

## **Operations Plan**

for the  
*GOES-R Proving Ground*  
portion of the  
*Hazardous Weather Testbed and  
2011 Fire Weather Experiment*

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# **1 Introduction**

## **1.1 Plan Purpose and Scope**

The activities at the National Oceanic and Atmospheric Administration's (NOAA's) Storm Prediction Center (SPC) and Hazardous Weather Testbed (HWT) in Norman, OK provides the GOES-R Program with a Proving Ground (PG) for demonstrating pre-operational data and algorithms associated with GOES-R. The main focus of the Experiment will be demonstrating the official GOES-R Baseline and Option-2 products; however, it will also include operational readiness trials of products transitioning from Risk Reduction. The availability of GOES-R products will demonstrate, pre-launch, a portion of the full observing capability of the GOES-R system, subject to the constraints of existing data sources to emulate the satellite sensors.

## **1.2 Overview**

The SPC as well as the HWT will receive early exposure to GOES-R PG products during the 2011 Fire Weather Experiment running from August through September. Pre-operational demonstrations of these GOES-R PG data will provide National Weather Service (NWS) operational forecasters at the SPC and HWT an opportunity to critique and improve the products relatively early in their development. During this first year of the Fire Weather Experiment activities, foundational relationships will be established and demonstration methodologies will be developed leading to optimal testing of suites of products in subsequent years. The Experiment will run from August 22<sup>nd</sup> – September 2<sup>nd</sup>, 2011 and the focus is to demonstrate and test GOES-R Proving Ground products within an operational framework and establish a framework for which future experiments will demonstrate GOES-R Proving Ground products towards a fire weather focus. Chris Siewert, the satellite champion at SPC, will be coordinating Proving Ground activities in Norman. He has coordinated the Spring Experiment activities at the SPC and HWT for the last several years and has since been building collaborative relationships within the local and broad operational community.

# **2 Goals of Proving Ground Project**

There are many products competing for the attention of the SPC and Weather Forecast Office (WFO) forecasters. This year will focus on demonstrating the GOES-R baseline GOES-R Risk Reduction (R3) and GOES I/M Product Assurance Plan (GIMPAP) products selected for this year's activities and identified in Table 1. This strategy has the best chance of maximizing the Operations-to-Research feedback that is one of the PG goals. The most important aspect of the interactions this summer will be to build relationships between each key product development team and the diverse user groups within both the HWT and the broader weather community. Thus, we envision that each visitor will participate in the experimental activities and discussions (in particular regarding satellite-based products) to improve integration of GOES-R PG effort within the HWT and SPC toward fire weather forecasting in future years.

# **3 GOES-R products to be demonstrated**

There are two GOES-R Baseline products identified to be demonstrated during the Fire Weather Experiment at the HWT and SPC. Additionally, the Fire Weather Experiment will also demonstrate R3 and GIMPAP products. These products are listed in Table 1 and described further in the following subsections.

**Table 1. Products to be demonstrated during Experiment**

<b>Demonstrated Product</b>	<b>Category</b>
Cloud and Moisture Imagery	Baseline
Fire / Hotspot Detection	Baseline
Nearcasting Model	GOES-R Risk Reduction
Weather Research and Forecasting (WRF) based lightning threat forecast	GOES-R Risk Reduction
NDVI / NDVI Change	GIMPAP
Surface Dryness / Dryness Anomaly	GIMPAP
<p><b>Category Definitions:</b>  <b>Baseline Products</b> - GOES-R products that are funded for operational implementation as part of the ground segment base contract.  <b>GOES-R Risk Reduction</b> - The purpose of Risk Reduction research initiatives is to develop new or enhanced GOES-R applications and to explore possibilities for improving the AWG products. These products may use the individual GOES-R sensors alone, or combine data from other in-situ and satellite observing systems or models with GOES-R.  <b>GIMPAP</b> - The GOES Improved Measurement and Product Assurance Plan provides for new or improved products utilizing the current GOES imager and sounder</p>	

### 3.1 Cloud and Moisture Imagery

Simulated cloud and moisture imagery from the Advanced Baseline Imager (ABI) will be provided to the SPC for use in the Fire Weather Experiment. This effort provides the GOES-R Proving Ground with direct collaborations within the modeling community, as synthetically produced satellite imagery can provide insight into model performance. Additionally, band differences between select GOES-R IR channels will also be provided to further analyze microphysical performance within the model, as well as simulate the capabilities of GOES-R IR channels to provide additional information to the forecasting community. The specific band differences will be determined by the product developers.

For UW-CIMSS, the radiance calculation for each ABI infrared channel involves several steps within the forward modeling system. First, CompactOPTRAN, which is part of the NOAA Community Radiative Transfer Model (CRTM), is used to compute gas optical depths for each model layer from the WRF-simulated temperature and water vapor mixing ratio profiles and climatological ozone data. Ice cloud absorption and scattering properties, such as extinction efficiency, single-scatter albedo, and full scattering phase function, obtained from Baum et al. (2006) are subsequently applied to each frozen hydrometeor species (i.e. ice, snow, and graupel) predicted by the microphysics parameterization scheme. A lookup table based on Lorenz-Mie calculations is used to assign the properties for the cloud water and rain water species.

Visible cloud optical depths are calculated separately for the liquid and frozen hydrometeor species following the work of Han et al. (1995) and Heymsfield et al. (2003), respectively, and then converted into infrared cloud optical depths by scaling the visible optical depths by the ratio of the corresponding extinction efficiencies. The longer path length for zenith angles  $> 0$  is accounted for by scaling the optical depth by the inverse of the cosine of the zenith angle. The surface emissivity over land was obtained from the Seaman et al. (2008) global emissivity data set, whereas the water surface emissivity was computed using the CRTM Infrared Sea Surface Emissivity Model. Finally, the simulated skin temperature and atmospheric temperature profiles along with the layer gas optical depths and cloud scattering properties were input into the Successive Order of Interaction (SOI) forward radiative transfer model (Heidinger et al. 2006) to

generate simulated TOA radiances for each ABI infrared band. The cloud and moisture imager is then derived from the TOA radiances.

The CIRA procedure for creating the synthetic ABI data is similar to that described above for CIMSS. A version of the CRTM is used for the gaseous absorption, with specialized procedures for the cloudy atmosphere. The CIRA procedure reads numerical model output from either WRF-ARW, Coupled Ocean/Atmosphere Mesoscale Prediction system (COAMPS) (developed at the Naval Research Laboratory, Monterey, California), or Regional Atmospheric Modeling System (RAMS), and then calculates synthetic brightness temperatures from several of the GOES-R ABI bands. For the SPC Proving Ground the emphasis is on the WRF-ARW, and the imagery is restricted to IR channels. Work is underway to utilize recent advances in the CRTM so that standard code can be used for the clear and cloudy atmospheres, but this will not be ready for the 2011 experiment.

An automated system is currently being developed by a team of collaborators from CIRA, NASA, National Severe Storms Laboratory (NSSL), and SPC, and the simulated GOES-R output produced by the system will be delivered to SPC during the 2011 Fire Weather Experiment. CIRA's observational operator will read the netcdf output from the WRF model that is run at SPC. As described above, the CRTM is used to compute gaseous optical depths, and the delta-Eddington formulation is to compute brightness temperatures for the clear and cloudy areas. Five simulated bands from GOES-R's Advanced Baseline Imager will then be produced from each hourly output file from the WRF simulation. Three band differences from these channels will also be produced and provided to the SPC. CIRA has elected to simulate a subset of the full ABI band spectrum in order to be able to deliver the output to the SPC in a timely manner. The 12- to 36-hour forecasts from the first IR and Water Vapor bands are available by 09 UTC each morning, in time for use by the operational forecasters.

### **3.2 Fire / Hotspot Detection**

The CIMSS GOES WildFire Automated Biomass Burning Algorithm (WF\_ABBA) Version 6.5 provides fire detection and characterization using GOES Imager data. WF\_ABBA output is produced for all images available from GOES-11/-12/-13 at full IR resolution of 4 km. The algorithm classifies detected fires into one of six groups: processed, saturated, cloud-covered, high possibility, medium possibility, and low possibility. Processed fires meet criteria that allow estimates of subpixel size, subpixel temperature, and subpixel radiative power. Saturated fires are fires that have saturated the sensor, causing it to read its highest temperature. Not all saturated pixels qualify as fires. Cloud-covered fires are covered by relatively thin clouds. High, medium, and low possibility fires are fires that cannot be characterized but have varying likelihoods of being fires. Characterization of size and temperature is achieved using a modified Dozier technique with the 4 and 11 micron bands. Fire Radiative Power (FRP) is calculated using an approximation of the relationship between power and radiance and thus is provided for Processed and High and Medium Possibility fires. FRP is a function of size and power and is useful for visualizing the intensity of a fire. WF\_ABBA data is available within minutes of the end of the satellite scan, providing a low-latency look at fires as they unfold.

The Fire Radiative Power (FRP) product assigns FRP values for fire pixels based on the WF\_ABBA FRP value. For certain fire categories (saturated, cloudy, and low possibility) assigned FRP values are used instead. FRP values reveal how intense a fire is burning and estimates the radiant heat of the detected fires as a means to characterize fuel consumption. Processed, High, and Medium Possibility fires are assigned an estimated FRP value by the WF\_ABBA. Saturated fires are assigned FRP values of 2000 MW. Cloudy and Low Possibility fires are assigned an FRP of 0 MW but still show up as fire pixels.

### 3.3 Nearcasting Model

A nearcasting model that assimilates full resolution information from the current 18-channel GOES sounder and generates 1-9 hour nearcasts of atmospheric stability indices will be included in the SPC Fire Weather Experiment. Products generated by the nearcast model have shown skill at identifying rapidly developing, convective destabilization up to 6 hours in advance. The system fills the 1-9 hour information gap which exists between radar nowcasts and longer-range numerical forecasts. Nearcasting systems must be able to detect and retain extreme variations in the atmosphere (especially moisture fields) and incorporate large volumes of high-resolution asynoptic data while remaining computationally efficient. The nearcasting system uses a Lagrangian approach to optimize the impact and retention of information provided by GOES sounder. It also uses hourly, full resolution (10-12 km) multi-layer retrieved parameters from the GOES sounder. Results from the model enhance current operational NWP forecasts by successfully capturing and retaining details (maxima, minima and extreme gradients) critical to the development of convective instability several hours in advance, even after subsequent IR satellite observations become cloud contaminated.

### 3.4 WRF based lightning threat forecast

The WRF based lightning threat forecast is a model-based method for making quantitative forecasts of fields of lightning threat. The algorithm uses microphysical and dynamical output from high-resolution, explicit convection runs of the WRF Model conducted daily during the 2011 Fire Weather Experiment. The algorithm uses two separate proxy fields to assess lightning flash rate density and areal coverage, based on storms simulated by the WRF model. One field, based on the flux of large precipitating ice (graupel) in the mixed phase layer near -15C, has been found to be proportional to lightning flash peak rate densities, while accurately representing the temporal variability of flash rates during updraft pulses. The second field, based on vertically integrated ice hydrometeor content in the simulated storms, has been found to be proportional to peak flash rate densities, while also providing information on the spatial coverage of the lightning threat, including lightning in storm anvils. A composite threat is created by blending the two aforementioned threat fields, after making adjustments to account for the differing sensitivities of the two basic threats to the specific configuration of the WRF model used in the forecast simulations.

### 3.5 NDVI / NDVI Change

NDVI images are derived from daytime measured reflectance in the visible (VIS, 0.4-0.7 microns) and the near-IR (NIR, 0.7-1.1 microns) bands of the NOAA AVHRR instrument (currently NOAA-18) for clear sky regions:

$$\text{NDVI} = (\text{NIR} - \text{VIS}) / (\text{NIR} + \text{VIS}) \quad (1)$$

The values of NDVI range from 0-1, providing a relative index of green vegetation cover (where photosynthesis is taking place). NDVI is based on the principle that plant leaves strongly absorb visible light for photosynthesis (chlorophyll) but reflect in the NIR portion of the spectrum. Low values of NDVI can mean relatively bare ground, or dry vegetation cover.

A time change in NDVI (current minus 4 weeks ago) is provided to identify regions of increasing and decreasing vegetation coverage. Decreasing coverage may be indicative of reduced green biomass (i.e., harvested crops) or increased amounts of dry biomass (uncut, dry grasses; dry leaves below dormant trees, etc.). It is important to consider the type of vegetation cover (i.e., agriculture vs pasture or forest) when interpreting trends in NDVI. An image of land cover type is available on NAWIPS for this purpose.

In general, green vegetation is associated with active photosynthesis and transpiration (where plants are drawing soil moisture from the root zone through the leaves and into the air). However, exceptions are succulent plants, such as are common in dry regions, which can inhibit transpiration while staying green.

### **3.6 Surface Dryness / Dryness Anomaly**

To augment information on vegetation cover, a dryness index was developed to provide information on the relative amount of moisture in the biomass (vegetation canopy) or the soil surface in the case of bare ground (or partially covered soil). This index is based on daytime heating rates of the land surface as observed from clear-sky GOES imagery IR measurements (see Rabin et al., 2006). Higher (lower) heating rates are associated with drier (wetter) surfaces and higher (lower) ratios of sensible to latent heat flux (Bowen ratio). In areas of moderate to high vegetation cover, the moisture index will be negatively correlated with NDVI. Both NDVI and the moisture index can be used together to help assess dryness. The moisture index may provide independent information on dryness where NDVI is relatively small (sparse vegetation cover).

The horizontal resolution of the GOES dryness index is dictated by that of the GSIP products (1/8<sup>th</sup> degree). The dryness index is only evaluated where sky conditions are deemed to be clear. Separate estimates are made from GOES-13 (east) and -11 (west) satellites. A bias adjustment is applied to the GOES-11 data. The choice of adjusting the GOES-11 index is arbitrary, but accounts for systematic differences from the GOES-13 heating rates. The dryness index is produced on a daily basis. Owing to limited coverage due to cloud cover (and to facilitate comparison with NDVI), 7- and 14-day averages are computed on a daily basis.

Quantitative validation of the surface dryness index is difficult. In-situ measurements of soil moisture are limited to a few locations (such as the Oklahoma Mesonet). Furthermore, these are not identical to biomass or exposed soil surface moisture.

## **4 Proving Ground Participants**

The Proving Ground participants are broken into two categories, Providers and Consumers. Providers are those organizations that develop and deliver the demonstration product(s) and training materials to the consuming organization. The Consumers are those who work with the providers to integrate the product(s) for demonstration into an operational setting for forecaster interaction and provide the product assessments (e.g., testbed operators and forecasters). For the Fire Weather Experiment at the SPC, there are four providers, CIMSS, CIRA, NASA SPoRT and NSSL, and there is one consumer, SPC. Participants will consist of in-house visiting scientists and forecasters from NSSL, OU-CIMMS and SPC. The visiting scientists and the SPC forecasters round out the experiment team and their participation are described in the following paragraphs.

### **4.1 CIMSS**

CIMSS will provide five products for demonstration in the Fire Weather Experiment and they are described below.

#### **4.1.1 Cloud and Moisture Imagery**

00 UTC initialized NSSL WRF ARW NWP model generated ABI synthetic infrared radiances will be prototyped and available via internet quicklook site and McIDAS area format for evaluation. Forecasters can use the derived synthetic satellite data to key in on ABI water vapor

or IR window band features of interest such as convective development and location rather than using NWP derived fields. Quicklooks of simulated WRF ABI radiances are available at: [http://cimss.ssec.wisc.edu/goes\\_r/proving-ground/nssl\\_abi/nssl\\_abi\\_rt.html](http://cimss.ssec.wisc.edu/goes_r/proving-ground/nssl_abi/nssl_abi_rt.html)

#### **4.1.2 Fire / Hotspot Detection**

The FRP product is delivered to SPC/HWT as calibrated FRP Mask Areas via the McIDAS ADDE server FLASH.SSEC.WISC.EDU under the group name WFABBA. The FRP is available for GOES-11 (ADDE ID: G11FRP), GOES-12 (ADDE ID: G12FRP), and GOES-13 (ADDE ID: G13FRP). These products are available at least half-hourly in the Western Hemisphere or more frequently as data is available. The McIDAS AREA files are pulled down and converted to N-AWIPS

#### **4.1.3 Nearcasting Model**

The nearcasting products will be delivered to SPC and within the Fire Weather Experiment in GRIB2 format via the University of Wisconsin LDM for display within the HWT N-AWIPS system. Forecasters will evaluate the nearcasting model to see if it offers improved spatial and temporal convective initiation forecasts.

#### **4.1.4 NDVI / NDVI Change**

The NDVI product is a composite over 7 or 14 days (in order to minimize the effect clouds). An automated cloud identification scheme and corrections for atmospheric absorption are applied in deriving the NDVI. These products are provided by the USGS EROS data center once every week on Tuesdays. The data are converted to McIDAS AREA files and remapped for viewing in NAWIPS. The most recent imagery is also available on the web at: <http://www.nssl.noaa.gov/~rabin/dryness>

#### **4.1.5 Surface Dryness / Dryness Anomaly**

The dryness index is based on the surface temperature (Ts) rise between 10:00 and 13:00 local solar time. This value is normalized (divided by) the incoming solar radiation at the surface (S). Both Ts and S are obtained from hourly GOES Surface and Insolation Products (GSIP) produced at the NESDIS Center for Satellite Applications and Research (STAR): <http://www.star.nesdis.noaa.gov/smcd/emb/gsip/index.htm>

Anomalies of the dryness index are computed based on deviations from 5-year monthly means (1996-2000). Those means were computed from GOES-based Surface Radiation Budget (SRB) output developed at University of Maryland from the GEWEX Continental Scale International Project (GCIP): <http://www.atmos.umd.edu/~srb/gcip/>

The following GOES heating rate-based dryness products are available on NAWIPS:

- GOES-E dryness index (Daily, 7-day, 14-day)
- GOES-W dryness index (daily, 7-day, 14-day)
- GOES-E dryness index anomaly (7-day, 14-day)
- GOES-W dryness index anomaly (7-day, 14-day)

The most recent imagery is also viewable on the web: <http://www.nssl.noaa.gov/~rabin/dryness>



## **4.2 SPoRT and NSSL**

NASA SPoRT and NSSL will provide lightning forecast data.

### **4.2.1 WRF based Lightning Threat Forecast**

For the HWT, SPoRT and NSSL will provide a WRF based lightning threat forecast based on the real-time NSSL forecasts. There will be three output fields based on graupel flux, vertically integrated ice, and a blended combination of the two. These model runs will expose forecasters to the ability to incorporate a short-term prediction of potential lightning activity into their forecasts and the results will be routinely displayed as hourly cumulative maximum gridpoint values, with units of flashes per square km per 5 min, on the NSSL WRF website: <http://www.nssl.noaa.gov/wrf>.

## **4.3 CIRA**

The CIRA and the National Environmental Satellite, Data, and Information Service (NESDIS) Center for Satellite Applications and Research (STAR) Regional and Mesoscale Meteorology Branch (RAMMB), located at Colorado State University in Ft. Collins, CO will be providing simulated satellite imagery for demonstration within this year's Fire Weather Experiment.

### **4.3.1 Simulated Imagery**

An additional GOES-R Risk Reduction activity, the generation of simulated ABI imagery calculated from WRF radiances, will be included in the Fire Weather Experiment. The simulated imagery will be converted to McIDAS AREA format and made available on the CIRA ADDE server, which can then be displayed with the HWT N-AWIPS systems. Simulated satellite imagery calculated from model radiances will provide forecasters with a tool to evaluate model performance, as well as be able to examine the use of all GOES-R IR bands within an operational framework. Simulated band differences from the synthetic radiance data will also be provided by CIRA to demonstrate the capabilities of GOES-R in detecting atmospheric features using methods not available on the current suite of GOES satellites but will be on GOES-R.

## **4.4 Storm Prediction Center**

In addition to severe weather forecasts, the SPC focuses on the regional forecast of fire weather from a day to a week in advance. From the 2011 Spring Experiment, evaluation and discussion of high-resolution ensemble NWP drove creation of an initial forecast, with updates based on more recent NWP and observational data. For the 2011 Fire Weather Experiment, one afternoon forecast will be developed with a combination of high-res numerical model guidance of dry thunder characteristics and the observations of surface dryness and vegetation from current satellite datasets. Product developer-participants are asked to issue real-time, concrete forecasts of convective behavior likely to lead to the onset of fire. As a product developer becomes invested in the forecast issuance process, many subtleties are illuminated that research-minded scientists might not otherwise have in mind. Operational SPC fire weather forecasters will also participate immediately following their operational morning day-1 fire weather forecast to help provide insight into the utility of these experimental datasets.

# **5 Responsibilities and Coordination**

## **5.1 Project Authorization**

Russ Schneider – SPC Director

Steve Goodman – GOES-R Chief Scientist and PG Program Manager

## 5.2 Project Management

Chris Siewert – SPC Proving Ground Liaison

## 5.3 Product Evaluation

Chris Siewert – Lead, SPC Proving Ground Liaison

James Correia, Jr. – SPC HWT Liaison

Phillip Bothwell – SPC Senior Development Meteorologist

## 5.4 Project Training

### 5.4.1 General Sources

GOES-R training is developed and provided by a number of different partners across the weather enterprise. NOAA, collaboratively through NESDIS and the NWS, partners with the COMET, VISIT, and SPoRT to develop and deliver training on the new features, operations, and capabilities of the GOES-R satellite. While the Fire Weather Experiment will not provide formal on-site training to participants as part of their operations plan, any training material will be made available for participants to view before, throughout and following the experiment.

### 5.4.2 Product Training References

#### 5.4.2.1 Cloud and Moisture Imagery

UW-CIMSS is providing real-time simulated ABI infrared band data from NSSL WRF ARW thermodynamic profile output.

(1) UW-CIMSS will provide a WES case (beta version). This includes not only simulated data, but a guide as well.

(2) CIRA has put together a VISIT training session titled "Synthetic Imagery for Forecasting Severe Weather." A few options for viewing the session are found here:

[http://rammb.cira.colostate.edu/training/visit/training\\_sessions/synthetic\\_imagery\\_in\\_forecast\\_ing\\_severe\\_weather/](http://rammb.cira.colostate.edu/training/visit/training_sessions/synthetic_imagery_in_forecast_ing_severe_weather/)

(3) ABI VISITView from 2003 (somewhat dated) -

<http://www.ssec.wisc.edu/visit/briefings/abi03/viewbriefing.html>

(4) GOES-R 101 VISITView -

[http://rammb.cira.colostate.edu/training/shymet/forecaster\\_GOESR101.asp](http://rammb.cira.colostate.edu/training/shymet/forecaster_GOESR101.asp)

(5) GOES-R ABI VISITView "Classic"

<http://www.ssec.wisc.edu/visit/briefings/abi03/viewbriefing.html>

#### 5.4.2.2 Fire / Hotspot Detection

SPC forecasters are already familiar with the concept of fire / hotspot detection within fire weather forecasting and view it regularly within their operational N-AWIPS workstations. The training resource for the FRP product is the document located at the following ftp location:

[ftp://ftp.ssec.wisc.edu/bioburn/9APR09\\_FRP/wfabba\\_frp\\_product\\_description.doc](ftp://ftp.ssec.wisc.edu/bioburn/9APR09_FRP/wfabba_frp_product_description.doc)

In this document a case study of fires observed from GOES-East Version 6.5.006 WF\_ABBA at 2045 UTC on 9 April 2009 over southern Oklahoma/northern Texas is shown with regards to the output from the WF\_ABBA FRP product.

#### 5.4.2.3 Nearcasting Model

Real-time UW-CIMSS NearCasts can be viewed on the web at:

<http://cimss.ssec.wisc.edu/model/nrc/>

Web images are generated using the NWS/NCEP N-AWIPS software system. In addition to producing high quality graphics, these products can be directly included into operational workstations at AWC and SPC. Background and initial training materials can be accessed through the CIMSS NearCasting web page at:  
<http://cimss.ssec.wisc.edu/model/nrc/>

These materials will be referenced during the 2011 Fire Weather Experiment.

**5.4.2.4 Weather Research and Forecasting (WRF) based lightning threat forecast**  
SPC forecasters have had experience with the WRF based lightning threat forecast since the 2009 Spring Experiment within operations and are familiar with the product. While the Fire Weather Experiment will not provide formal training to new participants as part of their operations plan, any training material will be made available for participants to view during the experiment. Training modules will be developed by SPoRT based on forecaster feedback after the Fire Weather Experiment.

#### **5.4.2.5 NDVI / NDVI Change**

Real-time NDVI and NDVI change imagery can be viewed on the web at:  
<http://www.nssl.noaa.gov/~rabin/dryness>

SPC forecasters are already familiar with the concept of NDVI within fire weather forecasting and view it regularly via web-based tools but have not been provided it within their operational systems to date. Product description and associated reference material will be provided to participants during the experiment.

#### **5.4.2.6 Surface Dryness / Dryness Anomaly**

Real-time surface dryness / dryness anomaly imagery can be viewed on the web at:  
<http://www.nssl.noaa.gov/~rabin/dryness>

SPC forecasters are already familiar with the concept of surface wetness/dryness from satellite measurements within fire weather forecasting via web-based tools but have not been provided it within their operational systems to date. Product description and associated reference material will be provided to participants during the experiment.

## **6 Project Schedule**

There are many activities that lead up to the successful execution of the Fire Weather Experiment such as identifying participants, coordinating schedules, delivering and integrating algorithms, and developing training materials. These specific activities are identified in the chart below.

1. Identify and invite project leads – July 6, 2011
2. Deadline for all product availability – August 15, 2011
3. Deliver training materials – August 15, 2011
4. Verification of integration – August 15-29, 2011
5. Fire Weather Experiment start – August 22, 2011
6. Fire Weather Experiment end – September 2, 2011
7. Final evaluation report – September 30, 2011

## **7 Milestones and Deliverables**

### **7.1 Products from Providers**

Products to be demonstrated within this year's Fire Weather Experiment should be delivered to the HWT by August 15 to ensure that product dataflow and display work correctly within the HWT programs. Delivered products to the SPC and within the HWT will be displayed within N-AWIPS and will be coordinated with Chris Siewert at the SPC.

### **7.2 Training materials from Providers**

Each product delivered to the GOES-R PG Fire Weather Experiment will be accompanied by related training materials. Forecasters and scientists participating in the Fire Weather Experiment may not be familiar with the products; therefore, it is important that they receive training in order to properly evaluate product performance during real-time forecasting exercises. Training on each of the products being demonstrated will occur on the first day of each experiment week. This will consist of hands on demonstration of the products within the operational N-AWIPS systems under the supervision of the product experts and visiting scientists. In addition, a short write-up explaining how the product works and is used, how it is loaded within N-AWIPS, including example images, will be provided for distribution amongst Fire Weather Experiment participants for reference. It is expected that the product developer provide the training material. Following each forecasting exercise, and at the end of each week, participants will be asked to provide feedback on the training they received. Participants will be asked if they felt prepared to use the products in a real-time forecasting situations and what material they would like to see in the future. This feedback will be invaluable in preparing formal training for future GOES-R products.

### **7.3 Final report**

A final report detailing the GOES-R PG Fire Weather Experiment activities during the entirety of the experiment shall be provided to the GOES-R Program Office at the date specified within the operations plan timeline. This report will discuss how each product was demonstrated within the various experiments. The report will also present feedback provided by participants of the Fire Weather Experiment as well as suggestions for improvements to the GOES-R PG Fire weather Experiment activities for years to come. This feedback will be captured by Chris Siewert and James Correia, Jr. during interactions with the participants throughout the Experiment timeframe.

## **8 Related activities and methods for collaboration**

### **8.1 GOES-R Risk Reduction Products and Decision Aids**

GOES-R Risk Reduction products and decision aids will be demonstrated in addition to the Baseline and Option 2 products. The risk reduction products and decision aids demonstrated in the SPC Fire Weather Experiment are described in Section 3.

## **9 Summary**

This year's GOES-R PG Fire Weather Experiment activities at the SPC and HWT will support the PG effort to demonstrate the defined GOES-R baseline products within an operational framework through an established experimental program. Direct collaboration with the operational forecasting community through the SPC is currently ongoing. Feedback gathered from these activities will aid in successful product training for forecasters as well as improvements in product performance by product developers.

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