stability and homogeneity.

Also the MI geometric performance is monitored by analyzing navigation and registration errors. All performance values are within the specification and the images show good matching between image and shoreline stably.

2.2 Success Rate of MI H/LRIT Broadcast

The success rate of MI H/LRIT broadcast can be the standard of operation and real time data service. We analyzed the success rate from April 1st to August 31th of this year. The success of broadcast means that MI H/LRIT image data dissemination is completed within 15 minutes after the end of image scanning.

- Period : 04.01. 2011 ~ 08.31. 2011 (6 months)
- H/LRIT (disseminated/planned) : 12,812/12,868 (* 99.56 %)

*The broadcasts by backup site antenna are included

The broadcast failure cases were caused by ground system anomaly such as

antenna and preprocessing system faults. But the success rate of H/LRIT broadcast has been higher than we targeted as a starter of meteorological satellite operation.

3. Data Service

3.1 Service via Satellite

The observed meteorological data by COMS MI, after being converted into HRIT (High Rate Information Transmission) and LRIT (Low Rate Information Transmission) formats (Table 2), is broadcast to medium/small-scale data utilization stations (MDUS/SDUSs). We provide the H/LRIT services free of charge and transmit encrypted data to identify the users of H/LRIT. The domestic and foreign MDUS/SDUSs that wish to use our services should make a formal application using the procedures outlined on the website of the National Meteorological Satellite Center (<http://nmisc.kma.go.kr/jsp/homepage/eng/contents/etc/member.jsp>). The technical documentations to learn about the application procedures for becoming a user station and the means to decrypt the encrypted data are posted on the website.



Fig. 2. Concept of MI H/LRIT direct broadcasting

H/LRIT is broadcast from COMS to user stations within 15 minutes after the end of a scanning. Currently, H/LRIT include the FD and ENH images and level 2 meteorological products images such as cloud detection (CT), cloud top height (CTH), cloud top temperature (CTT) and GOCI images are broadcast in only LRIT. KMA has a plan to add more contents such as sea surface temperature, fog, numerical weather prediction and typhoon information to LRIT service. Figure 3 shows a sample of H/LRIT dissemination schedule. The dissemination has started since April 1st, 2011.

Table 2. Classification of H/LRIT

Classification	HRIT	LRIT
Data Transmission Rate	3 Mbps	512 kbps
Data Types	MI image Alpha numeric text Encryption key message	MI image Alpha numeric text Encryption key message GOCI image Satellite meteorological products Numerical weather prediction data (planned) Typhoon information (planned)
Image mode	FD, ENH	FD, ENH
User Station	MDUS	SDUS

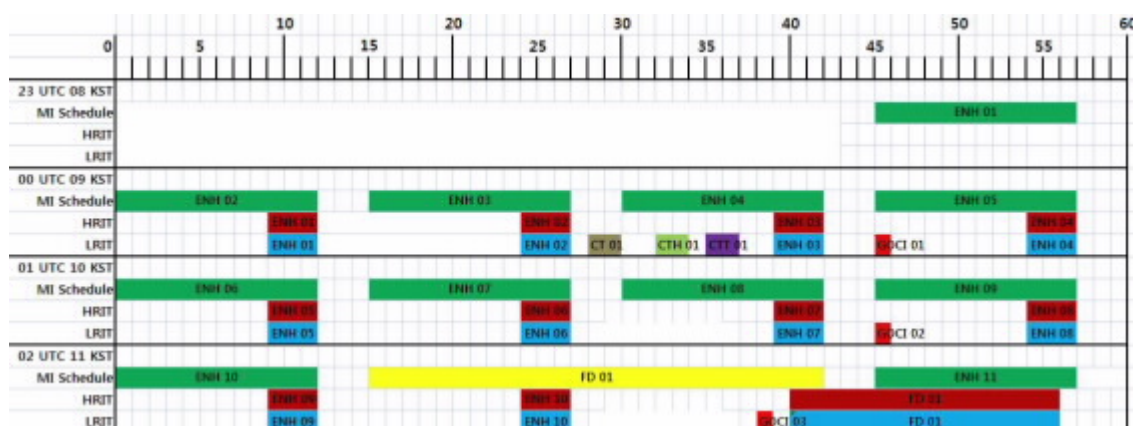


Fig. 3. Sample of COMS MI H/LRIT dissemination schedule

3.2 Service via Internet (planned)

COMS MI image data, operation information, and calibration information of COMS Meteorological Imager (MI) will be serviced through NMSC website from the end of 2011. And resent 7 days (TBC) MI image data will be stored on NMSC FTP server. The detailed information also will be posted on the website in the end of 2011. All registered members of the website will be able to log on, search, and download satellite data once the formal request is approved.

4. CONCLUSIONS

COMS MI has been normally operated since April 1st 2011 and its data has been disseminated to MDUS/SDUS users by KMA. The H/LRIT data has been broadcast stably until now (99.56%, 04.01 ~ 08.31, 2011). The service via internet will be available from the end of 2011.

The COMS MI radiometric and geometric performances satisfy the user

requirements and the image data are good enough to be applied to numerical weather prediction model and meteorological products generation.

KMA participates in Global Satellite Inter-Calibration System (GSICS) working group for COMS MI CAL/VAL and also continues to doing actions for quality control of MI data. KMA wishes that more users receive and utilize the COMS MI data and will support the users to do it as possible as KMA can.