

**NOAA National Weather Service  
National Digital Forecast Database (NDFD)  
Technical Workshop  
Summary**

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Executive Summary: Providing digital forecast services is a major element of NOAA's strategic goal to serve society's changing needs for weather and water information. Digital services allow NWS to provide better and more valuable weather and water information in standardized formats which can be used with other datasets to save lives and property, and support a healthier and economically stronger America.

On November 2, the NWS conducted a technical workshop in Silver Spring, MD, for users of its National Digital Forecast Database (NDFD). Updates were provided on the latest analysis and techniques NWS has implemented, including XML and GIS applications. Feedback from participants helped in assessing current system performance and future user requirements for data, training, or technical assistance.

Initial Participants Expectations: At the outset of the workshop, participants were introduced and asked by moderator, Andy Horvitz, to provide their desired outcome of this one-day workshop. Comments included:

- What data formats are available?
- How can digital weather data be shared easier?
- How can the Open Geospatial Consortium help?
- How can NDFD information be used in Geographic Information Systems (GIS)?
- How can NDFD data be acquired to support search and rescue missions?
- How can special user groups like recreational sailors receive NDFD-based weather information from off-shore areas?

Keynote - "Why your needs are important to us?"

In his opening remarks, Ken Graham (Acting Service Evolution Director) explained that as the NWS moves to an impact-based concept of operations, we want to ensure we are focused on how we can support our end-users' mission better. NDFD is just a starting point in our evolution of services. To remain relevant, we are exploring new methods of creating valuable weather information (e.g., utilizing ensemble modeling techniques and creating probability grids) to meet users needs in a variety of circumstances.

Ken's points were well taken by the group. An open discussion followed. Questions were asked regarding the relationship of NDFD and the Next Generation Air Transportation System (NGATS) and the DOT Intelligent Transportation Systems Vehicle Infrastructure Integration (VII) initiative. NWS is a part of the Joint Planning and Development Office (JPDO) for NGATS and is also involved with the FHWA on VII. Ken will be leading NWS efforts to develop a concept of operations for future weather services and urged participants to contact him.

#### Morning Panel Discussion - "What's Working and What's Not?"

(Robert Bunge, NWS Office of the Chief Information Officer, Dave Ruth, NWS Office of Science and Technology, and Glenn Austin, NWS Office of Services served as panelists.)

The main theme generated from this initial engagement was that we should establish/strengthen partnerships, develop strategies to share more data, and collaborate more closely to enhance system capabilities and create enterprise-wide solutions. The following specific ideas were shared:

- NWS should consider making NDFD fit into NOAA's Global Earth Observation System of Systems (GEOSS) environment. For instance, it was suggested that the NWS consider adopting future network designs proposed for the Integrated Ocean Observing System.
- NDFD should be expanded to include satellite data as well as a vertical dimension. Adding hazardous weather elements like turbulence and icing would support the aviation community. (NWS is planning to do so with the 4D Weather Cube project scheduled for implementation by 2012.)
- Surface transportation requirements (e.g., driver-level visibility and frost/freeze forecasts for road surfaces) should also be considered.
- Partners support NWS goals to increase spatial and temporal resolution of NDFD as well as explore probabilistic forecasts to communicate uncertainty.
- Partners requested access to NDFD verification statistics. (See below.)
- Consider adding snow level data in NDFD and increase the temporal resolution of the Probability of Precipitation forecast element to 3 hours (vs. 12).

#### Afternoon Session - Analysis and Techniques

Presentations made during this session led to many group discussions. Topics such as future technologies, data standards and coordinate systems were explored.

The NWS XML-SOAP Service has become extremely popular. This service will become operational in December 2006. The integration of NDFD with GIS is quickly becoming popular also. Concern was raised that slight differences in projections can cause errors in shapefiles. NWS currently uses Lambert conformal projections for CONUS forecast grids while a Mercator projection is used for OCONUS islands and a polar-stereographic

coordinate system for Alaska. An experimental Web Feature Service (WFS) is being implemented in early 2007 while a complimentary map (image) service is being debated. Currently, our philosophy is to provide a service of data, allowing the user to make the map and, therefore, have control over the final appearance of the product.

Additional topics briefly discussed were GEO RSS, ontologies, M2M, JMBL, and XMPP Alerting Service. Questions such as “Will it take many years to sort out vocabularies for various XML?” and “How should we optimize response time vs. system load time for the end user?” were raised.

The session ended with an announcement that the NWS Telecommunications Gateway ftp service is slated for draw-down in 2007. It will be replaced with a much faster http service. The Internet portion of new system comes online in November 2006. The transition will be transparent to current users.

#### Workshop Wrap up – Feedback from Users and Next Steps

Andy Horvitz asked our partners and customers two questions: 1) what was most beneficial for you about the workshop and, 2) what are the most important actions we should take next?

Benefits expressed by the attendees included the opportunity to network and meet other participants during the workshop. Learning about what’s available (systems, applications, and content) was most advantageous to attendees. As technology continues to evolve quickly, many recommended we conduct another workshop next year. It was recommended that we ask the Office of the Federal Coordinator for Meteorology to facilitate a gathering of stakeholders in the near future. An additional recommendation was for the NWS to strongly consider engaging the Homeland Infrastructure Foundation-Level Database (HIFLD) Working Group.

Regarding the second question, our customers and partners said it was important to ensure computer-readable forecast data is frequently updated, accurate, and reliably accessible. A number of users requested action be taken to address discontinuous (or, the apparent incoherency of) fields across NWS County Warning Area forecast boundaries. There was a persistent need expressed for aviation weather information in digital formats.

Also, there is a growing need to provide first responders, emergency operation centers, and on-sight incident response personnel digital weather information. Impact weather (i.e., watches and warnings) information is requested in digital formats. Digital versions of climate-based products (e.g., wind roses for major cities) would be beneficial in case communications outages prevent access to digital forecast information.

It was also recognized that NDFD is but a small subset of total information available from NOAA. The need was expressed to get all this information in one place (e.g., ocean currents, winds, and temperatures.) More verification information is also desired.

Follow-up Actions:

NOAA took the action to provide attendees with the following URLs:

1. NWS Concept of Operations (CONOPS) – Focus on the Future:

<http://www.weather.gov/com/digitalera>

2. NDFD Verification:

<http://www.weather.gov/ndfd/verification/index.htm>

3. The National Operational Hydrologic Remote Sensing Center provides comprehensive snow observations, analyses, data sets and map products for the Nation.

<http://www.nohrsc.nws.gov/>