



CGMS-34, NOAA-WP-36  
Prepared by M. Goldberg  
Agenda Item: II/7  
Discussed in WG2

**DRAFT TERMS OF REFERENCE FOR A NEW WORKING GROUP ON DATA  
HANDLING FOR DIRECT BROADCAST AND RELEVANT FORMATS**  
In response to CGMS Action 33.20

NOAA Response to CGMA XXXIII Action 33.20

## **Draft terms of Reference for a New Working Group on Data Handling for Direct Broadcast and Relevant Formats**

### **1 Introduction**

**CGMS Action 33.20 EUM, CMA, NOAA and WMO to establish a task force to draft terms of reference for a potential new working group on data handling for direct data broadcast and pertinent formats (e.g. BUFR) that could be considered at the next meeting of CGMS.**

### **2 NOAA Response to CGMA XXXIII Action 33.20**

In U.S., NOAA encourages the development of the task force to coordinate the data handling, file format, and other services for the direct broadcast users. NOAA NESDIS cooperative Institute for Meteorological Satellite Studies (CIMSS), located in University of Wisconsin-Madison, has long a history in developing and maintaining direct broadcast processing packages for NOAA and NASA EOS polar orbiting satellite data receiving and processing since 1983 (Huang, et al., 2004, Li et al., 2000; Wolf et al., 1999, Smith et al., 1993, ). CIMSS is willing to participate in the new working group to provide its direct broadcast experience and expertise in facilitating the data processing (level 0 to level 1), product generation (level 1 to level 2) and the optimal use and application of the products.

The polar orbiting satellites provide a wealth of information on ocean, atmosphere, and land processes that are of global environmental importance. A critical component of the data distribution system for current NOAA and NASA EOS satellites is the direct broadcast service on the spacecraft. The International MODIS/AIRS Processing Package (IMAPP) and ITOVS Processing Package (ITPP) provide researchers, governmental, educational, and commercial sector users with the capability of receiving and processing raw data in real-time (i.e., as observations are acquired) and creating environmental products which provide immediate information in areas as diverse as severe weather monitoring, forest fire detection, fisheries management, weather forecasting, aviation safety, and ice forecasts, to name a few.

The distribution of these packages to the direct broadcast user community means that the production software must be easy to install, use, and maintain. With this in mind, the software was developed with these requirements:

1. Package must be portable to a wide range of UNIX/PC platforms.
2. The number of required toolkits must be kept to a minimum.
3. Ancillary data sets must be easily accessible.
4. Software must be able to process overpasses of any size.
5. Downlinked spacecraft ephemeris and attitude data may be used for real-time geolocation.
6. Distributed products must be similar to those produced at the NOAA and NASA processing centers.

7. Input, output, and ancillary data file formats must be standardized and well specified. Where possible the internal and external file conversion routines must be provided.
8. The code must be efficient.
9. Documentation of the distributed package must be provided.
10. Training courses/workshop concerning the measurements characteristics, geolocation and calibration principal and accuracy, product algorithms and performance, and data/products applications should also be provided.
11. Public web sites for anonymous download of the packages
12. Understanding the needs, requirements, and limitation of users and be able to accommodate changes in the design and development of the packages.

Current CIMSS developed and distributed direct broadcast package web sites are:

- <http://cimss.ssec.wisc.edu/~gumley/IMAPP/IMAPP.html>
- <http://cimss.ssec.wisc.edu/opsats/polar/iapp/IAPP.html>

CIMSS hosted and planned direct broadcast package training workshops:

- June 2004 - Nanjing Institute of Meteorology, Nanjing, China
- January 2005 - National Central University, Chung-Li, Taiwan
- May 2005 - Beijing University, Beijing, China
- February 2006 - Andoya Rocket Range, Andenes, Norway
- April 2006 - South African National Biodiversity Institute, Pretoria, South Africa
- February-March 2007: Thiruvananthapuram, India

Note that the current file formats for NOAA/NASA polar orbiting processing packages are:

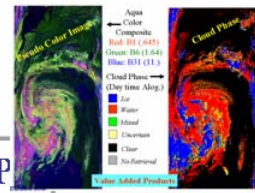
- AAPP – Sequential binary and BUFR
- ITPP – Sequential binary
- IAPP – NetCDF (level 2)
- IMAPP – HDF 4
- NPP/NPOESS PP – HDF 5



**CIMSS DB Station**

**CIMSS of STAR/NOAA Serving the Direct Broadcast Users World Wide**

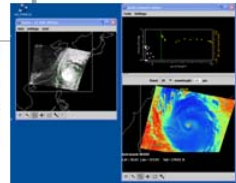
	<b>ITPP</b>	<b>IAPP</b>	<b>IMAPP</b>
<b>Sensor /Data Type</b>	HIRS/2 MSU AVHRR	HIRS/2 AMSU AVHRR	MODIS AIRS AMSU AMSR-E
<b>Example Products</b>	T/Q Sounding Cloud Height SST	T/Q Sounding Cloud Height SST	T/Q Sounding Cloud Mask Cloud Phase Cloud Height SST Others
<b>S/C</b>	TIROS-N to NOAA 14	NOAA 15-17	EOS Terra & Aqua
<b>Operation Period</b>	1983 – Current	1998 – Current	2001 – Current



**CIMSS DB Cloud Phase**



**CIMSS DB Serving N.A.**



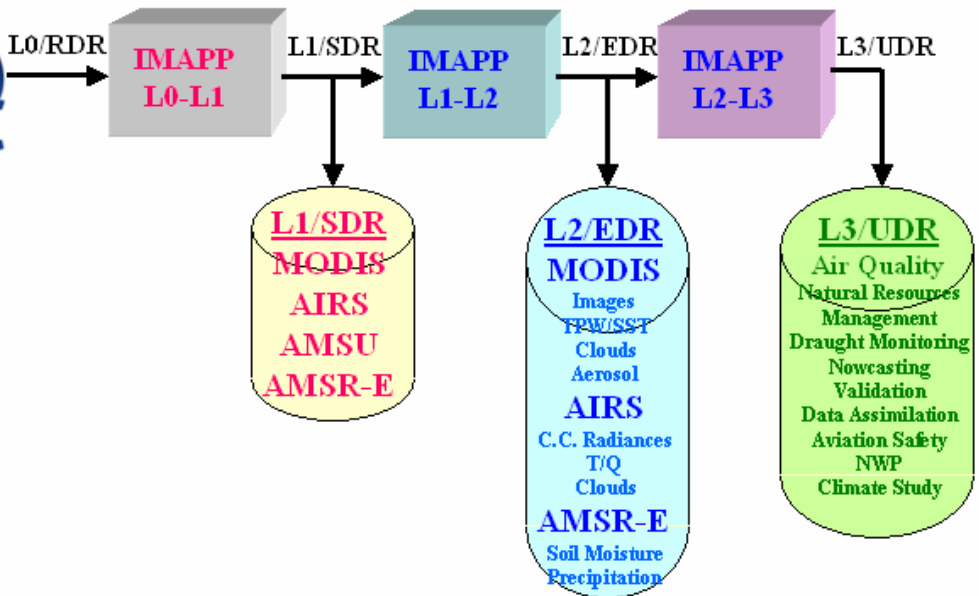
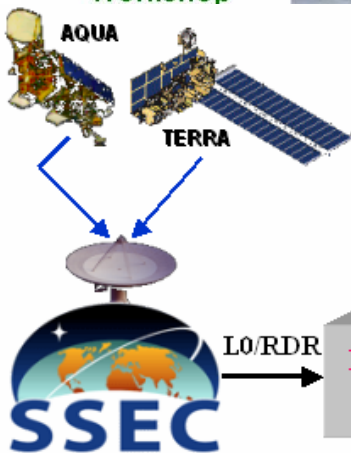
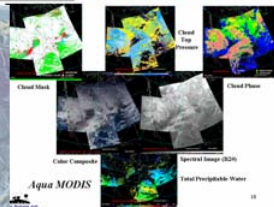
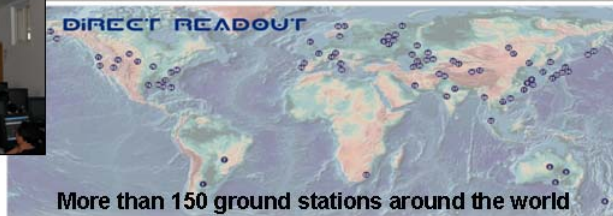
**CIMSS DB Vis. Tool**

<b>Operation Period</b>	1983 – Current	1998 – Current	2001 – Current
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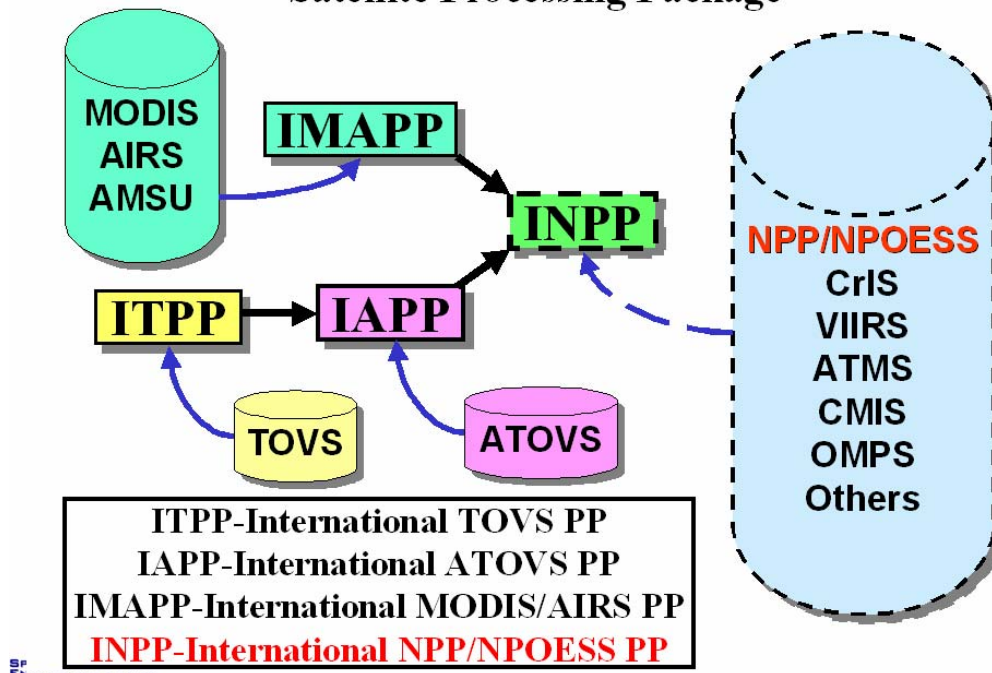
**CIMSS DB Products**



**DB Workshop**



## Past, Current and Future International Polar Orbiting Satellite Processing Package



### REFERENCES:

- Huang, H.-L., L. E. Gumley, K. Strabala, J. Li, E. Weisz, T. Rink, K. C. Baggett, J. E. Davies, W. L. Smith, and J. C. Dodge, 2004: International MODIS and AIRS Processing Package (IMAPP) – A Direct Broadcast Software Package for the NASA Earth Observing System. *Bulletin of the American Meteorological Society*, Vol. 85, Number 2, 159-161.
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- WOLF, W., P. VAN DELST, P., LI, J., ZHANG, W., ACHTOR, T. H, WOOLF, H. M., HUANG, H.-L., and MENZEL, W. P., 1999, The International ATOVS Processing Package (IAPP): The Next Generation ITPP. *Proceedings of the 10th International TOVS Study Conference*, Boulder, CO, 27 January – 2 February 1999.
- SMITH, W. L., WOOLF, H. M., NIEMAN, S. J., HUANG, H.-L., SCHREINER, A. J., and ACHTOR, T. H., 1993, ITPP-5 The use of AVHRR and TIGR in TOVS data processing. *Proceedings of the 7th International TOVS Study Conference*, Igls, Austria Feb. 1993.