DISSEMINATION AND USE OF NPOESS DATA IN AWIPS II

Gary Jedlovec* and Jason Burks†
*NASA/MSFC, Huntsville, AL
†NOAA/NWS, Huntsville, AL

1. USE OF POLOR ORBITING DATA AT WFOs

Real-time satellite data is one of the many data sources used by NWS forecast offices to diagnose current weather conditions and to assist in the preparation of regional and local short-term weather forecasts

- **GOES data provides relatively course spatial information at rapid repeat cycles (10-15 minutes), in a few spectral channels**
- **NASA polar orbiting satellite sensors such as MODIS, AMSR-E and AIRS provide snap shots of weather conditions at high spatial resolution or in unique / high spectral resolution channels**
  - **diagnostic studies - imaging and sounding products not available form geostationary orbit**
  - **forecasts improvement – assimilation of unique data sets and radiance / sounding products**
- **Launch of the NPOESS preparatory Project (NPP) satellite in 2009 will extend the continuity of high resolution data provided by the NASA instruments into future operational weather systems**
- **The NPP data will be available in a timeframe consistent with the installation of the next generation Advanced Weather Information Processing Systems (AWIPS II)**

NASA's Short-term prediction Research and Transition (SPoRT) project at Marshall Space Flight Center has pioneered the transition of real-time polar-orbiting data to selected WFOs to address regional and local forecast problems. SPoRT staff works directly with Southern Region WFOs to

- **identify their key forecast problems**
- **link NASA data / capabilities to problem**
- **develop, test, and implement solutions**
- **transition new capabilities to the WFOs via AWIPS**

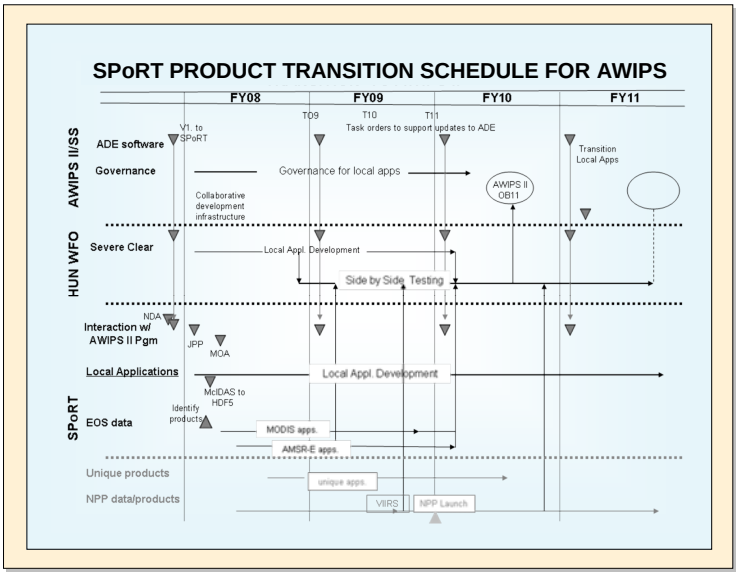
Real-time MODIS, AMSR-E and AIRS data and associated products are acquired from several direct broadcast ground stations and reformatted, and disseminated to WFOs via Local Data Manager software for use directly in AWIPS. Additional products derived using EOS science team and other algorithms are also made available in near real-time. Additional products from the Weather Research and Forecast (WRF) model (enhanced with assimilations of unique polar orbiting MODIS SSTs, AIRS radiances and profiles, and linked to the GSFC Land Information Systems (LIS)) provide supplemental guidance for WFO staff.

Local WFOs use these unique AWIPS products to:

- **obtain a better understanding of current weather conditions**
- **assist in the preparation of short term weather forecasts**
- **evaluating the utility of new products which will eventually be mainstreamed into AWIPS**

2. NPOESS PRODUCTS FOR WFOs

Based upon SPoRT's interaction with NWS forecasters, selected NPOESS instrument environmental data records (EDRs) have been identified as having utility to help forecasters understand the near term environmental conditions in the atmosphere, on the land, and in the ocean or to aid in addressing short-term weather forecast problems. These EDRs are listed in the adjacent table.



NPOESS PRODUCTS WITH POTENTIAL WFO APPLICATIONS

	END USER	APPLICATION	PRIORITY	COMMENT
IMAGERY				
visible, 6.7µm, 11 µm	WFO, RFC	nowcasting, diagnostic analysis		<0.5km, higher resolution supplements geostationary data
multi-channel composites	WFO, RFC	nowcasting, diagnostic analysis	HIGH	~1.0km identify atmospheric and surface features not easily seen in a single
SOUNDING				
temperature(p) moisture(p)	WFO	supplement radiosondes in	MODERATE	~10km horizontal resol., monitor changes in stability
layered precipitable water	WFO	supplement radiosondes in	MODERATE	~10km horizontal resol., monitor changes in moisture leading to clouds
CLOUD PRODUCTS				
cloud base (P, T, z)	WFO	forecast preparation,	MODERATE	~1km resol., aids in understanding storm dynamics and sfc visibility
cloud top (P, T, z)	WFO	forecast preparation,	MODERATE	~1km resol., aids in understanding storm dynamics, adjustments to T based
cloud cover - layers	WFO	forecast preparation,	MODERATE	~1km resol., cloud amount, phase, in various layers of the atmosphere
icing levels	WFO	aviation forecasts	HIGH	~1km resol., significant aid in aviation forecast preparation
IMAGE PRODUCTS				
night time fog product	WFO	aviation, public forecasts,	HIGH	<1km resol., identify regions of developing / existing fog
total precipitable water (TPW)	WFO	monitor variations in moisture for storm	MODERATE	~1km resol. useful, good cloud detection / filtering is necessary
aerosols - type, AOT	WFO	air quality forecasts, local visibility	LOW	type and optical depth can help with local visibility and air quality forecasts,
precipitation rate and type	WFO	local and short term hazard forecasts	MODERATE (coastal	stratiform, convective, snow, or rain - particularly useful over oceans or where
sea surface winds	WFO	marine forecasts	VERY HIGH (not	from coast to 60nm, ~10km spacing
wave height	WFO	marine forecasts	VERY HIGH (not	3ft increments, from coast to 60nm, 10km spacing
sea surface temperature	WFO	marine and public forecasts,	MODERATE (coastal	resolutions down to 1km, from coast to 60nm, 10km spacing continuous spatial
suspend solids	WFO	marine forecast	MODERATE (coastal	marine hazards and applications to fisheries
chlorophyll	WFO	marine forecast	MODERATE (coastal	marine hazards and applications to fisheries
soil moisture	RFC, WFO	local and regional forecast, greatest	HIGH (not	at highest resolution possible, affects local storm development and
surface vegetation type	RFC	impact in local models	LOW	
snow product - cover / depth	RFC, WFO	max/min temperature	HIGH (seasonal)	< 1km, discriminates between clouds and snow on ground, snow coverage
land surface temperature	RFC, WFO	max/min (frost) forecasts, local	MODERATE (seasonal)	~ 1km, resolution, at times surrogate for surface temperature

WFO - Weather Forecast Office
RFC - River Forecast Center

Note: shaded products are most likely to have significant impact in WFOs, have MODIS predecessors, and probably can be easily generated in near real time from VIIRS / CRiS

3. NPP PRODUCTS IN AWIPS II

The NPP data will be available in a timeframe consistent with the installation of the next generation NWS information system (AWIPS II) currently under development by Raytheon.

SPoRT has partnered with the NWS, the AWIPS II program office, and NWS local applications development teams to develop and transition the capabilities to access and display SPoRT data in the AWIPS II environment. The schedule for the development work is presented in the diagram above.

The AWIPS II system will be a Java-based decision support system which preserves the functionality of the existing system and offers unique development opportunities for new data sources, applications, and display capabilities in a Service Orientated Architecture (SOA) environment. SPoRT currently has access to the AWIPS II Development Environment (ADE) software to begin prototype development of tools to display MODIS, AMSR-E, and AIRS data and other SPoRT products in the future system. SPoRT will be developing plug-ins for NASA and NPP datasets, and local applications for the display of data which is currently not well handled by the existing system (e.g., 3D displays, 3-channel color composites, etc.).