RADIOMETRIC CALIBRATION AND VALIDATION PLAN OF GEOSTATIONARY OCEAN COLOR IMAGER (GOCI)

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1. ABSTRACT

Geostationary Ocean Color Imager (GOCI) is the first ocean observation imager in geostationary orbit, and it is one of the three main payloads in Communication, Ocean and Meteorological Satellite (COMS) which is scheduled to be launched in 2009. In 2003, by the request of Korea Ocean Research & Development Institute (KORDI), Republic of Korea determined to develop the GOCI. Ministry of Land, Transport and Maritime Affairs (MLTM) sponsored the GOCI which was co-developed by Korea Aerospace Research Institute (KARI) and EADS Astrium. Korea Ocean Satellite Center (KOSC) in KORDI is the main operation center of the GOCI, and has responsibility of the GOCI data processing and distribution.

In order to provide the monitoring capability in coastal zone where the biophysical phenomena varying on smaller space and shorter time scales demand a simultaneous increase in spatial and temporal resolution, the GOCI designed and developed with eight visible-to-near-infrared bands, a 500m×500m pixel resolution, and a coverage region of 2500km×2500km centered at 36˚N and 130˚E. Because the GOCI implemented a 2D staring-frame image capture system, the GOCI Image with full coverage consists of 16(4x4) slots. The GOCI planned to observe the full coverage region by every hour in daytime, and provide 8 images in daytime during single day. The life time of the GOCI mission is about 7.7 years.

Solar calibration is the in-orbit radiometric calibration method of the GOCI. QVD (Quasi Volume Diffuser) type Solar Diffuser and Diffuser Aging Monitoring Device (DAMD) are equipped in the GOCI as the on-board calibrators. Solar Diffuser and DAMD are identical except for the size. The GOCI on-ground calibration and characterization were performed by EADS Astrium and KARI. KORDI has selected “Thuillier 2004 spectrum”[1] as a reference solar irradiance model of the GOCI[2] and develop the enhanced solar irradiance model taken into account the solar irradiance variation due to Sun-Earth distance, solar rotation cycle, 11-year solar cycle, and etc. We present the GOCI in-orbit solar calibration and validation plan based on the on-ground calibration and characterization results

2. REFERENCES

[1] G. Thuillier, L. Floyd, T. N. Woods, R. Cebula, E. Hilsenrath, M. Herse, and D. Labs, “Solar Irradiance Reference Spectra”, Geophysical monograph, American Geophysical Union, Washington, D.C., USA, pp. 171–194, 2004.

[2] P. Shanmugam, and Y.H. Ahn, “Reference solar irradiance spectra and consequences of their disparities in remote sensing of the ocean colour”, Annales Geophysicae, European Geosciences Union, Toulouse, France, pp. 1235-1252, 2007.