CGMS-34 KMA-WP-08

Prepared by KMA
Agenda Item: II/6
Discussed in WGII

STATUS ON THE COMMUNICATION, OCEAN AND METEOROLOGICAL SATELLITE (COMS) METEOROLOGICAL DATA PROCESSING SYSTEM (CMDPS)

This paper reports on the status of the COMS Meteorological Data Processing System (CMDPS), which is developing in KMA to support the COMS operational meteorological application. CMDPS is designed to extract 16 baseline products operationally.

Status on the COMS Meteorological Data Processing System

The purpose of this document is to report the status on the Communication, Ocean and Meteorological Satellite (COMS) Meteorological Data Processing System (CMDPS).

1 INTRODUCTION on CMDPS

COMS to be launched in year 2008 will be the first Korean multi-purpose geostationary satellite. The development of systems for the meteorological mission sponsored by the Korea Meteorological Administration (KMA) consists of payloads, ground system, and data processing system. The program called COMS Meteorological Data Processing System (CMDPS) has been initiated for the development of data processing system to support the COMS operational meteorological application. The major function of CMDPS is the derivation of the baseline meteorological parameters from the calibrated and geo-located level 1B data. The planned baseline products consist of 16 parameters such as the analysis of special weather phenomena such as the yellow sand event in addition to the standard derived products from the current geostationary data. Additional function of CMDPS includes the development of calibration monitoring, upgrade, and validation mechanism of the baseline products.

CMDPS will be integrated into the operational data processing system, which will be used for the operational processing of the raw data, product generation, dissemination, archiving, and so on in real time. Currently, the prototype SW prepared in early 2006 is under process of standardizing the prototype SW and integration of standardized program. Integration of CMDPS to the operation system will be made early 2008 followed by the interface development in year 2007.

2 CMDPS baseline products

The current baseline products consist of 16 products, which can be categorized into scene analysis, surface information, cloud information, water vapour information, environmental information, and atmospheric motion vectors. The overall flow chart for the 16 baseline products is shown in Figure 1. The flow of the chains is arranged with consideration of many factors such as input data, its outputs, interfaces among algorithms, priority of the sequence, time requirement, and stability of operation. However, it should be noted that the order could be modified with final adjustment and priority of products.

The very beginning of the production chain is the scene analysis, which has main purpose of cloud screening, snow/sea ice detection, and possibly land use information. As the information such as land use is not derived from COMS, although it plays an important role in CMDPS, we are going to prepare this information through an off line process through various lines such as from other satellites, in situ measurement, and so on. The results from the scene analysis play key role in the determination of product type, whether it is a cloudy or clear sky product, and all the necessary basic information for the consequent products. Also, accuracy of the scene analysis affects on the accuracy of all of the products and quality information of the scene analysis will be provided.

The cloudy products include parameters such as cloud information including cloud phase, cloud top pressure and temperature, cloud amount, cloud motion vector, cloud type including ISCCP (International Satellite Cloud Classification Project) type classification and fog, rain rate. The clear products are such as the surface temperatures of sea and land, water

vapour information. The aerosol products, detection and optical depth, will be derived from the cloudy pixel although it is categorized as the environmental products.

Most algorithms of the baseline products are recycled from the currently available algorithms either from operational or research/development community. However, algorithms for cloud optical depth and cloud phase are newly developed by adjusting MODIS algorithms for COMS. Algorithms for such as aerosol detection and optical depth, etc. have been newly developed.

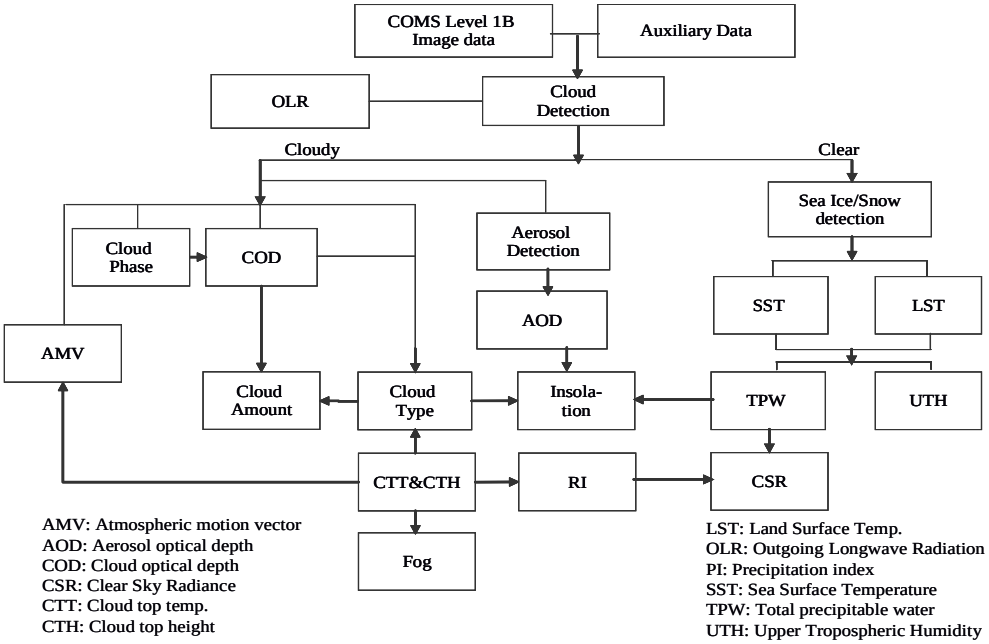

Figure 1. Flow chart of CMDPS.

3 Current Status of CMDPS

The overall flow diagram of milestones of the CMDPS development is shown in Figure 2. The conceptual design for the overall development strategy and plan including algorithm design for the products was prepared in the first project year, 2003. The conceptual design is based on the algorithm development strategy, annual progress strategy, implementation in the operational system, and preparation for the operation. The prototype S/W module for each product is developed at the end of 3rd project year (April 2006). Currently the prototype S/W module standardization is underway. Each prototype S/W module has been analyzed and coded with standard Fortran90 based on the framework of "European Standards for Writing and Documenting Exchangeable 90 Code." Standardized module will be integrated into production chain as shown in Figure 1. CMDPS will be integrated to the ground operation systems and overall test will be performed in the 5th project year followed by the preparation of the operation in the last year.

With the progress of the prototype S/W development, the character of each baseline products becomes clear. Through the in-depth review process between the end user and developer, the algorithm and expected accuracy of each baseline product have been investigated. At the end of this process, baseline products are going to be re-characterized and possibly re-defined. For example, snow and sea ice detection is considered to be experimental

products. The automatic process and consequent accuracy of the snow/ice information derived by the five channel data of the meteorological payload are in question.

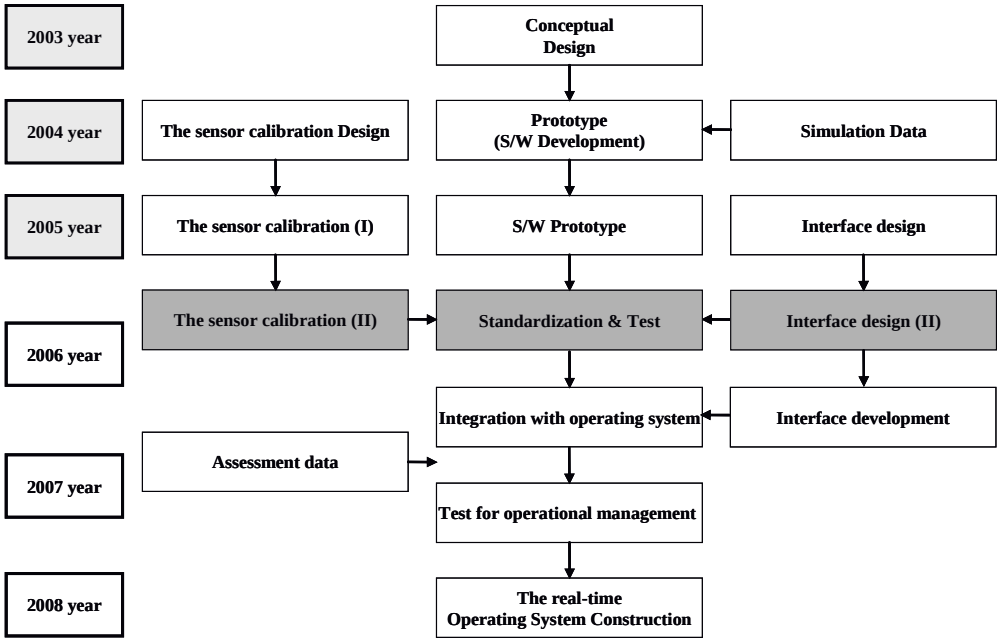

Figure 2. Milestones for CMDPS development.

4 CONCLUSION

The CMDPS has been successfully developed in phase with the initial conceptual design. Once it is fully developed and integrated into the operational system, it will produce the defined baseline products, which will be used for various application areas. The important characteristics of CMDPS are to have a stable, fast, accurate operational system. The calibration algorithm will ensure the high quality of raw observation data by monitoring, validating, and updating the calibration characteristics. Finally, for a better use of derived products, a validation strategy for the baseline products will be established in near future.