

Prepared by KMA
Agenda Item: C.2
Discussed in Plenary

UPDATE ON COMS PROGRAM

This document is to update the COMS program as a part of CGMS-34-WMO-WP-25. Currently, the integration of COMS system has been finished, and various ground tests including the compatibility test between the payloads and the ground image processing system are being performed. This document includes the current status of COMS payloads development, the information about the observation channels, and the HRIT/LRIT.

1. Introduction

Korea Meteorological Administration (KMA) has started the first Korean multi-purpose geostationary satellite program named by the Communication, Ocean and Meteorological Satellite (COMS), in cooperation with three other government ministries since 2003. Multi-missions of COMS are intended as not only meteorological and oceanic observation for the public welfare, but also in-orbit test of developed communication payload to be used for the next geosynchronous satellite.

2. Updated COMS program

The Korea Aerospace Research Institute (KARI) has been developing COMS for KMA. COMS will be a multi-purpose satellite, 3-axis stabilised. Table 1 records the planning details as known so far. Figure 1 is an artist's rendering of the satellite.

Table 1. Chronology of the COMS programme

Satellite	Launch	End of service	Position	Status (Sep 2009)	Instruments
COMS-1	2009	Expected \geq 2016	128.2°E	Under Ground Test	Meteorological imager (MI), Geostationary Ocean Color Imager (GOCI)
COMS-2	2017	Expected \geq 2022	116.2°E /128.2°E (TBD)	Being defined	Meteorological imager (MI), Ocean Coloring Sensor Atmospheric Trace Gas Monitor (TBD)

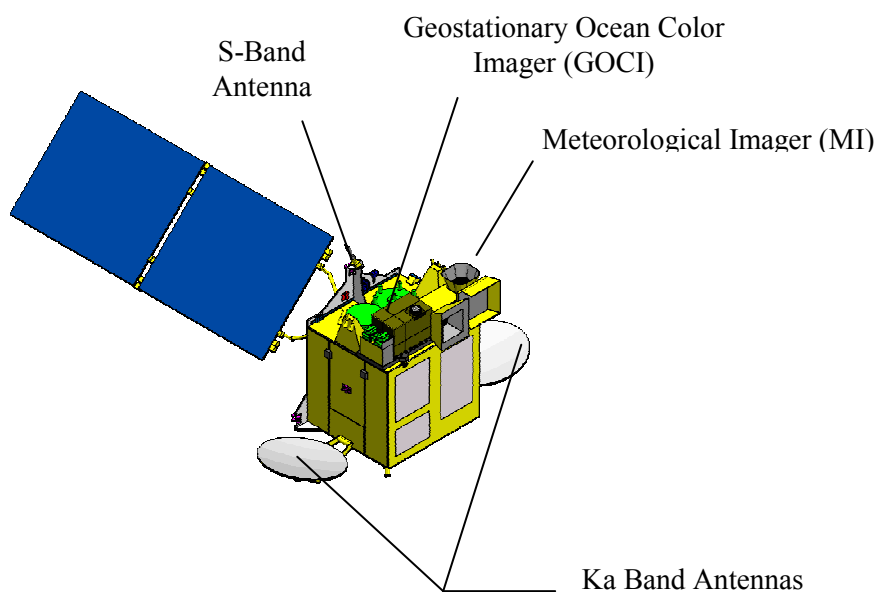


Figure 1. Artist's rendering of COMS

(1) The COMS payload for earth observation

- A Meteorological Imager with 5 channels in the range 0.55-12.5 μ m, resolution of 1 km in 1 VIS channel, 4 km in 4 IR channels, 27 min for full disk imaging (proportionally less for limited areas). See instrument sheet in Annex A3.1.
- An Geostationary Ocean Color Imager with 8 narrow-band channels in the range 400-865 nm for ocean color monitoring; resolution of 500 m over a limited coverage (2500 km x 2500 km). See instrument sheet in Annex A3.1.

(2) Data transmission from COMS

Raw data are transmitted to:

- Korea Meteorological Satellite Center (KMSC/KMA), Korea Ocean Satellite Center (KOSC), and the Satellite Operation Center:
 - Frequency of 1687 MHz, bandwidth of 6.0 MHz, RHCP/LHCP polarisation, 6 Mbps data rate.

After ground processing at MSC and/or KOSC, data are re-transmitted to the users by:

- HRIT (High Rate Information Transmission)
 - Frequencies of 1695.4 MHz; bandwidth of 5.2 MHz; Linear Polarization in horizontal direction
 - Antennas : diameters of 3.7 m, G/T ~ 11.1 dB/K, 3 Mbps information data rate;
- LRIT (Low Rate Information Transmission)
 - Frequencies of 1692.14 MHz; bandwidth of 1 MHz; Linear Polarization in horizontal direction
 - Antennas : diameters of 1.2 m(down), G/T ~ 1.9 dB/K, 256 kbps data rate(TBC, more details in KMA-WP-03).

(3) Current Status of COMS

The system integration of satellite system has been finished in early 2009. Various ground tests including mechanical test, vibration test, acoustic test and compatibility test have been performed successfully, and the thermal-vacuum test for the space environment is at its final stage. The launch schedule of COMS is targeting the end of 2009. Six month's In-Orbit Test will follow in order to confirm the performance of the satellite system.

A3.1 Operational meteorological satellites - COMS updated as of September 2009 -

Table A3.1.2 - List of the provided instrument sheets ordered by type of sensor and satellite

GEOSTATIONARY	Meteosat	GOES	MTSAT	Elektro-L	FY-2	INSAT-3A and 3D	Kalpana	COMS
Imager	MVIRI, SEVIRI	IMAGER	JAMI	MSU-GS	S-VISSR	VHRR, CCD, IMAGER	VHRR	MI, GOCI
Advanced imager	MTG FCI	ABI						
Sounder		SOUNDER				SOUNDER		
Advanced sounder	MTG IRS							
Earth radiation	GERB							
Lightning mapper	MTG Lightning	GLM						

MI	Meteorological Imager
Satellites	COMS
Status(September 2009)	Under Ground Test
Mission	Providing atmospheric variables over the Asia-Pacific region thru VIS/IR channels
Instrument type	5-channel VIS/IR radiometer (Instrument of COMS follow-on is TBD)
Coverage/cycle	Full disk in 27 min. Limited areas in correspondingly shorter time intervals
Resolution (s.s.p.)	1 km IFOV in 1 VIS channel, 4 km IFOV in 4 IR channels

Central wavelength	Spectral interval	Radiometric accuracy (NEΔT or SNR)
0.675 μm	0.55 - 0.8 μm	10:1@5% albedo, 170:1@ 100 % albedo
3.75 μm	3.50 - 4.0 μm	0.10 K @ 300 K
6.75 μm	6.5 – 7.0 μm	0.12 K @ 300 K
10.8 μm	10.3 – 11.3 μm	0.12 K @ 300 K
12 μm	11.5 – 12.5 μm	0.20 K @ 300 K

GOCI	Geostationary Ocean Color Imager
Satellites	COMS 1
Status(September 2009)	Under Ground Test
Mission	Ocean color and aerosol monitoring of seas around the Korean peninsula
Instrument type	8-channel VIS/NIR radiometer (Instrument of COMS follow-on is TBD)
Scanning technique	Snapshots of 2 mega pixel slot
Coverage/cycle	Area of 2500 km x 2500 km, hourly in daylight
Resolution (s.s.p.)	500 m IFOV

Central Wavelength	Band Width	Radiometric Accuracy (SNR @ Specified input radiances)
412 nm	20 nm	1000 @ 0.100 W m ⁻² sr ⁻¹ μ ⁻¹
443 nm	20 nm	1090 @ 0.086 W m ⁻² sr ⁻¹ μ ⁻¹
490 nm	20 nm	1170 @ 0.067 W m ⁻² sr ⁻¹ μ ⁻¹
555 nm	20 nm	1070 @ 0.056 W m ⁻² sr ⁻¹ μ ⁻¹
660 nm	20 nm	1010 @ 0.032 W m ⁻² sr ⁻¹ μ ⁻¹
680 nm	10 nm	870 @ 0.031 W m ⁻² sr ⁻¹ μ ⁻¹
745 nm	20 nm	860 @ 0.020 W m ⁻² sr ⁻¹ μ ⁻¹
865 nm	40 nm	750 @ 0.016 W m ⁻² sr ⁻¹ μ ⁻¹