

Summary Of NOAA's National Weather Service (NWS) Public Meeting  
To Discuss the NWS plans to collect, distribute, and archive WSR-88D Level II Data  
Held At Silver Spring, MD on June 18, 2003  
(As Of July 7, 2003)

**Meeting Background:**

As announced in Federal Business Opportunities (FedBizOps) on May 20, 2003, the National Weather Service (NWS) hosted a one-day public meeting in the Silver Spring Metro Center#2, Silver Spring, MD. The meeting discussions focused on NWS plans to electronically collect and distribute Weather Surveillance Radar-1988 Doppler (WSR-88D) Level II data in near real time. The NWS will use this approach to archive these data at the National Climatic Data Center and provide the data for operational use at the National Centers for Environment Prediction. The NWS also plans to make these data available to users outside the NEXRAD Program.

**Meeting Objectives:**

As listed in the FedBizOps announcement, the meeting objectives were:

1. The NWS will describe the proposed architecture for electronically collecting and distributing WSR-88D Level II data;
2. The NWS will describe the proposed NWS implementation schedule;
3. Current and prospective non-NEXRAD agency users of real-time Level II data will be asked to comment on the proposed NWS architecture;
4. Comments will be solicited on how the private sector may wish to redistribute Level II data, given the NWS-proposed architecture;
5. The NWS will discuss the decision-making process and how the information gathered from this meeting will be used in finalizing the Level II distribution architecture and distribution policy; and
6. The NWS will attempt to answer questions that may arise during the meeting with respect to distribution of Level II data.

**Meeting Summary:**

The list of the people attending the meeting is at:

[http://www.roc.noaa.gov/NWS\\_Level\\_2/ResultsFrom061803Mtg/061803FinalAttendanceList.pdf](http://www.roc.noaa.gov/NWS_Level_2/ResultsFrom061803Mtg/061803FinalAttendanceList.pdf)

The meeting agenda is at: [http://www.roc.noaa.gov/NWS\\_Level\\_2/ResultsFrom061803Mtg/Agenda.pdf](http://www.roc.noaa.gov/NWS_Level_2/ResultsFrom061803Mtg/Agenda.pdf)

The briefing slides shown at the meeting are at:

[http://www.roc.noaa.gov/NWS\\_Level\\_2/ResultsFrom061803Mtg/presentations.asp](http://www.roc.noaa.gov/NWS_Level_2/ResultsFrom061803Mtg/presentations.asp)

Dr. John Hayes, Director of the NWS Office of Science and Technology (OS&T), welcomed the meeting participants and explained the NWS meeting goals. The meeting was a follow up to the commitment the NWS made at the American Meteorological Society Annual Meeting in February 2003 when the NWS announced the plans to electronically collect and distribute Level II data. The NWS commitment was to

consult with and involve external users before the NWS planning was completed. While Dr. Hayes emphasized that the network is being implemented to meet NWS requirements, he stated that where changes can be made a no or little additional cost to accommodate external need, the NWS will seriously consider them. The schedule and architecture presented at this meeting is proposed, not final. He further emphasized there will be no restrictions on use or redistribution of these data. Dr. Hayes closed his presentation with stating he wanted the meeting participants to leave the meeting feeling they have fair treatment.

Dr. Tim Crum, NWS Focal Point For Operational WSR-88D Issues, discussed the flow of Level II data through the WSR-88D, possible WSR-88D changes that may impact Level II users, and the NWS requirements for these data. The NWS has installed Base Data Distribution Systems (BDDSs) at all (159) NWS sites and will be installing BDDSs at select (11) DOD WSR-88D sites in the continental U.S. (CONUS). The BDDS is the interface that provides Level II data to external users. The Radar Operations Center (ROC) web page ([http://www.osf.noaa.gov/NWS\\_Level\\_2/](http://www.osf.noaa.gov/NWS_Level_2/)) will have information on the interface control documents for reading the Level II data. Users will need to become familiar with the BZIP2 compression software and the Unidata Local Data Manager (LDM) software the NWS Network will use. Information for these software packages are available on the Internet. Users will need to be prepared for changes to the Level II data stream. In spring 2004, with the installation of WSR-88D Radar Product Generator (RPG) software Build 5, a file containing metadata will be added to the start of the data stream for each volume scan. It is possible after the deployment of the Open Radar Data Acquisition (ORDA) (deployments from September 2004 through December 2005), the contents of the metadata file will change by adding more metadata received from the ORDA. In addition, it is possible the NEXRAD agencies may require higher-resolution data from the ORDA (e.g., 250 m reflectivity data, 0.5 degree azimuth sampling). The NWS will decide whether there is a requirement for adding these data to the data stream sent to the NWS Network at a later date. The ROC will provide a web page that will list the software version individual sites are using and provide notification of planned changes to the Level II data stream. Dr. Crum also provided the list of the 11 DOD WSR-88D sites that will be a part of the network by the end of 2004. He also discussed the NWS delivery requirements for these: (1) one-minute latency (as measured from the time the data reaches a given BDDS to when the data reaches the central collection point at the University of Maryland); and (2) a 95% reliability of receipt of the data (measured when a radar is operational) at the central collection point at the University of Maryland

Phil Cragg, NWS OS&T and lead project engineer, provided a summary of the schedule and proposed architecture network which will be implemented in a two-phased approach:

- (1) Initial Operating Capability (IOC). Leverage the successful Collaborative Radar Acquisition Field Test (CRAFT) Project by supporting continued CRAFT operations. At NWS sites that are not a part of CRAFT, the NWS will add data compression/data manager PCs; add 128 kbps of bandwidth per radar to the NWS Net that connects NWS sites to their regional headquarters (4 in the CONUS); add 2 servers (one for redundancy) at each regional headquarters, add a DS3 connection from the regional headquarters to a nearby Internet2 Gigapop; and connect these additional sites to the NWS data collection network by the end of 2003; and
- (2) Full Operational Capability (FOC). Install the required compression and data manager software on WSR-88D systems, connect select CONUS DOD WSR-88D sites to the data collection network, and complete the full operational capability by the end of 2004.

Mr. Cragg provided a more detailed implementation schedule and the proposed architecture at each

phase. During IOC, the data from all sites connected to the network will go to a server at the University of Oklahoma, just as the data from the 62 sites participating in the CRAFT Project are now. During the transition to FOC, the central server for the data will move to the Gigapop at the University of Maryland. Several audience questions arose during the discussion, many focusing on concern for single-point of failures in the architecture. The NWS will evaluate ways the communications architecture and the LDM software can provide multi-pathing for the data to reduce possible single-points of failure. The CRAFT experience has shown that using an architecture that is not as robust as the proposed NWS Network and with a much more heterogeneous approach (hardware, software, and communications links), the data availability has been well above 95% . Mr. Cragg also stated that the desk top estimates of data latency show a figure of about 4 seconds.

Dr. Mohan Ramamurthy, Unidata Director, discussed Unidata plans to help ensure Level II data are distributed through the Unidata community (approximately 150 sites) to facilitate research and development. The Unidata role will not be to have the data come to a Unidata server, in fact, by design the Unidata approach has no data center. Instead, Unidata will work with their member universities to establish top-tier LDM nodes that will be placed strategically at universities on Internet2, close to Gigapops. Unidata already has 10 universities interested in serving as top-relay nodes who in turn would send the data to other universities and research labs. Dr. Ramamurthy stated that the Level II data flow will be smaller than the CONDUIT (high resolution model data not currently available on NOAAPORT) data stream. The Unidata Internet Data Distribution (IDD) uses more of Internet2 than any other advanced application.

#### Highlights of Open Q&A Session.

The NWS representatives did not list possible approaches for how the external users could obtain Level II data in real time. The NWS did propose a possible model - the private sector establish a not-for profit distribution consortium that would ensure the data are readily available on an equitable basis. The consensus of the group was that the NWS should propose options of how the data could be distributed without the need for the external users to organize a consortium.

A listing of the questions that arose and the NWS response are at: [http://www.osf.noaa.gov/NWS\\_Level\\_2/ResultsFrom061803Mtg/](http://www.osf.noaa.gov/NWS_Level_2/ResultsFrom061803Mtg/). The NWS also announced a 45-day period for external users, those attending the meeting and otherwise, to ask additional questions and provide comments on how the NWS could distribute the data to external users. Comments and questions should be sent to [Tim.D.Crum@noaa.gov](mailto:Tim.D.Crum@noaa.gov) by August 4, 2003. The NWS will provide responses to questions/comments.

The meeting participants were concerned about the NWS 95% availability requirement, they need the data at a much higher reliability. The NWS explained the desire to achieve a higher availability and will explore options that do not incur added costs.

#### **Major meeting conclusions:**

1. The NWS should take the initiative and proceed towards a family of services solution or equivalent. The private sector could develop their dissemination solution collaboratively or working separately (i.e., multiple dissemination approaches are possible) in parallel or at a later time.

2. Meeting participants liked the opportunity to provide additional comments for consideration.
3. The NWS benefitted from hearing the questions and comments of the meeting participants and looks forward to continuing the exchange of views and information.
4. While in general the meeting participants liked the flexibility and scalability of the proposed architecture, the participants were concerned about any aspect in the design which had a potential single point of failure. Redundancy was encouraged several times.
5. Unidata is working toward identifying the top-level relay nodes the NWS should send the Level II data to so the Unidata members and research organizations can receive the data.

**Major Actions Resulting From Meeting:**

1. The NWS will provide a summary of the June 18, 2003 meeting and copies of the presentation materials. [[http://www.roc.noaa.gov/NWS\\_Level\\_2/ResultsFrom061803Mtg/](http://www.roc.noaa.gov/NWS_Level_2/ResultsFrom061803Mtg/)]
2. The NWS will request public comments and questions on the NWS WSR-88D Level II data plans. The comments and questions should be sent to: [Tim.D.Crum@noaa.gov](mailto:Tim.D.Crum@noaa.gov) by August 4, 2003. The NWS will post the comments and questions and the NWS response on a public accessible URL: [http://www.osf.noaa.gov/NWS\\_Level\\_2/ResultsFrom061803Mtg/](http://www.osf.noaa.gov/NWS_Level_2/ResultsFrom061803Mtg/)
3. The NWS will provide information on options for external users to access WSR-88D Level II data in near real time. The options will include a description of the option, possible costs, and pros/cons of each option from the government perspective and from the external users perspective.

**NWS Future Plans:**

1. The NWS will provide a description of options for distribution to external users by 1 December 2003 and ask for comment.
2. The NWS will continue the deployment of the Level II electronic data collection and distribution program. Updates on deployment progress will be posted at: [http://www.roc.noaa.gov/NWS\\_Level\\_2/](http://www.roc.noaa.gov/NWS_Level_2/)
3. The NWS will respond to external user questions in a timely manner, but no later than 1 December 2003. See: [http://www.roc.noaa.gov/NWS\\_Level\\_2/ResultsFrom061803Mtg/](http://www.roc.noaa.gov/NWS_Level_2/ResultsFrom061803Mtg/)