Community Satellite Processing Package (CSPP) for NPP/JPSS Direct Broadcast Processing and Applications

H.-L. A. Huang, L. Gumley, and K. Strabala

University of Wisconsin-Madison (UW-Madison), Cooperative Institute for Meteorological Satellite Studies (CIMSS), Space Science and Engineering Center (SSEC), Madison, United States (allenh@ssec.wisc.edu)

The NPP satellite, launched October 28 2011, is the precursor to the operational Joint Polar–orbiting Satellite Series (JPSS). The Raw Data Records (RDRs) of three sensors on board NPP, the Advanced Technology Microwave Sounder (ATMS), the Cross-track Infrared Sounder (CrIS), and the Visible Infrared Imaging Radiometer Suite (VIIRS) are to be downlinked to the users using X-band frequency. After receiving RDR a direct broadcast (DB) version of NPP/JPSS Interface Data Processing Segment (IDPS) processing software can then be used to produce sensor data records (SDRs) and environmental data records (EDRs).

Cooperative Institute for Meteorological Satellite Studies (CIMSS) of the Space Science and Engineering Center (SSEC) has supported the global DB community since 1985 via the International TOVS and ATOVS Processing Packages (ITPP, IAPP) for NOAA POES and since 2000 via the International MODIS/AIRS Processing Package (IMAPP) for NASA Terra and Aqua. In cooperation with the NASA/NOAA NPP/JPSS program, CIMSS/SSEC continues to facilitate the use of polar orbiter satellite data through the initial development of a newly conceived Community Satellite Processing Package (CSPP) that will support the NPP/JPSS, and subsequently build up over time, to support GOES-R and other international polar orbiting and geostationary meteorological and environmental satellites for the global Real Time Regional (RTR) user community.

CSPP will emulate the successful Community Radiative Transfer Model (CRTM) software model conceived by NOAA to develop a cross cutting processing software system that can support global RTR users in both polar orbiting and geostationary satellite data processing and applications. CSPP would be supported by JPSS and GOES-R and expanded to include all satellite data from international meteorological and environmental satellite agencies that provide real time direct broadcast data down link to all users who are capable of receiving such data stream through either X-band or L-band receiving systems.

This paper highlights more than 10 years of success of IMAPP as a pathway to the development of a freely available software package to transform VIIRS, CrIS, and ATMS (Raw Data Records) RDRs (i.e. Level 0) to Sensor Data Records (SDRs) (i.e. Level 1), and SDRs to Environmental Data Records (EDRs) (i.e. Level 2) in support of NPP and subsequently the JPSS missions under the CSPP framework. In addition, this paper outlines ways in leveraging the JPSS Algorithm Development Library (ADL) effort to develop a processing software package suitable for global users in real time product generation and for their unique regional applications.

This paper will conclude with the real-time processing and applications goal of leveraging successful IMAPP applications such as air quality, short-term regional forecast, and global AVHRR cloud property climatology application and other emerging environmental applications using satellite imaging and sounding infrared and visible observations.