GOES-R AWG Winds Group Monthly Progress Report – CIMSS (March 2007)

Overall Project Plan

We plan to use locally-available hardware resources initially for software testing, with a phased transition to a collaborative testbed environment as it comes online. The proxy data will leverage off of existing imagery from GOES and MSG/SEVERI. We will also employ ABI simulated imagery for select case studies. The algorithm development, testing and validation will focus on heritage algorithms currently being used in NESDIS operations today to generate AMVs from satellite imagery. We will leverage and adapt current algorithms/software to expected ABI characteristics, focusing first on ABI heritage channels (VIS, IR-W, WV) for AMV testing. We will then turn our attention to the new spectral capabilities afforded by the ABI for AMV derivation. All software development will follow accepted AWG standards, and will be accompanied by documentation.

Proposed General Activities

- Continue Algorithm Development and Adoption Phase
- Conduct Algorithm Testing
- Document adopted code to AIT specifications (including alg. flowcharts)
- Distribute Software Demonstration

Goals for the this Reporting Period (March 2007):

1) Work will begin on flow charting the AWV software and providing this information to the Algorithm Integration Team (AIT).
2) Work will begin on identifying core scientific AMV software (that is not expected to change dramatically, if at all) so that efforts can begin on cleaning up this software per AWG software development standards.
3) CIMSS will continue work to generate and validate AMVs from simulated ABI imagery (proxy datasets).
4) CIMSS will continue modification of their C-Version of the AMV software to input GEOCAT Level 1 (radiances) files into it. Bringing in GEOCAT height info into the C-version will also allow a comparison of GEOCAT cloud heights to cloud heights computed via the current AMV tracer height algorithms.

Monthly Work Description and Accomplishments for March 2007

1)
This month, the highest priority was given to the preparation of the Flowchart Package for the AMV software following the AWG Integration Team requirements. Top level flowcharts, table of programs and subroutines, subroutines/function calling trees, tables of input and output files and directory listings have been prepared for all AMV software

modules – targeting and height assignment, tracking, and nine quality control modules. Detailed flowcharts have been prepared for a couple of modules: those that are not expected to change dramatically. The rest will be prepared after another team meeting aiming to clarify the amount of details to be included in the detailed flowcharts, and confirming the consistency among the top level charts.

2)
To efficiently proceed further with the detailed flowcharts for the targeting and height assignment, the team had a series of discussions to determine whether to keep 'as is' the internal Windco height assignment routines, or to take advantage of the pixel level cloud height product from GEOCAT. A case study inter-comparing the two height products was conducted using GEOCAT's CO2 slicing heights (defaulting to IR for T>270 K and P>650hPa) and AMV's CO2 heights (limited to T<255K and P<600hPa) for one full disk GOES 12 image. The general conclusion was that the transition from 'pixel height – AMV target height' is not straightforward, and a number of action steps were suggested to better understand the process before dedicating significant workforce efforts altering the targeting and height assignment module of the AMV software (i.e. selecting the target pixels for HA using the GEOCAT L1 radiances, pair only CO2 to CO2 heights and exclude the IR heights, investigate the amount of AMVs with non-CO2 heights and their spatial coverage, including CALIPSO data, etc.). Another case will be attempted.

3)
A calibration module suited for the simulated ABI TOA radiances (for all IR bands only at this time) was developed at CIMSS and was incorporated into the McIDAS system. It allows us to visualize simulated AREA files, and later on to overlay them with extracted AMV fields. Work on including the calibration coefficients for ABI into the wind retrieval algorithm had just started. Further simulated ABI data winds derivation will benefit significantly by this effort, because it will allow the usage of the non-heritage spectral channels imagery data from CIMSS and CIRA. Thus, exploration of proxy data at this point is on hold, giving priority to developing the tools to convert binary simulated data to formats appropriate for the wind algorithm.

4)
The targeting part of the AMV software was redesigned significantly to accommodate the use of GEOCAT L1 navigated and calibrated radiances as an input data source. It was found that 'carrying along' the arrays of latitude and longitude will add some extra time to the processing. However, this change is eliminating the use of McIDAS native format input, which will be taken care of in GEOCAT. Is this slow down acceptable?

Other)
The production of proxy data sets at CIMSS is progressing smoothly. For the Ocean Case, described in the Winds Team ADR presentation, one hour of 5-minute IR hyper-spectral imagery and the corresponding TOA ABI spectral band convoluted radiances were produced. They are in binary format and will have to be converted to McIDAS AREA files to extract AMV with the existing wind code.