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INTERPRETING LRIT FROM GK2A SATELLITE: COMMUNICATION FOR EVERYONE

Abstract

High/Low-Rate Information Transmission (HRIT/LRIT) is the Coordination Group for Meteorological Satellite (CGMS) standards agreed upon by satellite operators for the re-dissemination of digital data originating from geostationary satellites to users via direct broadcast. GEO-KOMPSAT-2A (GK2A) geostationary satellite, developed by Korea Aerospace Research Institute (KARI) and being operated by Korea Meteorological Administration (KMA) uses HRIT and LRIT to broadcast weather forecast data for users in East Asia. Compared to HRIT, LRIT is more cost beneficial due to its low spec. Thus, this paper focuses on the characteristics of GK2A LRIT and its potential applications.

LRIT mission specification of GK2A is based on ISO 7498 and CCSDS Advanced Orbit Systems (AOS) standard. LRIT consists of two parts: the Open Systems Interconnection (OSI) layers and the Synchronization Channel Coding Sublayer, which help with error-control, synchronization, and pseudo-randomizing. Starting from the data link layer, which is demodulated and frame synchronized, we used C++ as an interpreting system. Decrypting the data field of LRIT enables us to get additional files (ADD) and full disk files (FD). In case of additional files like regional wave analysis, no further treatment is required since only a single image is received. On the other hand, full disk files can be further analyzed using LRIT Header, where several parameters for additional information such as temperature and Geographic Coordinate System (GCS) are located. According to temperature index correspondence and mathematical computing, brightness temperature and GCS of each pixel are obtained. C++ and MATLAB are used to interpret and visualize that information.

GK2A's LRIT data, consisting of weather forecasts such as wave height map and temperature map, is mainly focused for the ships in the distant sea. Beyond this original purpose, we confirmed LRIT can be applied in broader ways: monitoring air pollution, global warming, wildfire and more. By checking that interpreting the LRIT data can be done easily by C++ programming, we suggest its possibility to be used

in a region with poor internet access. This means LRIT benefits whoever needs the weather information considering the simplicity and economical characteristics of the interpreting progress.