

COMMISSION FOR BASIC SYSTEMS  
OPEN PROGRAMME AREA GROUP ON INTEGRATED OBSERVING SYSTEMS

EXPERT TEAM ON SATELLITE UTILIZATION AND PRODUCTS

ITEM: 9.12

SIXTH SESSION

GENEVA, SWITZERLAND, 12-16 DECEMBER 2011

Original: ENGLISH

## **COMS METEOROLOGICAL IMAGER OPERATION AND DATA SERVICE**

*(Submitted by J.-D. Jang)*

---

### **Summary and Purpose of Document**

This paper presents the current status and future plan of COMS MI operation and data service. Communication, Ocean and Meteorological Satellite (COMS), the first Korean geostationary meteorological satellite was launched successfully on 27 June 2010 and has been operating at a longitude of 128.2°E since 1 April 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.

KMA is producing 16 meteorological parameters such as cloud analysis, fog, Asian dust, atmospheric motion vector from COMS raw data for various applications such as nowcasting, numerical weather prediction model, climate monitoring. Among them, 10 COMS meteorological products are distributed to users, and the others will be distributed by the end of 2011.

---

### **ACTION PROPOSED**

The sixth session is invited to note the information provided in this document.

---

## COMS METEOROLOGICAL IMAGER OPERATION AND DATA SERVICE

### 1. INTRODUCTION

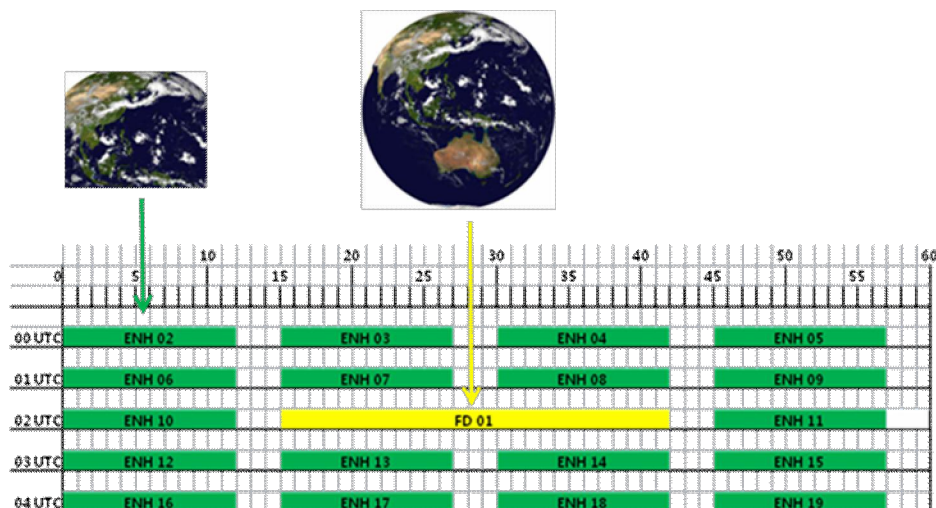
COMS (Communication, Ocean, and Meteorological Satellite), the first Korean geostationary meteorological satellite, was launched successfully on 27 June 2010 and has been operating at a longitude of 128.2°E since 1 April 2011. COMS meteorological mission is performed by MI (Meteorological Imager) with one visible channel and four infrared channels (Table 1). 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 acquisition. Also, we provide high quality COMS MI level 1B data through land-based network via the NMSC (National Meteorological Satellite Center) website (<http://nmisc.kma.go.kr/jsp/homepage/eng/main.do>) and FTP. 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.

**Table 1. The channels of COMS**

Channel	Wavelength ( $\mu\text{m}$ )	Spatial Resolution (km)
VIS	0.675	1 x 1
SWIR	3.75	4 x 4
WV	6.75	4 x 4
IR	10.8	4 x 4
IR	12.0	4 x 4

### 2. Current Status of MI Operation

The meteorological mission and data service of COMS has begun since 00UTC on 1 April 2011. Normally COMS MI measurement has two different observation modes: Full Disk (FD) and Extended Northern Hemisphere (ENH). 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 monitors 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 1<sup>st</sup> to August 31<sup>st</sup> 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 : 1 April 2011 ~ 31 August 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 at the start 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://nmsc.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 minute after the end of a scan. 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 content, 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 on 1 April 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

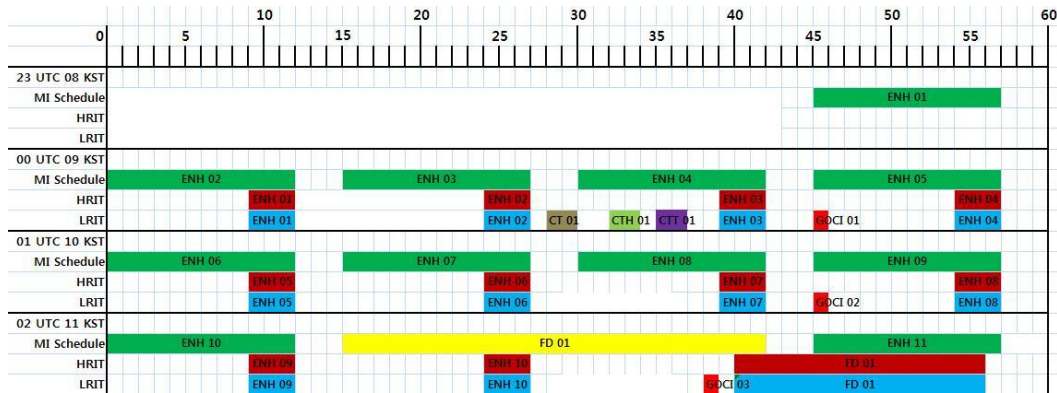
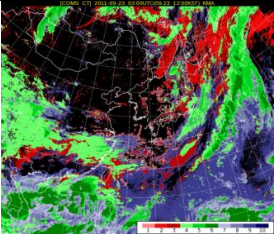
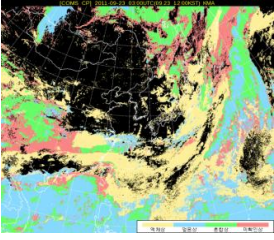
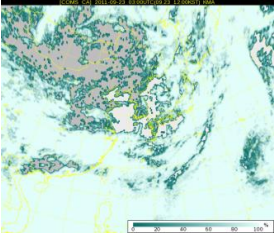
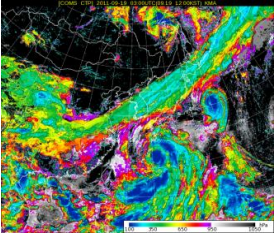
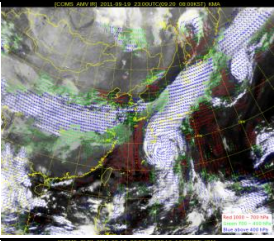
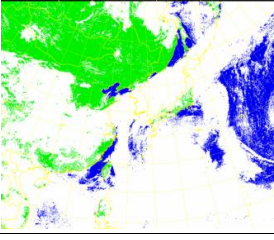


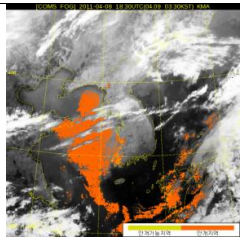
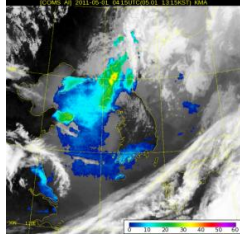
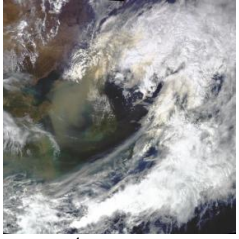
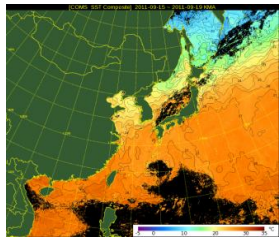
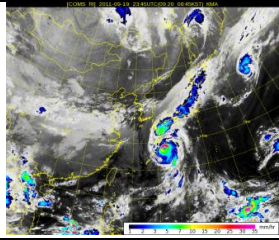
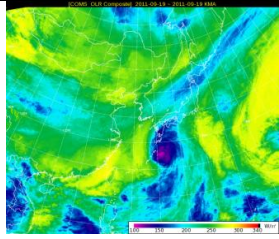
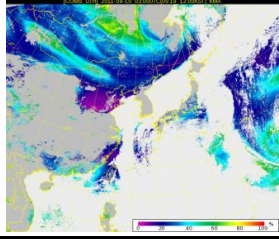
Fig. 3. Sample of COMS MI H/LRIT dissemination schedule

### 3.2 COMS Products Services

Parts of meteorological products from COMS was started to generate operationally on 1 April 2011 together with COMS operation. These are cloud analysis (type, phase and amount), cloud top temperature/pressure, atmospheric motion vector, cloud detection, fog, and aerosol index. And then, four products, which are sea surface temperature, rain intensity, outgoing longwave radiation, and upper tropospheric humidity, were generated additionally from 10 August 2011 on. These products are currently validated through comparison with satellite or ground in-situ data. For example, the detection area of an Asian dust event (aerosol index) that occurred in last April and May was compared with COMS/GOCI (Geostationary Ocean Color Imager) and MODIS true color images or OMI AOD. The other six products which are land surface temperature, sea ice/snow cover, total precipitable water, insulation, clear sky radiance, and aerosol optical depth will be produced by the end of this year. Table 3 shows the status of COMS products services.

**Table 3. Status of COMS products service**

Start Date	Products	Spatial Resolution	Obs. cycle	Images
1 April 2011	Cloud analysis (cloud type, phase, and amount)	4 km	Every 15 min.	 <p>SEVIRI Cloud type</p>  <p>Cloud phase</p>  <p>Cloud amount</p>
	Cloud top pressure/temperature/height	4 km	Every 15 min.	 <p>Cloud top pressure</p>
	Atmospheric Motion Vector (AMV)	64 km	1 hour	
	Cloud detection	4 km	Every 15 min.	

	Fog	4 km	Every 15 min.	
	Aerosol index (AI)	4 km	Every 15 min.	  COMS AI    GOCI <sup>1</sup> true color image
10 August 2011	Sea surface temperature (SST)	4 km	1-, 5-, 10-day composition	 5-day composite SST
	Rain intensity (RI)	4 km	Every 15 min.	
	Outgoing longwave radiation (OLR)	4 km	1 day	
	Upper tropospheric humidity (UTH)	36 km	Every 15 min.	

### 3.3 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 onwards. Resent 7 days

(TBC) MI image data will be stored on NMSC FTP server. Detailed information also will be posted on the website at 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 operating normally since 1 April 2011 and its data have 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 models and meteorological products generation.

KMA participates in the 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, within its capabilities, support users in doing so.

---