Quarterly Highlights

The SPoRT Roadshow

On August 22nd through the 26th, SPoRT members Kevin Fuell, Geoffrey Stano and Kris White traveled to the Jackson (Mississippi), Slidell, and Mobile National Weather Service offices to meet with staff and discuss how SPoRT capabilities can help local operational needs. These offices had recently requested (through Southern Region SSD) to acquire NASA/NOAA research data and participate in SPoRT product evaluations. In addition to sampling some of the great food for which the region is known, the SPoRT team presented an overview of the NASA SPoRT program, as well as specific products and imagery that match known forecast challenges. The first visit was to the Jackson, Mississippi NWS office (JAN) where there was a large turnout by the office staff and management. There was high interest in the NASA 3-km Land Information System (LIS) fields for local modeling efforts as well as high-resolution hybrid imagery for analysis of convective clouds and fog. The 250-meter resolution MODIS visible difference imagery was also of interest for aiding the post-event analysis and survey of tornado tracks. Greg Garrett, Science and Operations Officer, indicated that they have many rural areas in the forecast area that are difficult to get to, and this type of imagery could be very helpful with the storm survey process. In addition, they receive requests from the local and state emergency management offices for this type of tornado track map.

Next, the team made a two-day visit to the NWS New Orleans/Baton Rouge (LIX) office and Lower Mississippi River Forecast Center (LMRFC) in Slidell, Louisiana, speaking with forecasters, hydrologists, and modelers. At LIX, the SPoRT team learned about the difficulty with the early detection of advection fog off the northern

LMRFC senior hydrologist speaks with Kevin Fuell (left) and Geoffrey Stano (right).
Gulf of Mexico, particularly during the winter season. LIX has already found value in the single swath MODIS low cloud and fog (10-3.9 µm) product, therefore, the MODIS-GOES hybrid product was supported. MODIS RGB imagery to address fog and low clouds was also presented as a future GOES-R capability. Additionally, LIX highlighted the importance of determining the potential for fog development in the region. Mike Koziara (SOO) at LIX discussed the forecast challenge where the marine boundary layer (MBL) influences the stability over land near the coast and inhibits convection. This MBL influence is often not captured well by models or national watch areas. A potential collaboration with LIX and SPoRT could involve the use of SPoRT SST and LIS as initialization to the surface boundary of a local model in order to examine their influence on convection. More important may be the sensitivity of the planetary boundary layer (PBL) scheme used within the model with these SPoRT data sets. Tim Erickson at LIX has interest in looking at tornado paths and for help with post-storm watch areas. A potential collaboration with SPoRT on GOES-R would provide valuable information to the team describing new capabilities, such as the Land Information System resulted in a significant improvement to the forecast product suite and the MODIS-RGB imagery to depict air mass, dust, fire smoke, and true color. These products have been transitioned to NAWIPS for use at the Hydrometeorologic Prediction Center (HPC), the Ocean Prediction Center (OPC), the NESDIS Satellite Analysis Branch (SAB), and the National Hurricane Center (NHC). Additional information on these and other products can be found in the new GOES-R RG section on the SPoRT web page (http://weather.msfc.nasa.gov/sport/gorspgp/).

To foster ongoing collaboration and to ensure that forecasters are aware of new capabilities, the SPoRT team would like to thank personnel at these offices who took time out of their very busy schedules to meet and interact with us. Through this process, much was learned, both from the operational forecaster perspective and from the SPoRT perspective. We are looking forward to more such opportunities in the near future.

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The SPoRT Quarterly Report

July–September 2011

SPoRT hosts the 2011 Partners Virtual Workshop

On August 31, 2011 SPoRT hosted the Second Collaborative Partners Workshop. Unlike the first one in 2010, SPoRT adopted a web seminar format creating a virtual workshop forum. The virtual format allowed for far more attendance from forecasters who otherwise would not have been able to make the trip to Huntsville. The workshop brought together SPoRT’s collaborative National Weather Service partners as well as hosting attendees from other offices and regions to learn more about SPoRT and its collaborations with the National Weather Service. The format was a success with a dozen presentations and over 30 separate groups dialing in to participate during the day.

Starting with a welcome from SPoRT and introductions by the National Weather Service’s Eastern and Southern Region Headquarters, the workshop covered a wide range of topics. These were split across three main headings along with hosting attendees from other offices and regions to learn more about SPoRT and its collaborations with the National Weather Service. The format was a success with a dozen presentations and over 30 separate groups dialing in to participate during the day.

The day-long workshop concluded by identifying four key actions. First, our partner offices have expressed interest in receiving more of our GOES-R Proving Ground products for evaluation. Secondly, our partners involved in modeling activities are interested in SPoRT providing support for implementing the MET Tools verification package. Unlike normal grid-based verification schemes, MET Tools verifies model output against model objects. Also, the aforementioned Land Information System resulted in a significant improvement to the forecast product suite and the MODIS-RGB imagery to depict air mass, dust, fire smoke, and true color. These products have been transitioned to NAWIPS for use at the Hydrometeorologic Prediction Center (HPC), the Ocean Prediction Center (OPC), the NESDIS Satellite Analysis Branch (SAB), and the National Hurricane Center (NHC). Additional information on these and other products can be found in the new GOES-R RG section on the SPoRT web page (http://weather.msfc.nasa.gov/sport/gorspgp/).

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In late August and through September, WFO Albuquerque used the MODIS-GOES Hybrid 3.9-µm imagery to monitor a hotspot from the Guacamalla Fire southwest of Los Alamos. In previous examples of small fires, the baseline GOES 3.9-µm imagery tended to overestimate the spatial coverage of the fire due to its relatively coarse resolution. However, in this case the 2-km SPoRT MODIS-GOES Hybrid 3.9-µm imagery (at GOES-R ABI resolution) showed the hotspot with much greater detail, delineating the size and location of the fire compared to the GOES 3.9-micron imagery. MODIS 1-km imagery showed even more detail of the hotspot location.

### Miami (MFL)

The Miami WFO is participating in the evaluation of the UAH Convective Initiation product in conjunction with MLB and HUN. Convective activity in Florida has a somewhat longer season than more northerly WFOs in Southern Region. Like MLB, the staff at MFL have submitted examples of where the CI product correctly provided advance warning of convection and resulting thunderstorms, up to 30 minutes. The number of missed convective events is qualitatively estimated to be about 40 percent. In many cases, high clouds from thunderstorm outflow or upper level cirrus identified as the culprit preventing the detection of cumulus clouds growing underneath.

### Huntsville (HUN)

In addition to the Miami and Melbourne FL WFOs, WFO Huntsville is also testing the UAH Convective Initiation product (part of the GOES-R AWG proxy products). On September 7th, a relatively unstable air mass was in the Tennessee Valley area. The HUN short-term forecaster was able to use the UAH CI product to monitor the potential for developing storms which were to lead to the threat of lightning for aviation impacts and for a couple of outdoor activities. In Jackson County, the CI algorithm allowed for about a 40 minute lead time on the occurrence of deep convection and lightning (as validated by subsequent radar). However, it was noted that the other areas in Jackson County were not detected by the CI algorithm. Evaluation of the product will continue and ramp up in Spring of 2012. Efforts also continue with the use of the 1-km NASA Land Information System (LIS) soil moisture fields to assess rainfall deficit impacts for input to the U.S. Drought Monitor. Also of particular interest, was the “drierness” noted in the 1-km LIS soil moisture fields during the passage of the remnants of tropical storm Lee in early September. Very dry antecedent soil moisture conditions (relative integrated soil moisture values around 20–40 percent), as depicted in the LIS, apparently played a large role in the lack of flooding experienced by the area, despite very abundant and widespread rainfall amounts. This, and other cases, will be examined in future studies to determine the applicability of the LIS data in assessing flooding potential.

### Updating and Transitioning Model Verification Scripts

SPoRT updated internal scripts that generate model verification statistics using the Model Evaluation Tools (MET) software developed by NCAR. The goal is to produce a streamlined scripts that can be transitioned to SPoRT partners interested in conducting evaluations of their local numerical weather prediction models. Forthcoming plans involve installing and testing the first version of these streamlined scripts at select WFOs as part of establishing a NWS Southern Region modeling collaboration with SPoRT.

### Recent Accomplishments

#### Data Assimilation

After completing development of a cycling script to mimic NCEP operations, the SPoRT data assimilation group has shifted focus to examining diagnostic output from the Gridpoint Statistical Interpolation (GSI) system for the handling of hyperspectral radiance measurements assimilated within the system. An examination of these diagnostic variables will clarify the processing used in the assimilation of individual observations and the implications for tracking which observations are rejected by data thinning, detection of cloud-contaminated radiances, and impact of surface emissivity on the use of radiances within GSI. Additionally, SPoRT developed three-dimensional moisture analysis product enhanced with the assimilation of AIRS profiles to monitor atmospheric rivers of moisture over the Pacific Ocean. This product is being developed as a way to aid in the forecasting of these moisture features in Western and Alaska Region NWS WFOs. Additionally, SPoRT continues its collaboration with Don Morton and his staff at the Arctic Region Supercomputing Center at the University of Alaska Fairbanks in the efforts to assimilate AIRS profile data into an operational version of the High-Resolution Rapid Refresh configured for an Alaska domain (HRRAK). These efforts have a path to being transitioned to SPoRT’s partnering offices in the Alaska region.

#### Technical Interchange Meeting

In August, three SPoRT personnel attended a Technical Interchange Meeting in Omaha, Nebraska, home of the Raytheon group responsible for writing the core software for AWIPS II. The TIM was a two-day discussion between the architects of AWIPS II and groups from NASA/SPoRT, NWS MMSS/UW, CIRA/CSIU, and NOAA/OST. Raytheon explained much of the software design from a high level, and answered many of the questions of the attendees. The group was given explanations of upcoming changes and historic perspectives of why the code was written as it is. Some of the most significant answers involved the challenges of early efforts and expected system changes. Some exciting future AWIPS II capabilities were discussed (such as 3D display) that are awaiting full NWS/WFO implementation and FAA approval.

### Proposal Accepted

NOAA/NESDIS has agreed to fund a proposal submitted by SPoRT to conduct a demonstration activity for the Visible Infrared Imager Radiometer Suite (VIIRS) data on NPP. On October 28, NASA launched a new member of its Earth-observing fleet called the NPOESS Preparatory Project (NPP) as a demonstration satellite for NOAA’s reformed National Polar-orbiting Operational Environmental System (JPSS, http://www.nesdis.noaa.gov/jpps/) program. In addition to extending the suite of long-term NASA measurements to measure variables critical to the understanding the Earth’s climate, the NPP observations extend NOAA’s operational weather forecasting support first begun with the polar orbiting TIROS series (http://servirmm5.osis.rice.edu/mcm/mcm_mm5_forecast.php). SPoRT will demonstrate the utility of multispectral observations from the VIIRS, one of several instruments on the NPP satellite, to improve short-term weather forecasting at various weather offices in the continental U.S. and Alaska. SPoRT scientists will work collaboratively with staff from the University of Alaska Fairbanks (UAF) and the Naval Research Lab (NRL) in Monterey, California over the next two years demonstrating new capabilities of VIIRS including a new low light sensor which can detect moonlight reflected from the Earth’s surface and clouds for night time weather monitoring.
Calendar of Events

- Missions Applications Workshop, Arlington, VA, Sept. 28–29
- NWA Annual Meeting, Birmingham, Oct. 17–20, numerous SPoRT presentations
- GOES Users Conference, Birmingham, Oct. 20–21, numerous SPoRT presentations
- NPP Launch, Oct. 27
- NOAA GPM User Workshop, Nov. 29–Dec. 1
- SPoRT Science Advisory Committee (SAC) Meeting, Huntsville, Nov. 29–Dec. 1
- AGU Fall Meeting, San Francisco, Dec. 5–9, several SPoRT presentations
- NWS Corporate Board AWIPS II Demonstration, Dec. 7–8, Silver Spring, MD.
- AMS Annual Meeting, Jan. 22–26, numerous SPoRT presentations
- NPP Science Team Meeting, Jan. 31–Feb. 2, GSFC, Greenbelt, MD.
- NPP Applied Science Workshop, Mar. 7–8, Ames Research Center
- LANCE Users Meeting, Feb. 6–8