

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, COMS MI was shipped to AIT facility of KARI and now in the integration phase. GOCI will be delivered to KARI site at the beginning of November. The compatibility test between the payloads and the ground image processing system. 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 (Aug 2007) | Instruments |
|-----------|--------|----------------|------------------------|----------------------|---|
| COMS-1 | 2009 | Expected 2016 | 128.2°E | Being defined | Meteorological imager (MI), Geostationary Ocean Color Imager (GOCI) |
| COMS-2 | 2016 | Expected 2023 | 116.2°E /128.2°E (TBD) | Being defined | (TBD) |

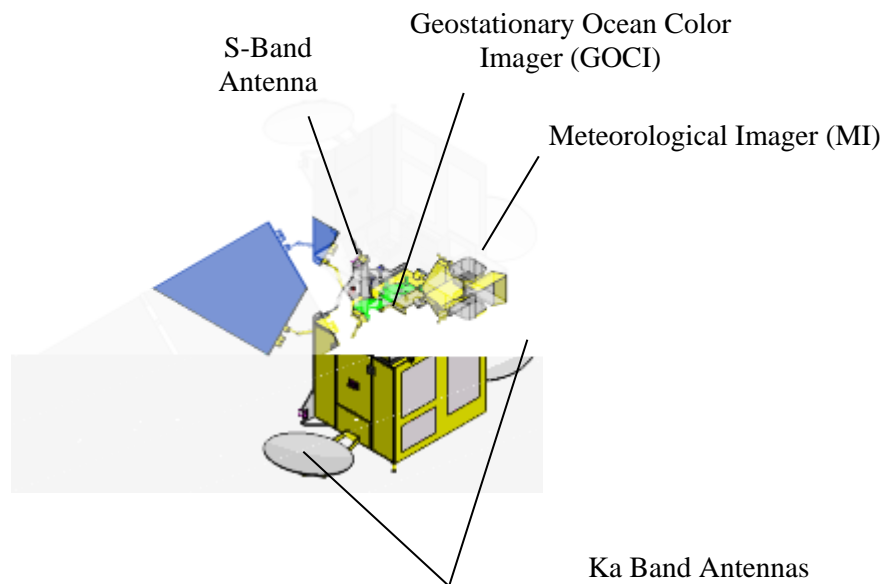


Figure 1. Artist's rendering of COMS
COMCOMSketch view of COMS.

(1) The COMS payload for earth observation

A Meteorological Imager with 5 channels in the range 0.55-12.5 μm , 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 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.

(3) Current Status of COMS

The Critical Design Review (CDR) of COMS spacecraft was done in March 2007, and the Assembly, Integration Test (AIT) has begun in September 2007. The Meteorological Imager has been shipped to the AIT facility of KARI in August 2008, and is in the integration phase.

After the integration MI and GOCI at the end of 2008, the compatibility test of the whole system of COMS is going to be performed until the first quarter of 2009. COMS is scheduled to be launched in third quarter of 2009, and 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 October 2007 -

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

| GEOSTATIONAR Y | Meteosat | GOES | MTSA T | Elektro- L | FY-2 | INSAT-3A and 3D | Kalpan a | COMS |
|-------------------------|------------------|-------------|-----------|---------------|---------|----------------------|-------------|-------------|
| Imager | MVIRI, SEVIRI | IMAGER | JAMI | MSU-GS | S-VISSR | VHRR, CCD, IMAGER | VHRR | MI, GOCI |
| Advanced imager | MTG Imager | ABI | | | | | | |
| Sounder | | SOUNDE R | | | | SOUNDER | | |
| Advanced sounder | MTG Sounder | HES | | | | | | |
| Earth radiation | GERB | | | | | | | |
| Lightning mapper | MTG Lightning | GLM | | | | | | |

| MI | Meteorological Imager |
|-----------------------------|---|
| Satellites | COMS 1 and 2 |
| Status (August 2007) | Being designed – To be utilised in the period 2009 – 2021 |
| Mission | Providing atmospheric variables over the Asia-Pacific region thru VIS/IR channels |
| Instrument type | 5-channel VIS/IR radiometer (Instrument of COMS2 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 (NE T 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 and 2 |
| Status (August 2007) | Being designed – To be utilised in the period 2009 – 2021 |
| Mission | Ocean color and aerosol monitoring of seas around the Korean peninsula |
| Instrument type | 8-channel VIS/NIR radiometer |
| 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 radiance) input |
|---------------------------|-------------------|--|
| 412 nm | 20 nm | 1000 @ 0.100 W m ⁻² sr ⁻¹ |
| 443 nm | 20 nm | 1090 @ 0.086 W m ⁻² sr ⁻¹ |
| 490 nm | 20 nm | 1170 @ 0.067 W m ⁻² sr ⁻¹ |
| 555 nm | 20 nm | 1070 @ 0.056 W m ⁻² sr ⁻¹ |
| 660 nm | 20 nm | 1010 @ 0.032 W m ⁻² sr ⁻¹ |
| 680 nm | 10 nm | 870 @ 0.031 W m ⁻² sr ⁻¹ |
| 745 nm | 20 nm | 860 @ 0.020 W m ⁻² sr ⁻¹ |
| 865 nm | 40 nm | 750 @ 0.016 W m ⁻² sr ⁻¹ |