APPENDIX H Action Items

This appendix lists the recommendations and unanswered questions gathered at the conference. It contains the responses obtained by the publication date of the Final Report. A document containing current Action Item responses is available in both the GOES Users' Conference section and the Documents section of the GOES-R web site. The Action Item document on the web page will contain additional responses as they become available.

In the listing below, each action item is assigned an identifier, for reference purposes, which is based on the Session the statement is associated with. For example, "S1-1" is a statement from conference Session 1. The person(s) providing the response is given in italics after the response.

Session 1

S1-1 Remind users that the updates about the new satellite capabilities are important and that training exists on the NOAA LMS and MetEd Web site for GOES 13-15.

Response: We do regular monthly notifications to all of the NWS Science and Operations Officers (SOOs) to introduce new training and VISIT teletraining. We also work with COMET, which covers an extensive user community, to include NWS, Broadcast Meteorologists, the entire University Community, Unidata, World Meteorological Organization, United States Air Force, United States Navy, Environment Canada, and other specialized user communities (such as aviation, coastal/marine, winter weather and tropical weather) to name just a few. COMET's reach is detailed more fully on the COMET and MetEd web site.

The most recent GOES satellite, GOES-15, included special teletraining from VISIT targeted to the NWS offices covered by GOES-West (15) when it became operational early in the year. That training specifically itemized the new satellite capabilities aboard GOES-15 and the improvements in the calibration, signal-to-noise, and spatial resolution increase in the Water Vapor channel on the Imager. *(From Brian Motta, 4/27/2012)*

Session 2

S2-1 What is the status of the more formal approach on making the near cast forecasting available to SPC forecasters?

Response: In order to transition the Nearcast product into operations we will need a more formal training module for the product, which is currently in development for the 2012 Spring Experiment. Once that is available, we will be able to include the Nearcast within one of the bi-annual SPC forecaster training sessions that occur around Feb and Oct of each year. *(From Chris Siewert, 1/4/2012)*

Session 3

There were no action items taken from Session 3.

Lunch Panel

LP-1 How will the GOES project address outdated satellite products and techniques (generating, processing, and sending out data) for GOES-R with a limited budget.

Response: The Ground Segment is funded to build a state of the art system for PG and PD. Due to budget limitations, some of the originally planned products will not be produced in the Ground System. *(From Satya Kalluri, 12/23/2011)*

LP-2 How do we get broadcast meteorologist to use satellite data during severe weather?

Response: GOES-R will be a real turning point in this regard, but a part of this problem is that resolution is lost when the imagery is remapped over a color base map. The remapping of the 1km visible GOES data is especially poor and only looks good on air for about 4 hours per day. Low sun angles and remapping do not work well. If some company or NASA/NOAA comes up with an inexpensive way of showing hi-res visible imagery that looks really good on air, then news directors will stumble over one another to get it on air. A good example is the MODIS images from Aqua and Terra. Viewers love those images.

The lack of rapid scan availability to broadcast mets is another reason. The vendors almost never send this data to on air mets. This is something that can and should be corrected, and I plan on mentioning to the folks at WSI, Baron, and Weather Central. (These three companies supply 90% of the on air weather imagery to TV stations.)

Last, but perhaps most important is the fact quite a few on air mets are not that comfortable interpreting the satellite data in regards to severe weather. This is true of both VIS and IR imagery. *(From Dan Satterfield, 12/24/2011)*

LP-3 Create a mechanism or allow the access of the meta data for fused products so the user knows how the product is being created.

Response: Response pending.

LP-4 Are the bandwidth issues being addressed with the development of products? The bandwidth is considerably lower at the forecast offices than the NCEP centers?

Response: The most recent GOES satellite, GOES-15, included special teletraining from VISIT targeted to the NWS offices covered by GOES-West (15) when it became operational early in the year. *(From Mike Johnson / Satya Kalluri).*

LP-5 Work on the dissemination policy at NWS for decision support systems endorsing satellite and other data to the user community in ways other than AWIPS II.

Response: That training specifically itemized the new satellite capabilities aboard GOES-15 and the improvements in the calibration, signal-to-noise, and spatial resolution increase in the Water Vapor channel on the Imager. *(From Mike Johnson / Kevin Schrab, 4/27/2012).*

LP-6 Make products intuitive for the public to understand (i.e., colors that correspond to natural physical attributes).

Response: This issue is being worked. Refer to Steve Miller's paper on GOES-R ABI synthetic green published in the *International Journal of Remote Sensing* entitled: A case for natural colour imagery from geostationary satellites, and an approximation for the GOES-R ABI. The paper is available at:

http://www.tandfonline.com/doi/abs/10.1080/01431161.2011.637529

(From Steve Miller, 3/21/2012)

LP-7 Utilize social media more to increase public awareness of GOES-R.

Response: There is already a GOES-R Facebook page at: http://www.facebook.com/GOESRsatellite, a GOES-R specific Wikipedia page was recently launched at: http://en.wikipedia.org/wiki/GOES-R, and a GOES-R Twitter page will be available closer to the launch of GOES-R. GOES-R will also be developing a YouTube Channel and will look at other social media applications as appropriate *(From Dann Karlson, 8/2/2012)*

LP-8 Continue creating blended/fused products for operational forecasters.

Response: Response pending.

Session 4

S4-1 Produce the specifications for GRB by April 2012.

Response: The GRB product specifications will be in the PUG which will available by the fall of 2012. Refer to the GOES-R website when the PUG is published. *(From Satya Kalluri, 8/2/2012)*

S4-2 What are the plans to produce more work on meso scale models and near cast forecasting?

Response: As global and mesoscale models both advance to increasingly finer spatial and temporal resolution, the assimilation of rapidly refreshed observations such as those as will become available from GOES-R in NWP models is expected to be increasingly important, especially for short-term forecasting. Current efforts to assimilate the hourly GOES AMV wind products may provide a bridge to optimal exploitation of the GOES-R wind products. The implementation of operational mesoscale models (including the WRF) on non-operational computing platforms such as the JCSDA JIBB will provide opportunities to develop and test methods to assimilate GOES-R datasets. The development of forward models for GOES-R observations, including the GLM, should be pursued.

The GOES-R program is continuing to fund NearCasting development and applications activities. Initial efforts have focused on feedback from the 2011 HWT and AWC evaluations. Specific emphasis has been placed on improving education and training, product presentation and interpretation and expanded testing. Testing is planned to continue for the next several years and could expand to include HPC and OPC, as well as additional WFOs. Development efforts over the next two years include:

1) Moving the NearCasting model from an isobaric to and an isentropic framework and thereby make the NearCasts more responsive to variations in the peak weighting function levels across different air masses and more representative of the adiabatic flow implicit in areas for clear-sky GOES IR products
2) Identifying and removing biases from the GOES moisture retrievals
3) Determining the seasonally varying information content of the GOES retrievals relative to NWP model ‘first guess’ fields to understand when the NearCast fields should be most beneficial to forecasters
4) Developing plans for real-time testing of the NearCasting model over Europe and central Africa using SEVIRI data as a proxy for GOES-R ABI data (and as requested by EUMETSAT and CGMS)

5) Lastly, studying month-long loops of the hourly evolution of lower- and mid-level moisture fields across the US to help understand the mesoscale climatology of moisture transports and destabilization processes.

(From Ralph Petersen and Jim Yoe, 4/27/2012)

S4-3 Suggested that the Proving Ground include broadcasters and international users.

Response: Agreed. Two broadcasters were invited to GOES-R Science Week April 30-May 4 to begin relationship with the broadcast community. Broadcasters will be included in future plans. International participants at GOES-R Science Week will include EUMETSAT, Environment Canada, JMA, INPE, WMO, and the Australian Bureau of Meteorology. *(From Jim Gurka and Steve Goodman, 12/23/2011)*

S4-4 Request to clarify the available system formats. A lot of users use GIS format.

Response: GOES-R data will be available in NetCDF and McIDAS formats for ABI, and in FITS for space weather formats from PDA. *(From Satya Kalluri, 1/19/2012)*

S4-5 When will the polling on who will need the GRB simulator data occur. And will there be a priority system? If so, what is the priority system? And how can users sign up for the GRB simulator data?

Response: Details of this are being worked. *(From Satya Kalluri, 1/19/2012)*

S4-6 Need a Product User Guide (PUG) by April 2012.

Response: PUG will be available by July 2012. *(From Satya Kalluri, 1/19/2012)*

Discussion 1

D1-1 More effort needs to be put into delivering proxy products to WFOs.

Response: More products are added each year to the PG locations. Some products are now ported to the AWIPS II environment and will gain more use over the coming year. We welcome participation by additional WFOs. *(From Steve Goodman and Jim Gurka, 12/23/2011)*

D1-2 Broadcast community requests a "one stop shop" Web site for satellite data and imagery, as well as collaboration with their graphics vendors like Baron, WxCentral, and WSI, to generate satellite imagery the way radar imagery is so readily available. "One Stop Shop" Web site was also strongly supported by WFO personnel and satellite champions.

Response: The Office of Satellite and Product Operations was formed as merger of two offices (Office of Satellite Operations and Office of Satellite Data Processing and Distribution). With that merger, many web pages are being consolidated and merged. The web site of http://www.ospo.noaa.gov/ has links to data imagery.

In the future, the "PDA" (Product Distribution and Access server) will be managed to allow authorized users access to satellite data and products.

For users wishing to access current data, they may follow the NESDIS policy at http://www.ospo.noaa.gov/Organization/About/access.html

All users have free and open access to data that are direct broadcast from the satellites via their own antenna systems.
(From Tom Renkevens, 1/6/2012)

D1-3 WFOs are understaffed and overworked. Better communication from the GPO/PG to the WFOs is needed (more than just email). Monthly teleconferences with short presentations or a monthly newsletter were suggested.

Response: We will use the NWS Operational Advisory Team presentations by our algorithm teams as a springboard for broader participation by forecasters. Additional coordination with the new NWS Operational Proving Ground will be discussed at GOES-R Science Week. *(Response from Steve Goodman / Jim Gurka)*

D1-4 Forecasters need products that will highlight situations they DO NOT expect, rather than spending valuable time looking at a product that reaffirms their thinking. That will be more valuable.

Response: We acknowledge the need for decision aids that alert the forecaster to unexpected events. These will be incorporated in future PG activities. *(From Jim Gurka, 12/23/2011)*

D1-5 Broadcast community does not have a media training center like the NWSTC. They need training that is quick, easy, and available on the internet.

Response: Many of the TV folks use COMET. This is quite good and the AMS committee on Station Science has worked hard to make sure that all of those in the TV met community know about it. Continuing education is required to keep the AMS CBM seal and those COMET modules count for that. *(From Dan Satterfield, 12/23/2011)*

D1-6 Suggested that to have a product evaluated fairly in a testbed, the forecasters need one-on-one training with a subject expert on the product.

Response: This has been put into practice, principally at the Hazardous Weather Testbed Spring Experiment in Norman Oklahoma which is a cooperative effort hosted by the NOAA/Oceanic and Atmospheric Research/National Severe Storms Laboratory and the National Weather Service Storm Prediction Center. For the past few years, both the Experimental Warning Program and the Experimental Forecast Program have made research team members and trainers with deep knowledge about their techniques, products, algorithms, models, etc. available to the forecasters participating in the real-time forecast and warning exercises and evaluations. Other testbeds do similar focus periods and evaluations: The NOAA HydroMeteorological Testbed and the Northern Latitude PG to name a couple. Other testbeds are in a formative stage and have been preparing for such exercises but have not executed them yet. The most mature and best test bed to model would be the HWT Spring Experiment. *(From Brian Motta, 4/27/12)*

D1-7 Suggestion to train more WFO forecasters than just the testbed experiments at the National Centers. Train at least one person from a WFO to take that new knowledge back to their local office to share with others.

Response: This fits the long-time practice of the NWS train-the-trainer model. VISIT, COMET, SPoRT, NWS, NESDIS and other training providers routinely use remote meeting software and VISITview software to "bring the experts" to the forecasters remotely. This provides multiple forecasters at a WFO the opportunity to not only get trained but inquire with the algorithm or product developers directly and get authoritative expert answers directly. Subsequent application and verification of correct application of the training is done onsite by the SOO, Satellite Focal Point, or local training facilitator. *(From Brian Motta, 4/27/12)*

Discussion 2

D2-1 Suggested ways to promote to the broadcast meteorologists: include them in HWT Spring Experiment, Testbed activities, other PG activities, and the visiting scientist program.

Response: I think all of these are good ideas. If the on air met can bring back some video to show on air, and make it promotable, then stations will be more likely to give paid time off. Making it an educational experience for the TV met, and on a different level, an educational experience for the viewers is a win-win! This is how I approached my trips to Antarctica and Greenland. *(From Dan Satterfield, 12/24/2011)*

D2-2 Suggested that more focus be put on the development and research of fused and merged products (radar, satellite, microwave, polar, etc.).

Response: Response pending.

D2-3 Suggested that the PG has a real time test to see if it fits into the time availability of a broadcaster in the work field.

Response: We will discuss way forward with Dan Satterfield, who is now the on-air broadcast meteorologist in Salisbury, MD. *(From Brian Motta/Steve Goodman/Jim Gurka)*.

D2-4 CIMSS' current process in the PG for products is to place them on the Local Data Manager (LDM) to the Weather Forecast Offices (WFOs). There is currently no efficient, non-bureaucratic way to move products up to the satellite broadcast network to give broadcasters more exposure and help alleviate bandwidth concerns. What is the operational legacy of the products and who should be involved for doing that?

Response: If user groups desire access to operational satellite products from NESDIS, they can follow the policy and procedures at http://www.ospo.noaa.gov/Organization/About/access.html

If authorized, these users would gain access to the operational products requested. *(From Tom Renkevens, 1/6/2012)*

D2-5 Are there any efforts into creating smart phone applications or products that can be readily used by the public?

Response: GOES-R is part of the NASA App for iPhone/iPad and Android operating systems. We are listed as one of the official "Missions" in the app which provides users general information about GOES-R and its capabilities. A significant update of the information running on the app was released in the summer of 2012 to provide more user content and program-related information. Information on the NASA App can be accessed at: http://www.nasa.gov/centers/ames/iphone/index.html or on USA.gov's app web site at: http://apps.usa.gov/nasa-app.shtml

In addition, GOES-R developed NOAA's first iOS app game called "Satellite Insight". Educational as well as entertaining, the game challenges players to keep up with the stream of data from GOES-R's six main instruments. While primarily geared to middle school and high school students, the game builds awareness of the GOES-R mission. The game instructions include basic information about GOES-R and geostationary satellites as well as links to GOES-R.gov, The Space Place (one of NASA's primary web sites for elementary school education); and SciJinks.gov, the web site about weather and Earth science for middle-school kids jointly sponsored by NASA and NOAA. Satellite Insight can be accessed from the following web sites:

http://apps.usa.gov/satellite-insight.shtml

http://www.goes-r.gov/education/fun.html

http://scijinks.jpl.nasa.gov/satellite-insight

Above and beyond this, GOES-R has plans to develop its own GOES-R app to provide the general public and users with an enhanced user content and information about the GOES-R mission and products that will be available to the user community. Development of this application will likely take place beginning in FY13.

(*From Dann Karlson, 8/2/2012*)

D2-6 The GOES-R web site is difficult to navigate and somewhat confusing if you are not part of the program. Suggested to clarify and/or re-arrange things on the web site.

Response: The GOES-R web site (www.goes-r.gov) was completely overhauled and redesigned in 2011, making it more relevant, comprehensive, and user-friendly. As part of the redesign, a "search" feature was added, making it simple for users to find the information they are looking for. In addition, top menus are organized by respective segments, with specific drop-down menus clarifying all pages in each section. The GOES-R Program is continually updating and improving the site, expanding content and enhancing the user experience. Specific recommendations for improvement are always welcome. (*From Dann Karlson, 8/2/2012*)

Discussion 3

D3-1 Suggested that people from training be more present at PG testbeds and need to work to make training an easier task.

Response: This has been a more difficult challenge in FY12 with drastic reductions in NOAA travel budgets. Training staff have worked diligently with development and research staff to promote early availability of training for operational forecasters and to promote short-duration easily taken training in online and recorded formats for PG and testbed activities. Additional travel resources are needed for NWS and NESDIS training experts to be able to travel and be present at all of the testbeds during their focus exercises. Significant effort is expended to deliver training remotely and facilitate interactions from a distance. *(From Brian Motta, 4/27/2012)*

D3-2 Suggested that forecasters be trained on products before they participate in PG activities/testbeds.

Response: This was a major finding from the Hazardous Weather Testbed last year. Many participants and the HWT SE organizers noted that significant time was spent on the first day of the week completing briefings and training that could have been delivered remotely before their residence/attendance in person at the testbed. The Experimental Warning

Program instituted deadlines for training development and readiness well in advance of the experiment for 2012. The Experimental Forecast Program instituted similar goals but in a less restrictive way to allow for more flexibility among its participants who may have certain focus areas or specialties.

For the larger-scale PG activities, VISIT also participated and facilitated delivering training to forecasters before their offices were provided PG participation or new data sets. New offices or existing offices requesting new products are often the result of new offices/forecasters attending VISIT training to find out about new products or capabilities that are available through the Satellite/GOESR PG to their operational AWIPS/Information Processing Systems. VISIT even had NWS Regional HQ attendance at alpha- and beta-test training sessions to provide reviews and comments on soon-to-be-released training for NWS forecasters. *(From Brian Motta, 4/27/2012)*

D3-3 Direct broadcast community strongly asks for products to be available through IMAPP or IPOPP as was done with NPP. Otherwise, the products will not reach all the users.

Response: Users should submit a request to the GOES-R program office for consideration. This may be accomplished through private sector enterprises or university endeavors but would need to be formally allocated as requirement space for some group to pursue. *(From Tom Renkevens, 1/6/2012)*

D3-4 Suggested that a good way to get people excited and familiar with the new satellite products is to introduce them one at a time and build upon products they already know.

Response: This is essentially the philosophy followed in the Proving Ground. *(From Chris Siewert, 12/23/2011)*

D3-5 Become involved in the Short Course for Broadcast Meteorologists at the Annual AMS meeting.

Response: Jim Gurka will attend the next AMS Broadcasters Conference in Massachusetts and is presenting a talk on the GOES-R Proving Ground to begin the conversation with the broadcaster community.

Other Questions from Attendees

Q-1 Provide a description of the descope of the Option 2 products and the impact. What is the process for these products be made in the future?

Response: Most Option 2 algorithms were completed and delivered to the Program in 2011. The remaining Option 2 algorithm will be delivered in 2012. The ATBDs are available if someone wants to implement them. Option 2 products, now referred to as Future Capabilities, may be implemented post-launch if NWS decides they are a high priority, the science meets their needs as a stand-alone GOES-R or fused product, and funding within the Ground Segment Project is available for implementation. *(From Steve Goodman)*

Q-2 When will the specs for the GRB (GOES Rebroadcast) be available, and where? Vendors need this so they can build ingest equipment. Lots of questions from DoD and International users in side bars on the GUC on this one.

Response: The specs for the GRB will be finalized at the CDR and will be in the PUG by July 2012. *(From Satya Kalluri, 1/19/2012)*

Q-3 What is the rough cost for a current GVAR user to upgrade to a GRB system, what is involved, and where is that information?

Response: It depends. A current GVAR antenna may be modified (depending on the size and the geographic location) to receive GRB. The user will need a new feed horn and new hardware to process the data. *(From Satya Kalluri, 1/19/2012)*

Q-4 What is the update as to the change/shift in downlink spectrum and impact to products or users?

Response: The spectrum changes should not have an impact on GRB. *(From Satya Kalluri, 1/19/2012)*

Q-5 It is slated for GOES-R to go to the west orbital slot first... can this be changed to east, and if so, what is the process to request?

Response: NWS would need to make the request to NESDIS Senior leadership. *(From Steve Goodman)*.

Q-6 Are the plans to check GOES-R out, then store, before operating? Can it be considered for GOES-R to either operate initially or go into an extended checkout phase so as not to lose continuity of data?

Response: Yes, it can be considered. The current plan is 6 months of on-orbit checkout and it may be possible to extend it. *(From Steve Goodman)*

Q-7 What formats will be available for products in the PDA? If not McIDAS, then what are plans for current McIDAS users to do to gain access for data?

Response: ABI products will be available in both McIDAS and NetCDF format. *(From Satya Kalluri, 1/19/2012)*

Q-8 For those users (largely NWP centers) that make use of products in BUFR or GRIB formats, will they be able to get products in these formats? If not, what is their potential alternative?

Response: ABI products will be available in both McIDAS and NetCDF format. *(From Satya Kalluri, 1/19/2012)*

Q-9 What images and/or products will users see in the NOAAport broadcast? For example, all 16 channels of imagery at full disk, or some smaller subset?

Response: Response pending.

Q-10 For an AWIPS user at a WFO, how will Level 2+ products (such as winds, stability, total precipitable water) be presented? Automatically delivered? Push vs. Pull?

Response: The products will be automatically delivered. *(From Mike Johnson, 12/23/2011)*

Q-11 What will be the default scanning mode of the ABI - Mode 3 (flexible) or Mode 4 (Continuous Full Disk) and in the flex mode? Who/how will the center points be set for the 30 second mesoscale?

Response: TBD, but mode 3 is anticipated to be in effect most often. Center points will be decided similar to today, with a WFO requesting a location, and approved by the NCEP shift supervisor. *(From Steve Goodman/Jim Gurka/Tim Schmit, 12/23/2011)*

Q-12 What is the full list of products to be backed up at the remote backup, and if a limited subset, why, and will anything be done to augment these products at the backup?

Response: The RBU will produce the following data and products: L0; L1b; GRB; L2+ GlM; and 2+ Cloud and Moisture Imagery. *(From Satya Kalluri, 12/23/2011)*

Q-13 Is there a CONOPS for the way users will gain access to the PDA, and how products will be accessed and delivered?

Response: Response pending.

Q-14 Describe the HRIT/EMWIN migration and what users will need to do to gain access to this blended stream of data.

Response: The GOES-R High Rate Information Transmission (HRIT)/Emergency Managers Weather Information Network (EMWIN) relay service is an evolution of the current Low rate Information Transmission (LRIT) service of the GOES-8/15 spacecraft. LRIT is an unencrypted, clear channel L-Band hemispheric downlink from GOES at 1691 MHz with BPSK (Binary Phase Shift Keyed) modulation at 128 K bits per second (BPS). LRIT contains selected environmental and weather data products from NOAA produced by or derived from a variety of space and in-situ sensors, as well as EMWIN and Data Collection System (DCS) Platform Reply (DCPR) data as embedded virtual channels. EMWIN data is also available on its own dedicated L-Band hemispheric downlink from current GOES at 1692.7 MHz with QPSK (Quadrature Phase Shift Keyed) modulation.

HRIT, like LRIT, will be an unencrypted, clear channel L- Band hemispheric downlink from GOES at 1694.1 MHz (a new frequency)with BPSK modulation, but at a higher information rate (400 Kbps, on a link transmission rate of 927 Kbps). HRIT will contain

selected environmental and weather data products, as well as EMWIN and DCS data as embedded virtual channels. There will be no separate, dedicated EMWIN channel available through GOES-R spacecraft.

Aside from a frequency and demodulator change, and possible modification of the CCSDS (Consultative Committee for Space Data Systems) channel identifiers, a current user of LRIT will be able to receive HRIT on the same antenna and front-end equipment. Functionality of the user post-front-end processing and display hardware and software is a choice of the individual user in conjunction with available commercial vendors. *(From Richard G. Reynolds, 1/29/2011)*

Q-15 Will direct readout users have a chance to acquire a test GRB stream prior launch? If so, how?

Response: A test GRB stream will be available through the GRB simulator. Specifics will be on the GOES-R web site. *(From Satya Kalluri, 1/29/2011)*

Q-16 How can users get involved in any end-to-end product testing?

Response: Users can get involved with end-to-end product testing through the Proving Ground. Contact Bonnie Reed, bonnie.reed@noaa.gov, for details. *(From Steve Goodman/Satya Kalluri, 1/29/2011)*

Q-17 With all the current blended products (GOES and POES, or GOES and foreign geo sats), how will these blended products continue? Who makes them and how?

Response: The continuation of blended products will depend on their complexity. Some products, such as the Red, Green, Blue (RGB) products tailored to specific phenomena such as dust or air mass boundaries, are relatively simple image combinations and could be generated from the basic imagery by end users. Other more complex blended products will still need to be generated centrally by NESDIS or other operational agencies and distributed by the mechanisms that are in place at the time of the GOES-R launch. *(From Mark DeMaria, 3/20/2012)*

Q-18 Once GOES-R is operational, will the proving ground still provide GOES-R products to AWIPS-2?

Response: If the interest is still there after launch, we can continue the Proving Ground. *(From Jim Gurka/Steve Goodman, 12/23/2011)*