Land and Atmosphere Near real-time Capability for EOS (LANCE) User Working Group (UWG) Meeting

February 7-8, 2012

Holiday Inn Capitol
Washington, DC

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National Aeronautics and
Space Administration

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2012 LANCE UWG Meeting

Contents

1 LANCE UWG Members and Attendees

1.1 UWG Members

There are fourteen members of the User Working Group (UWG) and eleven members, or their designated alternates, were in attendance (Kim Richardson, Mike Fromm, Brad Quayle by phone). Liam Gumley, Robert Brakenridge, and Bradford Green did not attend.

Name	Affiliation	Alternate	Element of Interest
Chris Justice	University of Maryland		All Elements
Liam Gumley	University of Wisconsin/Madison		MODIS
Jeff Hawkins	Naval Research Lab	Kim Richardson	MODIS/AMSR-E
James Verdin	USGS	Jesslyn Brown	MODIS
Gary Jedlovec	NASA/MSFC/SPoRT	Mathew Smith	MODIS/AIRS/AMSR-E
Rama Nemani	NASA/ARC	Petr Votava	MODIS
Nickolay Krotkov	NASA/GSFC		OMI
Arlindo da Silva	NASA/GSFC		MODIS/AIRS
Mike Fromm	Naval Research Lab		MODIS
Robert Brakenridge	Dartmouth Flood Observatory		MODIS
Brad Quayle	Forest Service		MODIS
Bradford Green	DOD		
Chris Vaughan	DHS/FEMA		
Mark Trice	Maryland/DNR		MODIS

1.2 Other Attendees

There were a number of additional attendees representing other members of the user community, representatives of the individual LANCE elements, NASA Headquarters (HQ), and NASA Earth Science Data and Information System (ESDIS). These are listed in Appendix A.

2 Minutes

The principal topics of the UWG meeting were the review of the status of previous UWG recommendations, identification and discussion of potential enhancements and upgrades to the LANCE system, and the provision of recommendations by the UWG for future efforts. The potential system changes were suggested by the UWG, the representatives of the LANCE elements, and other attendees representing various segments of the LANCE

user community. Presentations were given by representatives of the various LANCE elements with focus on the changes that had been made to the system in response to user recommendations from the LANCE UWG meeting at the University of Maryland in November 2010 and the UWG telecom in June 2011. A summary presentation on the overall system was given to provide context to the new and existing UWG members.

The detailed agenda is in Appendix B. Most of the first day's presentations are available online at http://earthdata.nasa.gov/data/nrt-data/user-community/user-working-group-uwg/february-2012-meeting.

The meeting was divided into four sessions:

1. ESDIS Reporting
2. UWG Round Table Feedback
3. Closed Door Feedback / Recommendations
4. Open Session

2.1 ESDIS Reporting Session

In this session, presentations were given that

- Welcomed the UWG members and covered the meeting objectives
- Provided perspective from program management, UWG chair, and Applied Science Program
- Reviewed LANCE related work accomplished over the past year and what will be occurring within the current term.
- Reviewed interactions with sample LANCE users
- Described usage of LANCE data by two new UWG members
- Provided status of the AMSR-E instrument
- Discussed NPP status and NRT data policy

2.1.1 Welcome by Kevin Murphy (ESDIS)

The meeting was opened by K. Murphy (ESDIS), who welcomed the UWG members and other attendees and thanked them for their participation in the UWG and their support of LANCE. The presentation:

- Summarized some of the characteristics of the Earth Observing System Data and Information System (EOSDIS), one of the largest civilian Science Information Systems in the world.
- Explained LANCE in the context of EOSDIS and the main objectives of LANCE.
- Identified LANCE data products and how to access them.
- Reviewed meeting objectives, structure, and agenda

2.1.2 Project Manager Perspective by Martha Maiden (NASA HQ)

M. Maiden welcomed the UWG members and other attendees. She discussed the importance of the mission of all EOSDIS UWGs and how they provide necessary

feedback and guidance for all components of EOSDIS. Science priorities of LANCE, and more generally EOSDIS, are guided by priorities highlighted in the National Research Council Decadal Survey. The near real-time (NRT) component of EOSDIS is a vital part of our data systems.

2.1.3 UWG Chair Perspective by Chris Justice (Co-Chair, UMD)

C. Justice welcomed the UWG members. He said that LANCE is one of NASA's big successes. Noting one specific example, he said that from the agricultural community user perspective, the speed of the delivery of NRT data is critical.

He discussed his background working with fire-related EOS data and said that he has applied that experience to his work on the LANCE UWG. He said that there is real desire on the part of NASA to get LANCE data out quickly to the user community.

He said that eleven UWG members or alternates were attending the meeting, either in person or online. UWG members represent a number of different science/application disciplines.

He mentioned a few LANCE topics to consider over the course of the meeting:

- How can the LANCE program benefit society as a whole?
- How can we maintain and increase support for LANCE within the science community?
- When proposing UWG recommendations, try to represent not only your own needs but represent the general needs your broader user community.

He asked that the LANCE project help new UWG members understand current capabilities and that attendees review the following material from the previous UWG meeting (available from the LANCE website at http://earthdata.nasa.gov/data/nrt-data/user-community/user-working-group-uwg) :

- The Mar/Apr 2011 Earth Observer article summarizing the Nov 2010 UWG meeting.
- Minutes from the Nov 2010 meeting.
- The presentations for this and the Nov 2010 meeting.

2.1.4 Applied Science Perspective by Brad Doorn (NASA HQ)

This presentation focused on:

- The purpose of the Applied Science program in regards to earth science is to build knowledge and develop abilities on how to apply earth observations.
- The strategy for discovering and demonstrating Earth Science applications via:
    - Enhancing applications research
    - Increasing collaboration by pursing partnerships
    - Accelerating the process of identifying needed applications early in the mission lifecycle

- Application areas are organized around the nine US Group on Earth Observations (GEO) Societal Benefit Areas (SBAs).
- Project examples include fire alerts generated from MODIS Fire/Thermal Anomalies product and volcanic ash advisories derived from Aura OMI SO2 data.
- The nine Applications Readiness Levels (ARL) span 1) Discovery and Feasibility, 2) Development, Test, and Validation, and 3) Partner Demonstration and Transition.
- Feasibility-to-Decisions Projects (F2DS) are solicitations to identify, prioritize, and implement high-reward applications ideas with committed partners.
- The importance of data latency as a major factor in the utility of data products for applied and operational uses and some scientific investigations.
- The purpose of the ROSES 2011 Disaster Solicitation was to select applied research and applications projects to improve disaster forecasting, response, and mitigation. Projects were encouraged to incorporate near real-time earth observations.

During the presentation, M. Maiden discussed the success of SERVIR, a NASA initiative that integrates satellite observations, ground-based data and forecast models to monitor and forecast environmental changes and to improve response to natural disasters. M. Goodman mentioned that the LANCE program has done a good job encouraging the development of relationships between the end user community and application developers.

2.1.5 LANCE Action Status and Accomplishments by Kevin Murphy (ESDIS)

This presentation:

- Reviewed the progress of the action items/recommendations from the November 2010 UWG meeting and the June 2011 telecom. A table of the recommendations, priority, and status is provided in Appendix C.
- Examined metrics showing that:
    - There are approximately 2000 user registered for LANCE data.
    - Latency among all elements is consistently well below the three hour requirement with few anomalies.
    - Since Jan 2010, latency among LANCE MODIS-Terra products has shown significant year-over-year reductions as a result of ground system enhancements.
    - Unique Rapid Response users ranging from approximately 15,000 to 35,000 a week.
    - Rapid Response image downloads ranging from 20,000 to over 50,000 a week.
- Reviewed project accomplishments, including reduced latency, new/enhanced NRT products, advancements in data distribution, Rapid Response integration, Web Mapping Service (WMS) prototype, Global Image Browse System

(Worldview/Tiled WMS), additional LANCE tools, the LANCE web site, and Outreach.

During and subsequent to the presentation:

- C. Justice asked for more details on the previous UWG recommendation to investigate adding a rolling daily NBAR LANCE-MODIS product. M. Teague said that he discussed this with Crystal, Liam, and Ed Masuoka, and, based on those discussions, concluded that there was no identifiable user community.
- P. Votava asked if it was understood why only a small percentage of registered users are downloading LANCE data. K. Murphy said that there could be a number of reasons, including users not realizing that registration is only required to utilize ftp downloads, users not needing the HDF granules, etc.
- M. Maiden asked if LANCE offers explanations on the differences between NRT and science quality data.
- E. Masuoka provided an example of using NRT data to fill in science quality data gaps in a crop detection forecast application.

2.1.6 Interactions with sample LANCE Users by Diane Davies (ESDIS)

This presentation focused on:

- Investigation into understanding of LANCE user needs and report of user feedback on LANCE applications.
- Interviews with users from nineteen organizations, made up of eleven brokers and eight direct users.
- The overall consensus towards LANCE data and services was positive.
- Suggested improvements on LANCE image viewer applications (WMS/Worldview) included comments on layers, downloading underlying data, and specific functionality. Most suggestions have either been completed in Worldview development versions or are scheduled to be included in later versions.
- Significant interest from a number of organizations in directly accessing the back end image data store, bypassing the user interface.
- Examples of how image data are used to monitor floods in Thailand and to assist in navigating through Antarctic ice.
- Significant user popularity in image subsets.
- Requests for new NRT products, including Burn Scar, NDVI, and Evapotranspiration, and data continuity for current measurements.

During and subsequent to the presentation

- C. Justice expressed concern about quality control regarding the highlighting of environmental events in the WMS/Worldview clients using RSS feeds. He said

that the Earth Observatory was not a systematic source and LANCE should work with FEMA and others qualified to help identify significant events.

- B. Doorne recommended that LANCE collaborate with FEMA and NOAA to similarly classify hazard/disaster events.
- M. Maiden and C. Justice stressed that the LANCE and UWG should not solicit widely with individual groups for new NRT data products but should rather communicate with established and known user communities to evaluate potential high-demand products.
- C. Justice suggested a regular one to two page article in the Earth Observer showcasing use of LANCE data with real world examples, similar to the example D. Davies presented to the UWG of users navigating through Antarctica with the aid of NRT imagery.
- C. Justice suggested that UWG members could promote LANCE applications to their own user community and suggested a standard LANCE slide set be made available to the UWG and kept up to date by the Project.

2.1.7 EOSDIS Global Browse Tools by Ryan Boller (ESDIS)

This presentation discussed:

- The driving goal of providing full resolution product viewing capability for EOSDIS products. This includes providing:
    - Standardized services for brokers to access NRT imagery for their own purposes
    - A full-resolution global browse tool to access the same imagery
- The LANCE WMS Client is a prototype for browsing and downloading imagery.
- The LANCE team is currently implementing an imagery serving architecture using the Open Geospatial Consortium (OGC) Web Mapping Service (WMS) and a PO.DAAC-developed Tiled WMS (TWMS) to ingest and serve imagery from more than 50 global data products.
- The frontend successor to the WMS client is Worldview, a web-based client (http://earthdata.nasa.gov/labs/worldview/) developed using open standards for cross-device compatibility which uses the imagery serving architecture detailed above.
- Future work:
    - Frontend: Polar stereographic viewing, imagery download, custom subsets, color bars
    - Backend: Reduced ingest latency, standardization to OGC Web Map Tiling Service (WMTS), provide specs for external access to data

During and subsequent to the presentation:

- R. Boller gave a live presentation of the Worldview client to view current flooding in Pakistan using several MODIS band combinations, then shifted to viewing a Saharan dust storm blowing across the Atlantic Ocean as seen by MODIS, AIRS, and OMI data products.
- C. Justice and B. Doorn asked what sources the LANCE group would use to identify and capture hazardous/disastrous events. R. Boller said that they had not yet incorporated event sources into Worldview. C. Justice said that the LANCE group should research official event repositories.
- M. Maiden asked if NSIDC EASE-Grid data had been considered for use in polar stereographic visualizations. D. Davies will talk with users to investigate interest.
- M. Maiden asked if there was a path for moving the Worldview application out of the alpha stage. R. Boller and K. Murphy are working on defining requirements from transitioning from alpha to beta to production. Definition of this process is more broadly applicable to EOSDIS applications, not just Worldview and the TWMS.
- M. Fromm asked when color bars would be added. R. Boller responded that this feature is a high priority and will be implemented as soon as possible.

2.1.8 LANCE Planned Activities and Enhancements by Kevin Murphy (ESDIS)

This presentation discussed:

- The integration of the LANCE website into the EOSDIS site http://earthdata.nasa.gov in order to leverage and coordinate EOSDIS-wide capabilities (Science and NRT data).
- The transition to from the prototype LANCE User Registration System (URS) to an EOSDIS-wide system will occur by late spring 2012.
- Global Image Browse system enhancements are planned including those for the TWMS system and collaborations with brokerage users.
- LANCE datacasting, an extension of RSS and GEORSS, will be prototyped to populate the ECHO metadata repository with NRT metadata. This will make searching for science and NRT data more transparent.
- The integration of FIRMS into LANCE/Earthdata by Spring 2012.
- Newly implemented and proposed LANCE products.

During and subsequent to the presentation:

- K. Murphy said that there is a need to improve the announcement of new data products and guide users to ensure that people are using the correct data.
- J. Brown asked how LANCE ensured that science products are used in place of NRT data once available. Kevin said that future functionality would ensure that searches would display science data if available – this would be facilitated by integrating with ECHO

2.1.9 Future EDOS Ground System Upgrades by Bruce McLemore (EDOS)

This presentation discussed:

- EDOS implemented three major latency enhancements in 2011:
  - Removal of Reed-Solomon decoding
  - Deployment of 2nd Terra EBox-R at LZPF to eliminate WAN transfer time for MODIS
  - Implementation of lossless compression/decompression and Terra PN decoding
- Planned and Future Latency Enhancements:
  - EDOS ground station support at McMurdo (Antarctica)
  - Implementation of a new "Hybrid" architecture to decrease WAN transfer time.

During and subsequent to the presentation:

- M. Maiden and C. Justice asked about the purpose of the reusable architecture. B. McLemore said that it would make it easier to set up new ground stations.
- C. Justice said that considerable progress has been made by EDOS in reducing latency and the Project should weigh the cost/benefit to reducing latency any further.

2.1.10 FEMA's Usage of NRT Data by Chris Vaughan (DHS/FEMA)

Presentation summary:

- The National Alliance for Public Safety GIS Foundation (NAPSG) Concept of Operations (GeoCONOPS), which is intended to identify and align geospatial resources necessary to support homeland security and emergency management operations. The GeoCONOPS is available on the NAPSG website -- http://www.napsgfoundation.org/.
- Disaster Assistance Employees (DAE) will greatly benefit from their ability to utilize LANCE products and services.
- FEMA has developed a geospatial viewer called the Situational Awareness View for Emergency Response & Recovery ($SAVER^2$), displays available data from multiple emergency management partners and stakeholders. LANCE data feeds would be an important source of geospatial information.
- The geospatial platform of the data.gov (http://geo.data.gov/) is also an important source of geospatial information for FEMA.

2.1.11 Maryland DNR's and NRT Data by Mark Trice (MD DNR)

Presentation summary:

- The MD DNR tidal quality mission is to:
  - Assess water quality criteria

    - Determine WQ status and trends for tidal waters
    - Target habitat restoration potential
    - Provide data access to the public
    - Determine impacts of weather and harmful algal blooms
- A significant number of visits (46%) to the MD DNR website "Eyes on the Bay" (http://www.eyesonthebay.net/) are to view LANCE Rapid Response MODIS true color images of the bay.
- LANCE imagery was used to study the effects on the bay caused by Tropical Storm Lee in September 2011.
- MODIS SST is used to determine Bay-fishing seasons, monitor vibrio bacteria, and ascertain population shifts.
- A water quality-mapping example using August 2005 MODIS chlorophyll data to investigate a 1-mile long fish kill near Smith Island.
- Water quality challenges include improvement of ecological forecasts, providing additional assessment for water quality indicators, and enhancing in situ interpolation methods.

During and subsequent to the presentation:

- M. Maiden asked if MD DNR has push-based subscriptions to the LANCE data. M. Trice said that their group manually retrieves the data as needed.
- C. Justice asked if the LANCE WMS/Worldview imagery tools would be of benefit. M. Trice responded that they would.

2.1.12 NPP Status and Data Policy re: LANCE by Jim Gleason (NPP) and Diane Wickland (HQ)

Summary of the first presentation on Suomi NPP status, given by J. Gleason:

- NPP spacecraft is in normal Mission Mode with all systems nominal.
- NPP data are flowing to National Environmental Satellite, Data, and Information Service (NESDIS) and AFWA Centrals and to CLASS archive.
- NPP instruments in normal operations mode, with commissioning continuing for VIIRS, CrlS, OMPS, and CERES
- A revised commissioning schedule, with the Satellite Acceptance Review is scheduled for 6 March 2012.
- A VIIRS data anomaly was observed after launch. The rate of data degradation, should slow and eventually level off. Even with the anomaly, VIIRS data should meet instrument specification requirements.

Summary of the second presentation on Suomi NPP data policy, given by D. Wickland:

- The NPP mission is to provide a continuation of the EOS data record by bridging EOS satellites with those of the NOAA Joint Polar Satellite System (JPSS).

- NPP high level responsibilities and mission phases were presented.
- The makeup and responsibilities of the NPP science team, which was re-competed in ROSES-2010.
- NOAA is responsible for NPP data processing, production, distribution, and archive of NPP Science Data Records (SDRs) and Environmental Data Records (EDRs). NASA will evaluate SDRs and EDRs and recommend algorithm improvements.

During and subsequent to the presentations:

- In regards to the availability of NRT data, D. Wickland said that some products are being produced at near real-time to support weather prediction activities, and, they could be used for NRT purposes if they meet the needs of the LANCE science community
- VIIRS Surface Temperature data will be available from the NOAA Comprehensive Large Array-data Stewardship System (CLASS) with about a six-hour latency.
- Since JPSS is responsible for data quality, questions regarding latency for NRT algorithms should be posed to them.
- C. Justice said that the VIIRS Science Team meeting planned for June would be critical for users to voice their needs that are not being met by the current system. NASA needs to be aware of potential NPP NRT products that could meet the needs of the LANCE community. NASA is planning an Applied Science meeting on VIIRS later in the year.

2.1.13 AMSR-E Status presented by Helen Conover (ESDIS)

Presentation summary:

- The Advanced Microwave Scanning Radiometer – EOS (AMSR-E) is a passive microwave radiometer built by JAXA and launched aboard Aqua on 4 May 2002.
- Detects water in all its state phases in the environment and monitors climate and weather water processes. Products include Brightness Temperature, Rain Rate, Soil Moisture, Ocean Products, Snow Water Equivalent, Sea Ice.
- Torque from spinning sensor dish has been increasing over time near the limit of 4.5 Newton-meters. On 4 October, torque spiked to over 8 N-m, starting a controlled spin-down to stop rotation.
- JAXA plans to spin up AMSR-E around launch of GCOM-W1, which has AMSR2 as a follow-on instrument to AMSR-E.
- Nominal AMSR-E spin rate is 40 rpm. Target resumption spin rate is 4 rpm. This will allow cross-calibration with AMSR2. If all goes well, may investigate resuming nominal 40 rpm. Approval of the 4 rpm spin rate will be made in conjunction with all Aqua components.

- At 4 rpm, 100 km between adjacent scans instead of nominal 10 km. Adjustments to science algorithms would be required to process LANCE data.
- Science value of 4 rpm data will be reduced but could still be useful, pending evaluation.
- AMSR2 is similar to AMSR-E, but has additional low frequency channel and larger antenna for improved spatial resolution.
- NOAA STAR will generate AMSR2 products for archive and distribution via CLASS. Early access available for registered users.
- GSFC Precipitation Processing System will generate AMSR2 products (L1C inter-calibrated BT, L2 rain, and L3 daily/monthly rain) as part of GPM mission.

During and subsequent to the presentations:

- If JAXA cannot get AMSR-E spin rate up to 4 rpm, then they are not planning on continuing troubleshooting. Instead, they will focus on AMSR2.
- C. Justice requested that the LANCE AMSR-E element poll the NRT AMSR-E community on the utility of reduced resolution data if JAXA determines that AMSR-E can only operate at 4 rpm.
- M. Maiden asked if AMSR2 SDR will correspond with L1A or L1B AMSR-E products. H. Conover will investigate.

2.2 UWG Round Table Feedback Session led by Chris Justice

C. Justice asked each of the UWG members to provide feedback on LANCE products and services in the context of the previous presentations.

- K. Richardson: LANCE is a success. Commend the LANCE team for proactively informing the community on status updates. Latency in past three months has been excellent. As a member of the VIIRS cal-val team, has made inter-comparisons of VIIRS edge of scan with MODIS. VIIRS NRT data would be beneficial. Currently getting VIIRS data from Wisconsin PEATE. Additional comment that AMSR-E has been a real benefit for hurricane centers.
- M. Fromm: MODIS subsets are very important. Requests that subsets not be removed. Subsets could be implemented for parts of globe not covered. Stressed the importance of color bars in Worldview. Asked if metadata could somehow be provided with browse imagery. Information on data holes/missing data in Worldview needs to be carried forward.
- A. DaSilva: Uses LANCE MODIS aerosol, fire product, and color radiances. Recommended that the LANCE group investigate the utility of NRT MISR data. Could also use MISR for validation and verification. Would like to talk to R. Boller about using forecasted data from GMAO into Worldview.

- P. Votava: Could use NRT data for agriculture irrigation modeling. Will brief the Unmanned Airborne Vehicles (UAV) Planning and Scheduling group at AMES. Interested in NRT collaborations with the NASA Earth Exchange (NEX). Would like more information on NRT-science data comparisons. Would like to know why so many registered users are not downloading data.
- M. Smith: Works extensively with National Weather Service (NWS). Reduced latency for NRT data is important. Uses AIRS L2 profiles. Was a big user of AMSR-E, but will probably not be interested in using 4 rpm AMSR-E data. Interested in learning more about GeoRSS in the context of NRT data related to weather forecasting, data assimilation, moisture profiles, temp profiles, etc. Suggested that a consideration is made for weather forecasting in the use-case matrix. Hopes that NRT VIIRS data will be made available to NWS. Asked if NOAA have a comparable UWG? (C. Justice response: NESDIS does have something, focused on User Readiness but it's structured differently. Will investigate if there's a VIIRS working group, which would include NWS.)
- J. Brown: Uses LANCE to obtain MODIS L1B data. Uses NRT for the USGS Drought Monitor. Biggest concern is how to obtain VIIRS. While it would be possible to translate AVHRR data to provide MODIS continuity, using VIIRS would be much easier. Interested in the comparison between collection 5 and 6 MODIS. Interested in NRT land surface temperature (LST) products, as well as evapotranspiration (ET) characterization. Asked if there were plans for a vegetation composite index? If so, then EROS can focus more resources to other anomaly detection.
- M. Trice: NRT data provides support for interaction with high level politicians. Might want to consider making some LANCE services easier for less informed users to understand.

In closing the session, C. Justice briefly discussed two items:

- The need for more Working Group members that would provide a more diverse representation of the LANCE user community.
- The need for UWG members to help develop plans for a user symposiums on the benefits of LANCE data, services, and developments.

2.3 Closed Door Feedback / Recommendations Session

C. Justice said that the purpose of this session was for UWG members and LANCE management to discuss program progress, next steps, and recommendations for the coming year. The following was discussed:

- C. Justice said that the LANCE group is doing an excellent job for such a relatively small investment. He said that the program is not getting enough credit due to lack of outreach.

- A. DaSilva asked about the possibility of NRT MISR data. C. Justice said that the group needs to determine if there is a significant user community and what would be involved to bring it to production. M. Maiden said that it was an interesting idea and one worth pursuing if the community supports it. It might be possible to leverage off of work done by JPL.
- C. Justice and D. Lowe reiterated the need for a regular article in the Earth Observer and other similar publications highlighting LANCE applications and technology.
- C. Justice said that the June 2012 NASA Application Workshop for VIIRS would be a good forum to promote the use of LANCE for VIIRS. M. Maiden would like for UWG members/associates to participate in the development and testing of VIIRS NRT data.
- C. Justice said that LANCE should be represented at the MODIS Science Team meeting in May 2012.
- In the context of expanding sources of EOS NRT data, C. Justice said that upcoming missions (SMAP, IceSAT2, etc) should consider the NRT community prior to launch. K. Murphy said that we should probably have a best practices document to present to upcoming missions so they can see the value of using or recreating capabilities.
- M. Maiden commended the LANCE group for providing support to the U.S. EPA AIRNow program.
- C. Vaughan recommended LANCE/UWG participation at the *HIFLD WG Meeting - Support to Hurricanes and Flooding* to be held on 3-4 April 2012 in Silver Spring, MD. Working group information can be found at https://www.hifldwg.org/.
- M. Maiden asked what the next steps were for Worldview. R. Boller said that Worldview should soon have all the functionality of the LANCE WMS viewer. The LANCE group will provide the top priorities for Worldview and a roadmap of development activities.
- M. Maiden suggested that World Wind and various other projects that could incorporate NRT data. C. Justice said that there could possibly be a discussion of other projects use of NRT data at the next LANCE UWG meeting. K. Murphy said that in this context, we need to be careful to distinguish the brokers from the end users. LANCE primarily works with brokers.
- C. Justice recommended that UWG meetings be held every six months; one telecom and one face to face meeting per year.
- M. Maiden suggested that project scientists/NRT users need to be involved with the UWG if they wish to have new products/services. She asked that an action be taken to contact T. Wagner to see if he could identify a represenitive for the cryosphere community to serve on the UWG.

- K. Richardson said that global NRT data is as important as CONUS data. He also said that the typhoon/hurricane warning center (i.e., passive microwave) community would still be interested in 4 rpm AMSR-E data.
- M. Maiden suggested that the Geospatial Platform could be a potential partner for LANCE data.
- C. Justice said that LANCE/UWG needs to do a better job of getting the message out. Suggested one or more slide presentations prepared by the LANCE group to be used by UWG members at symposiums/conferences.
- C. Justice said that K. Murphy needs to provide the NASA Applied Science Program with a demonstration of LANCE capabilities and applications.
- S. Kreisler will provide A. DaSilva with a new product template to be used to propose MISR and GMAO data.

2.4 Open Session

2.4.1 Action Items from the meeting

In this session, UWG members and other participants reviewed and prioritized the action items and recommendations proposed during the meeting. The categorized action items derived from the meeting, along with element, priority, responsible party, status, and comments, can be found in Appendix D.

2.4.2 Meeting Wrap-Up

In this session, participants reviewed a few outstanding issues and made any closing remarks prior to adjournment. The following was discussed:

- A request was made that the project provide expanded guidance on the appropriate use and quality of LANCE data. K. Murphy and C. Justice said that the project does not have the resources or expertise to do the latter.
- K. Murphy said that the LANCE group will place an up-to-date slide presentation on LANCE on the LANCE/Earthdata website to be available for UWG members to incorporate into their communications.
- C. Justice recommended that a symposium be developed to promote the utility of LANCE data.
- C. Justice asked if the LANCE group could emphasize on its website the acknowledgement and citation policy regarding LANCE data and images.
- M. Maiden said that the UWG should consider more members. Recommendations could come from the NASA Applied Science Program.
- M. Trice said that the MD Geographic Information Officer (GIO) has requested that data be more accessible, and that perhaps there was a disconnect between expert and non-expert users. K. Murphy said that the LANCE group will meet with new UWG members to understand their needs and present LANCE capabilities.

Appendix A Other UWG Attendees

Name	Affiliation	Representing
Martha Maiden	NASA HQ	HQ
Stephen Berrick	NASA HQ	HQ
Lawrence Friedl	NASA HQ	HQ
Brad Doorn	NASA HQ	Applied Sciences
Michael Goodman	MSFC	Applied Sciences
Diane Wickland	NASA HQ	HQ
Jim Gleason	GSFC	Suomi NPP
Dawn Lowe	GSFC	ESDIS
Jeanne Behnke	GSFC	ESDIS
Kevin Murphy	GSFC	ESDIS
Ryan Boller	GSFC	ESDIS
Michael Teague	GSFC	ESDIS
Tilak Joshi	GSFC	ESDIS
Steve Kreisler	GSFC	ESDIS
Bruce Vollmer	GSFC	GES DISC
Ed Masuoka	GSFC	LANCE MODIS, OMI
Gang Ye	GSFC	LANCE MODIS
Jeff Schmaltz	GSFC	LANCE Project
Helen Conover	UAH	LANCE AMSR-E
Kathryn Regner	UAH	LANCE AMSR-E
Diane Davies	UMD	LANCE Project
Phil Durban	GSFC	LANCE OMI
Terri Wood	GSFC	EDOS
Bruce McLemore	GSFC	EDOS
Kelvin Brentzel	GSFC	Direct Readout Lab

Appendix B LANCE UWG Meeting Agenda

Day 1 - February 7, 2012

ESDIS Reporting Session
Objective: Review work accomplished over the past year and what is occurring within the current term. This information will provide information for the UWG discussion session in the afternoon.

Welcome	K. Murphy (ESDIS)	9.00 – 9.10
Program Managers Perspective	M. Maiden (HQ)	9.10 – 9.20
UWG Chairs Perspective	C. Justice, Co-Chair (UMD)	9.20 – 9.30
Applied Science Perspective	B. Doorn (HQ)	9.30 – 9.45
Action Status and Accomplishments	K. Murphy (ESDIS)	9.45 – 10.30
Break		10.30 – 10.45
Interactions with sample LANCE Users	D. Davies (ESDIS)	10.45 – 11.15
EOSDIS Global Browse Tools	R. Boller (ESDIS)	11.15 – 11.45
LANCE Enhancements	K. Murphy (ESDIS)	11.45 – 12.15
Lunch		12.15 – 13.45
Future EDOS Ground System Upgrades	T. Wood (EDOS)	13.45 – 14.00
FEMA's Usage of NRT Data (***New Member***)	C. Vaughan (DHS/FEMA)	14.00 – 14.15
Maryland DNR and NRT Data (***New Member***)	M. Trice (MD DNR)	14.15 – 14.30
AMSR-E Status	H. Conover (ESDIS)	14.30 – 15.00
NPP Status and Data Policy re. LANCE	D. Wickland (HQ) & J. Gleason	15.00 – 15.30
Break		15.30 – 15.45
UWG Round Table Feedback Session	C. Justice (Co-Chair)	15.45 – 17.00

Objective: to have comments /presentations from the UWG providing feedback on i) the presented LANCE activities and ii) their experience in using LANCE, iii) 'user community' suggestions/priorities for LANCE enhancements.

Day 2 – February 8, 2012

Closed Door Feedback / Recommendations Session C. Justice (Co-Chair) 9.00-10.30
LANCE Management and UWG discuss program progress, next steps and recommendations for the coming year.

Break		10.30 – 11.00
Open Session		
Review of Action Items from the Meeting	ESDIS	11.00 – 11.30
Meeting Wrap Up	C. Justice/M. Maiden	11.30 – 12.00

Appendix C UWG FY11 Action Items and Recommendations

UWG Action Topic	Description	Submission Date	Priority	Status	Completion Date
Reduced Latency	Investigate the use of AMSR-E Direct Broadcast data and the provision of L1 and L2A algorithm codes to the Direct Readout Laboratory at GSFC	Nov 2010 UWG mtg	High	Prototype test of DB data successfully completed. Algorithm codes not completed due to instrument anomaly.	Sep 2011
	Investigate NRT products not available from the current EOS DB community that are needed with less latency than the 2-3 hours that is currently offered by LANCE	Nov 2010 UWG mtg	Low	Completed. Satisfaction express by Pat Coronado and other users using CONUS data. Not the case for AMSR-E and some international users.	Dec 2010
New/Enhanced Products	Investigate adding a rolling daily Nadir Bidirectional Reflectance Distribution Function (BRDF) adjusted Reflectance (NBAR) product to LANCE-MODIS	Nov 2010 UWG mtg	Medium	Investigated and not able to establish a user community of any significance	Feb 2011
	Investigate generating incremental AMSR-E products to reduce the L3 latency	Nov 2010 UWG mtg	Low	Completed. Produced incremental AMSR-E L3 products.	Mar 2011
	Extend the period for overlap of MODIS Collection 5 and 6 products	Nov 2010 UWG mtg	High	Agreed to but additional hardware required. C6 processing has not yet started.	Projected late 2012
	Investigate adding other element products, e.g., AMSR-E rain rate data to Rapid Response	Nov 2010 UWG mtg	High	AMSR-E rain rate data added to RR. After June 2011 UWG telecom, sixty additional products added based on use case matrix.	Jun 2011
	Generate and distribute daily and weekly snow maps in LANCE-MODIS at the request of Dorothy Hall (GSFC)	Jun 2011 UWG telecom	High	Completed	Oct 2011
	Generate and Distribute the NRL Aerosol Assimilation product from LANCE-MODIS at request of Ed Hyer	Jun 2011 UWG telecom	High	In progress	Projected Fall 2012
	Generate and distribute L1B Band 31 products from LANCE-MODIS at the request of Andrew Archer (US Antarctic Program), Paul Morin (Polar Geospatial Center, University of Minnesota), and Andrew Fleming (British Antarctic Survey)	Jun 2011 UWG telecom	High	Completed	Jan 2012
Data Access	Perform trade studies for LANCE data distribution techniques	Nov 2010 UWG mtg	Medium	Completed. Currently testing and evaluating datacasting as an option.	Spring 2011
	Perform trade studies for visualization techniques	Nov 2010 UWG mtg	Medium	Completed. Resulted in the Tiled Web Mapping Service.	Summer 2011
	Complete the Web Mapping Service and the Web Coverage Service for LANCE-MODIS	Nov 2010 UWG mtg	High	WMS client (and Worldview) complete for all LANCE elements	Dec 2011
Additional Tools	Investigate adding product formats such as BUFR, netCDF, and GeoTiff for all elements	Nov 2010 UWG mtg	Medium	netCDF implemented for MODIS. GeoTiff will also be supported by the Tiled WMS.	Ongoing and needs to be worked on
	Verify that compression for LANCE data is	Nov 2010 UWG mtg	High	Completed. Data are compressed.	Nov 2010
	Investigate using standard tool sets (e.g., sub-setting) for all elements and investigate software re-use across elements	Nov 2010 UWG mtg	Low	HDFEOS Subsetter is available from UAH. Rapid Response software and processes reused for other LANCE Elements.	Needs to be re-opened
LANCE Web Site	Investigate generating browse products for all LANCE elements	Nov 2010 UWG mtg	Low	AMSR-E browse completed. Worldview replaces browse data for individual instruments.	Dec 2011
	Add interactive area for users	Nov 2010 UWG mtg	Medium	This is being considered for inclusion within the Earthdata web site, which will house LANCE	Summer 2012
	Add links for access to Direct Broadcast data	Nov 2010 UWG mtg	High	Completed in the LANCE dev site -- being migrated to Earthdata	Jan 2011
	Plan Near-Real Time Symposium to include data providers other than LANCE	Nov 2010 UWG mtg	Medium	No progress	
	Add linkages of NRT data available from EOSDIS	Nov 2010 UWG mtg	Mediun	Completed. Available on LANCE website.	Jan 2011
	Investigate and implement publication metrics	Nov 2010 UWG mtg	Low	TBD	Dropped
	Evaluate FEMA's need for LANCE data	Nov 2010 UWG mtg	High	Completed. FEMA now using FIRMS and RR data products.	Spring 2011

Appendix D UWG 2012 Action Items and Recommendations

Category	Description	Element	Priority	Assigned To
VIIRS	LANCE to participate in the NASA Application Workshop for VIIRS expected to be held in June 2012.	MODAPS	High	LANCE MODIS (Ed Masuoka, Jeff, Gang Ye) and Kevin Murphy
	Investigate if NOAA has a comparable NRT UWG for VIIRS/NPP.	UWG Members		Chris Justice
EOSDIS Worldview / Tiled WMS imagery browse	LANCE to incorporate color bar/legend into Worldview/WMS to allow for interpretation of images.	Worldview	High	Ryan Boller
	LANCE to investigate mechanisms and content for providing metadata about WMS layers.	Worldview	Medium	Ryan Boller
	LANCE to modify the user interface so that areas with data gaps/missing data, etc.. can be discriminated from areas that have data.	Worldview, OMI	High	Ryan Boller, Phil Durbin
	LANCE to implement functionality so users can define custom subsets.	Worldview	High	Ryan Boller, Jeff
	LANCE to provide roadmap for Worldview development activities as they pertain to LANCE.	Worldview	Medium	Ryan Boller
Potential Product Candidates	Investigate community demand for MISR data for aerosol modeling community (ICAPS) and, if warranted, complete enhancement request form for evaluation by LANCE management.	External		A. DaSilva
	Explore adding GMAO model output from GMAO WMS into Worldview client, including all applicable policies and issues and present findings to ESDIS and HQ.	LANCE Project	Medium	Ryan Boller
	Investigate and define user communities, algorithm modifications, and other factors influencing the utility of reduced spin rate (4 rpm) for AMSR-E NRT data and applications.	AMSR-E	High	Helen Conover
	Investigate availability and latency of NRT L1C AMSR2	AMSR-E		Helen Conover
Product Quality	LANCE to make it easier to find existing product quality information that compare NRT and science products.	All	Medium	Tilak Joshi, Ed Masuoka, Mike/Bruce
	LANCE to evaluate current product quality information and determine if additional capabilities need to be investigated (work with existing instrument QA teams).	All	Medium	Ed Masuoka, Phil Durbin, Bruce Vollmer
	LANCE to investigate providing more guidance on product usage between NRT and science data.	All	Medium	Ed Masuoka, Phil Durbin, Bruce Vollmer
Outreach	Applied Science Program (F. Lindsey) to provide guidance to coordinate and plan LANCE symposium for user community show and tell/outreach.	LANCE Project	Medium	Kevin Murphy
	LANCE to contact new UWG members to help them get up to speed and understand LANCE capabilities and for LANCE to understand their needs.	LANCE Project	High	Kevin Murphy
	LANCE to provide regular (two to four times a year) articles that showcase usage of LANCE data to Earth Observer.	LANCE Project	High	Diane Davies
	LANCE to provide Applied Science Program (F. Lindsey) a demonstration of capabilities with emphasis to ensure full utilization of current capabilities during agency response to hazards and disasters.	LANCE Project	High	Kevin Murphy
	Reserve a spot for LANCE at the MODIS Science Team meeting May 2012.	LANCE Project	High	Chris Justice
	LANCE and the Applied Science Program to regularly communicate about capabilities and needs.	LANCE Project	High	Kevin Murphy
	LANCE to create a generic slide presentation package for use by UWG members and others to promote LANCE.	LANCE Project	High	Jeff, Diane Davies
	LANCE to coordinate with UWG members and submit an article about LANCE capabilities and utility to EOS.	LANCE Project	High	Mike Teague
	LANCE to implement citations/acknowledgments for NRT data.	LANCE Project	High	Tilak Joshi
	LANCE to attend and present capabilities in conjunction with F. Lindsey at FEMA HIFLD meeting.	LANCE Project	High	Kevin Murphy
Application Matrix	LANCE to work with Applications Science Program on refining the application matrix and mapping the matrix to GEOSS SBAs.	LANCE Project	Medium	Mike Teague, Diane Davies
	LANCE to investigate adding a weather forecasting category to the applications matrix.	AIRS	High	Bruce Vollmer
UWG Membership	UWG members and Application Science Program to nominate additional UWG members, especially from the cryosphere program.	UWG Members	High	Chris Justice, Steve Berrick, Frank Lindsay