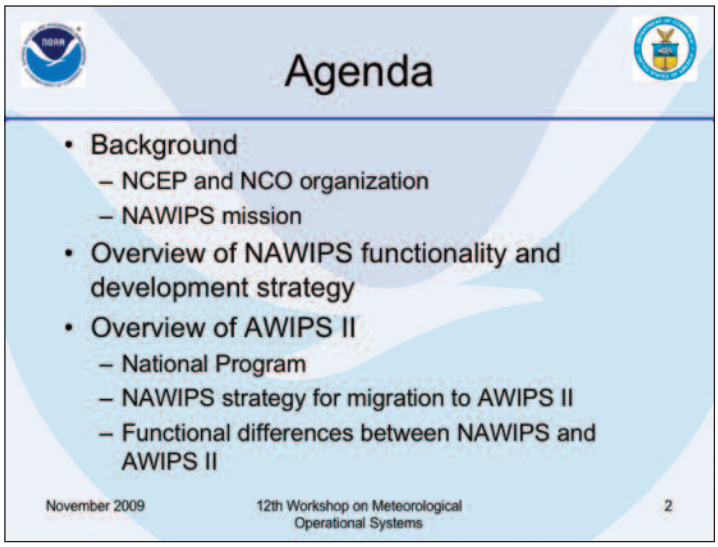
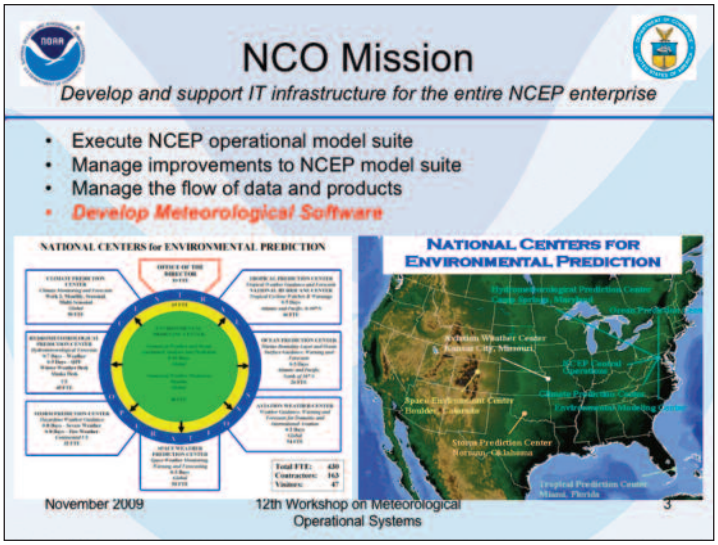
NAWIPS Migration to AWIPS II – Overview and Data Display Challenges

Scott Jacobs, NCEP/NCO/SIB



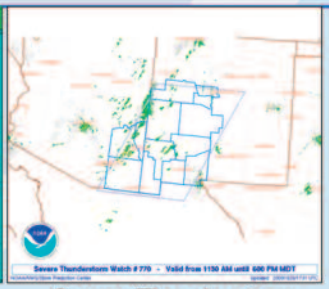


NAWIPS Key Attributes

- NAWIPS Software:
  - Ingests, performs calculations on and displays meteorological observational and model data
  - Operates on the full spectrum of geographic and temporal scales
  - Is adaptable, allowing for the introduction of new data, products and functional improvements
  - Has the flexibility to support a diverse user base
    - **NCEP Centers (AWC, CPC, HPC, NHC, OPC, SPC)**
    - **Automated products on the NCEP super computer**
    - NWS Alaska Region, Pacific Region and River Forecast Centers
    - UCAR-Unidata (supporting about 300 universities)
      - Unidata freely distributes NAWIPS to non-U.S. Government organizations
    - Government labs
  - Is used to create a diverse set of forecast products

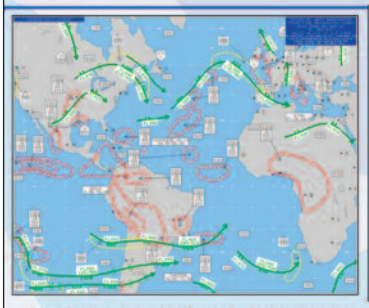
NAWIPS Product Samples

Hurricane Track Forecast
From the Tropical Prediction Center's National Hurricane Center

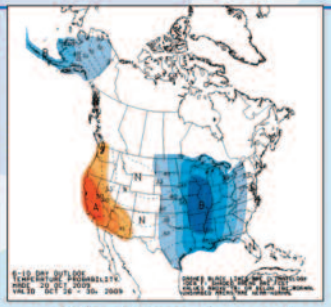


Severe Thunderstorm Watch
From the Storm Prediction Center

NAWIPS Product Samples

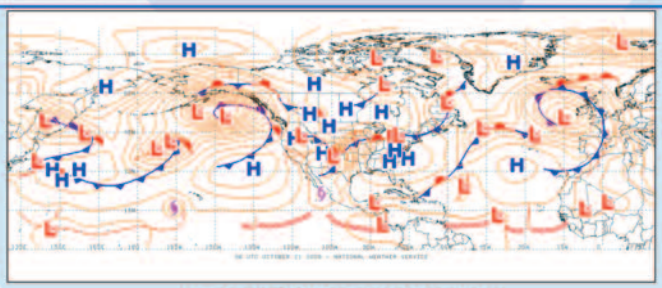


Upper Level Aviation Chart
From the Aviation Weather Center



6 to 10 Day Forecast
From the Climate Prediction Center

NAWIPS Product Samples



Unified Surface Analysis

Collaboration of the Hydrometeorological Prediction Center, Ocean Prediction Center, Tropical Prediction Center and Pacific Region

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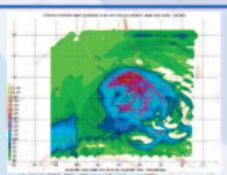
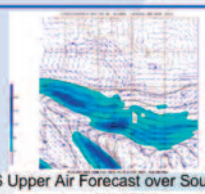
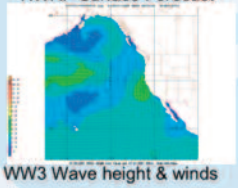
Automated Product Samples
Created on the NCEP CCS



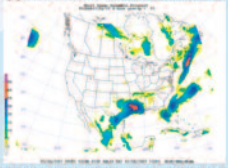
HWRF Surface Forecast



GFS Upper Air Forecast over South America



WW3 Wave height & winds



SREF Probability of Precip > 0.25 inches/6hr

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NAWIPS Key Attributes

- Integrated Product Generation
  - Creation/Editing of graphical products overlaid on meteorological data displays
- Critical requirements
  - Drawing and editing tools using meteorological objects, e.g., fronts, weather symbols, etc.
  - Graphical objects navigated to account for multiple product sectors and projections, wind rotation, etc.
  - Facility to import first guess fields, e.g., model fields and other centers' graphical products
  - Product formatting to support Text Products, GIF, TIFF, PostScript, GRIB and BUFR
  - Product layering to support multi-component or multi-time concurrent editing

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NMAP2 Integrated Product Generation

NAWIPS Development Strategy

- Address multiple requirements with generic functionality
- Use an agile, evolutionary strategy
  - Build in small, frequent increments
  - Quarterly release cycle
  - Refine requirements based upon forecaster feedback

AWIPS II Overview
National Program

- AWIPS II Technology Infusion (FY2005 – FY2015)
  - A long-term project which delivers a modern, robust software infrastructure that provides the foundation for future system level enhancements for the entire NWS enterprise
- Phase I: (FY2006-FY2011)
  - Migration of WFO/RFC AWIPS (AWIPS I) to a modern Service Oriented Architecture (SOA) infrastructure executed incrementally through a series of task orders
- Phase II: (FY2009-FY2012) – AWIPS SOA Extension
  - Creation of a seamless weather enterprise spanning NWS operations
  - Migration of NAWIPS into the AWIPS II SOA
  - Delivery of thin client to support the Weather Service Offices, Center Weather Support Units, Incident Meteorologists, (e.g., Fire Weather, backup support for RFCs and National Centers)
  - Integration of Weather Event Simulator
  - CHPS Integration into AWIPS SOA
- Phase III: (FY2009 – FY2015) – Enterprise Level Enhancements
  - Data delivery enhancements: "Smart push-smart pull" data access
  - Integrated visual collaboration
  - Information generation enhancements
  - Visualization enhancements

AWIPS II Overview
National Program

- Perform **"black-box"** conversion
  - Preserve existing functionality, look-and-feel on top of new infrastructure
- Thorough field validation and acceptance before deployment
  - Incremental releases via task orders for test and evaluation strategy
- No loss of functionality
  - Deployed system current with latest deployed AWIPS capability
- Use open source projects - No proprietary code
  - JAVA and open source projects enable AWIPS II to be platform and OS independent
- Objective is to make AWIPS II available for collaborative development

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NAWIPS Migration Project
Goals

- Full NAWIPS capabilities must be ported to the AWIPS II architecture
- Software must be ready for Operational Testing and Evaluation by October 2010
- No changes to the forecaster workflow
  - **"Gray box"** migration
  - Some visual differences may be unavoidable
- Capitalize on new technology

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NAWIPS Migration Project
Focus

- Migration activities in four primary areas
  - Decoders
  - Graphical User Interface integration
  - Product Generation (PGEN)
  - GEMPAK
- Testing and Test Plans
  - Developed by the National Centers based on operational concepts

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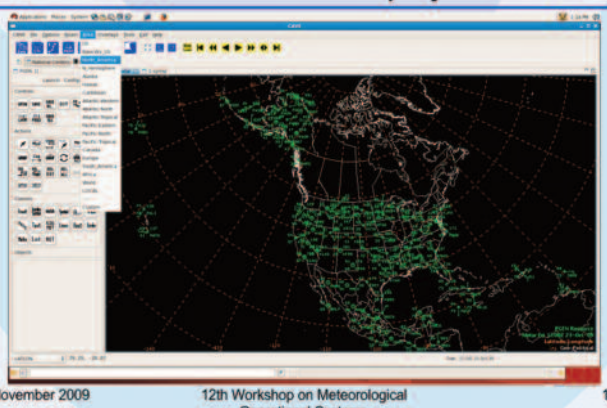
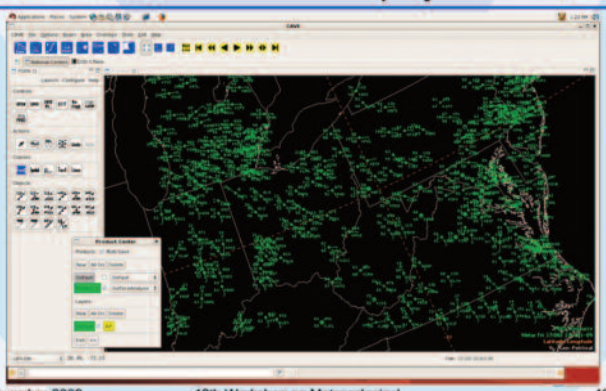
NAWIPS Migration Project
Decode and Display

- Decoders are incorporated into the system as server plugins
- Data display is provided in the Common AWIPS Visualization Environment (CAVE) through data resources
- The National Program is providing decode and display functions for many standard data types
  - METAR, Radiosondes, GINI Satellite, GRIB, etc.
- NCEP must provide decoders and display for unique data sets or those in different formats
  - SIGMET, McIDAS Satellite, QuikScat, etc.

NAWIPS Migration Project
Decode and Display



NAWIPS Migration Project
Decode and Display



NAWIPS Migration Project
Product Generation

- Includes all current functionality
  - Drawing and editing
  - Derived product creation
- New functionality
  - Make the user experience product-centric
  - Allow widget set to reflect the product being created
  - Change from the legacy binary storage format to an XML-based format

NAWIPS Migration Project
Product Generation

NAWIPS Migration Project
GEMPAK

- Initial work is to modify GEMPAK to access the AWIPS II database
  - This will allow the users to continue to use their legacy batch scripts with the new database
  - The graphical applications that are part of NAWIPS will be removed
  - GEMPAK will continue to be supported
- Future plans include providing GEMPAK functionality as a service
  - Create a GEMPAK macro language that will provide the user with batch process access to the AWIPS II functionality

NAWIPS Migration Project
Challenges

- Raytheon is still doing development at the same time
  - Creates a moving baseline of the software
  - Must react to all changes and incorporate NCEP code with each delivery
  - Documentation is lacking in most areas
- New environment for many NCEP developers
  - Java and Object Oriented development
  - Eclipse
- Inclusion of Space Weather
  - The Space Weather Prediction Center added to NCEP in 2004
  - SWPC would like to use AWIPS II for terrestrial and solar products

NAWIPS Migration Project
Roadmap