UPDATE ON COMS PROGRAM

This document is to update the COMS program as a part of CGMS-34-WMO-WP-25. This includes the 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 *(Section 2.8 in CGMS-34-WMO-WP-25)*
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

<table>
<thead>
<tr>
<th>Satellite</th>
<th>Launch</th>
<th>End of service</th>
<th>Position</th>
<th>Status (Aug 2007)</th>
<th>Instruments</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMS-1</td>
<td>2009</td>
<td>Expected ≥ 2016</td>
<td>116.2°E /128.2°E (TBD)</td>
<td>Being defined</td>
<td>Meteorological imager (MI), Geostationary Ocean Color Imager (GOCI)</td>
</tr>
<tr>
<td>COMS-2</td>
<td>2014</td>
<td>Expected ≥ 2021</td>
<td>116.2°E /128.2°E (TBD)</td>
<td>Being defined</td>
<td>(TBD)</td>
</tr>
</tbody>
</table>

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 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:

- Meteorological Satellite Center (MSC/KMA) and Korea Ocean Satellite Center (KOSC), and to 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 2040.9(up) and 1695.4(down) MHz; bandwidth of 5.2 MHz; RHCP/LHCP polarisation
  - Antennas: diameters of 13 m(up) and 3.7 m (down), G/T ~ (TBD) dB/K, 3 Mbps data rate;

- LRIT (Low Rate Information Transmission)
  - Frequencies of 2037.64(up) and 1692.14(down) MHz; bandwidth of 1 MHz; RHCP/LHCP polarisation
  - Antennas: diameters of 13 m(up) and 1.2 m(down), G/T ~ (TBD) dB/K, 256 kbps data rate.

(3) Test of COMS

The COMS Meteorological Imager has undergone the performance test since 2007 Spring at ITT Industry, USA. The Critical Design Review (CDR) of COMS spacecraft was on March 2007, and the Assembly, Integration Test (AIT) has begun in September 2007.
### 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**

<table>
<thead>
<tr>
<th>GEOSTATIONARY</th>
<th>Meteosat</th>
<th>GOES</th>
<th>MTSAT</th>
<th>Elektro-L</th>
<th>FY-2</th>
<th>INSAT-3A and 3D</th>
<th>Kalpana</th>
<th>COMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imager</td>
<td>MVIRI, SEVIRI</td>
<td>IMAGER</td>
<td>JAMI</td>
<td>MSU-GS</td>
<td>S-VISSR</td>
<td>VHRR, CCD, IMAGER</td>
<td>VHRR</td>
<td>MI, GOCI</td>
</tr>
<tr>
<td>Advanced imager</td>
<td>MTG Imager</td>
<td>ABI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sounder</td>
<td>SOUNDER</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced sounder</td>
<td>MTG Sounder</td>
<td>HES</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Earth radiation</td>
<td>GERB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lightning mapper</td>
<td>MTG Lightning</td>
<td>GLM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**MI - Meteorological Imager**

<table>
<thead>
<tr>
<th>Satellites</th>
<th>COMS 1 and 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status (August 2007)</strong></td>
<td><strong>Being designed</strong> – To be utilised in the period 2009 ~2021</td>
</tr>
<tr>
<td><strong>Mission</strong></td>
<td>Providing atmospheric variables over the Asia-Pacific region thru VIS/IR channels</td>
</tr>
<tr>
<td><strong>Instrument type</strong></td>
<td>5-channel VIS/IR radiometer (Instrument of COMS2 is TBD)</td>
</tr>
<tr>
<td><strong>Coverage/cycle</strong></td>
<td>Full disk in 27 min. Limited areas in correspondingly shorter time intervals</td>
</tr>
<tr>
<td><strong>Resolution (s.s.p.)</strong></td>
<td>1 km IFOV in 1 VIS channel, 4 km IFOV in 4 IR channels</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Central wavelength</th>
<th>Spectral interval</th>
<th>Radiometric accuracy (NEΔT or SNR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.675 μm</td>
<td>0.55 - 0.8 μm</td>
<td>10:1@5% albedo, 170:1@100% albedo</td>
</tr>
<tr>
<td>3.75 μm</td>
<td>3.50 - 4.0 μm</td>
<td>0.10 K @ 300 K</td>
</tr>
<tr>
<td>6.75 μm</td>
<td>6.5 – 7.0 μm</td>
<td>0.12 K @ 300 K</td>
</tr>
<tr>
<td>10.8 μm</td>
<td>10.3 – 11.3 μm</td>
<td>0.12 K @ 300 K</td>
</tr>
<tr>
<td>12 μm</td>
<td>11.5 – 12.5 μm</td>
<td>0.20 K @ 300 K</td>
</tr>
<tr>
<td>GOCI</td>
<td>Geostationary Ocean Color Imager</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>---------------------------------</td>
<td></td>
</tr>
<tr>
<td>Satellites</td>
<td>COMS 1 and 2</td>
<td></td>
</tr>
<tr>
<td>Status (August 2007)</td>
<td>Being designed – To be utilised in the period 2009 ~ 2021</td>
<td></td>
</tr>
<tr>
<td>Mission</td>
<td>Ocean color and aerosol monitoring of seas around the Korean peninsula</td>
<td></td>
</tr>
<tr>
<td>Instrument type</td>
<td>8-channel VIS/NIR radiometer</td>
<td></td>
</tr>
<tr>
<td>Scanning technique</td>
<td>Snapshots of 2 mega pixel slot</td>
<td></td>
</tr>
<tr>
<td>Coverage/cycle</td>
<td>Area of 2500 km x 2500 km, hourly in daylight</td>
<td></td>
</tr>
<tr>
<td>Resolution (s.s.p.)</td>
<td>500 m IFOV</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Central Wavelength</th>
<th>Band Width</th>
<th>Radiometric Accuracy (SNR @ Specified input radiances)</th>
</tr>
</thead>
<tbody>
<tr>
<td>412 nm</td>
<td>20 nm</td>
<td>1000 @ 0.100 W m(^2) sr(^{-1}) (\mu)(^{-1})</td>
</tr>
<tr>
<td>443 nm</td>
<td>20 nm</td>
<td>1090 @ 0.086 W m(^2) sr(^{-1}) (\mu)(^{-1})</td>
</tr>
<tr>
<td>490 nm</td>
<td>20 nm</td>
<td>1170 @ 0.067 W m(^2) sr(^{-1}) (\mu)(^{-1})</td>
</tr>
<tr>
<td>555 nm</td>
<td>20 nm</td>
<td>1070 @ 0.056 W m(^2) sr(^{-1}) (\mu)(^{-1})</td>
</tr>
<tr>
<td>660 nm</td>
<td>20 nm</td>
<td>1010 @ 0.032 W m(^2) sr(^{-1}) (\mu)(^{-1})</td>
</tr>
<tr>
<td>680 nm</td>
<td>10 nm</td>
<td>870 @ 0.031 W m(^2) sr(^{-1}) (\mu)(^{-1})</td>
</tr>
<tr>
<td>745 nm</td>
<td>20 nm</td>
<td>860 @ 0.020 W m(^2) sr(^{-1}) (\mu)(^{-1})</td>
</tr>
<tr>
<td>865 nm</td>
<td>40 nm</td>
<td>750 @ 0.016 W m(^2) sr(^{-1}) (\mu)(^{-1})</td>
</tr>
</tbody>
</table>