NAWIPS Integration with AWIPS II
System Overview

Training Module 1

NCEP Central Operations

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Topics

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  – Functions/Mission
  – Technology Infusion Background
  – Technology Infusion Scope

• AWIPS II Migration Overview
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AWIPS Overview Functions/Mission

- NEXRAD
- GOES/POES
- NCEP Models
- Buoy, River Gauges
- AWIPS Communications
- AWIPS
- N-AWIPS

169 separate AWIPS systems at 137 geographical locations

- Warnings
- Watches
- Advisories
- Forecasts
- Analyses

Service provided to 3066 US Counties 24 hrs/day, 365 days/yr.

11 separate N-AWIPS systems at 8 geographical locations (includes HI, PR, Offutt AFB, Scott AFB)
AWIPS Tech Infusion

Background

Late 80s – Early 90s: AWIPS I developed
1997: AWIPS I deployed
2004: NWS review identified AWIPS software as major obstacle to meeting future mission requirements
  – Costly to maintain
  – Challenging to infuse new science and applications
2006: NWS executed contract option for AWIPS II-related projects
Present: AWIPS II software development and migration underway
AWIPS Tech Infusion
Background

• AWIPS II Migration:

Migrate current AWIPS functionalities to a “Service Oriented Architecture” (SOA)

– Improve maintainability and stability via streamlined, extensible software
– Reduce time to transition from 18 months to 9 months
– Reduce software development time for new products by 50%
– Increase software release frequency from 2 to 4 per year
– Enable greater flexibility to ingest and visualize new datasets
AWIPS Tech Infusion
Background

• AWIPS II Extended:
  Implement on-going pre-planned, major infrastructure enhancements

• Extend AWIPS II architecture to the entire NWS weather enterprise
  – Enables more seamless product suite among NWS Ops centers, e.g., National Centers, WFOs
  – Improves efficiencies in developing new capabilities that can be used across the NWS weather enterprise

• Implement system-wide infrastructure enhancements
  – Smart Push/Pull technologies to enable AWIPS to handle increased data volumes associated with major agency initiatives, e.g., GOES-R, Higher resolution models, etc.
  – Real-time collaboration among NWS operators and between NWS operators and partners, e.g., Emergency Managers to support improved product consistency, quality and decision assistance
  – Streamlined information generation dissemination and access for partners to support decision assistance
  – Improve data visualization to support situational awareness and decision assistance
AWIPS II Technology Infusion Scope

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 1: (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-FY2013) – AWIPS SOA Extension
  – Creation of a seamless weather enterprise spanning NWS operations
    • Migration of NAWIPS into the AWIPS Integrated Service Oriented Architecture (ISOA)
    • Delivery of thin client to support for 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
    • NOAA’s Community Hydrologic Prediction System (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
NAWIPS to AWIPS II Migration Overview

• Mission
  – Provide generalized software solutions that meet NCEP and other NWS requirements

• Background
  – NAWIPS was first deployed to NCEP Centers in 1994
  – NAWIPS Migration was originally an AWIPS II Extended pre-planned project that was established as part of AWIPS II Technology Infusion
  – As the National Program AWIPS Migration schedule became overlapped with NAWIPS Migration schedule the two efforts became integrated.

• Objectives/Goals
  – Incorporate NAWIPS capabilities into AWIPS Service Oriented Architecture (SOA)
  – Create one system to meet the needs of the entire NWS
Migration: Business Need

• Key Benefits
  – Enables more cost-effective software development environment for common requirements across the NWS enterprise; Helps enable software agility
  – Lays groundwork for more effective collaboration and seamless products across NWS enterprise (NCs, WFOs, RFCs, CWSUs) by providing common infrastructure
  – Strengthens NWS partnership with University Community by providing entire suite of AWIPS capabilities – Helps enable more efficient Research to Operations (R to O) and Operations to Research (O to R)
  – Improves support for OCONUS Regions by providing common software infrastructure for NAWIPS and AWIPS functionality
  – Enables opportunity to provide NAWIPS capabilities to NWS enterprise
Philosophy behind the Changes

- **Canonical requirements:** Software must
  - Operate on the full spectrum of spatial and temporal scales
  - Be adaptable, flexible to support a diverse user base
    - NCEP Centers (AWC, CPC, HPC, NCO, NHC, OPC, SPC, SWPC)
    - NWS Forecast Offices
    - NESDIS Satellite Analysis Branch
    - UCAR-Unidata (supporting about 300 universities)
      - Freely distributed to non-governmental organizations
    - Other government labs
  - Be generalized to create a diverse set of forecast products
National Center Perspective Overview

• Integrates NAWIPS applications NMAP2, NTRANS, NWX, NSHARP
  – Not a “Black Box” conversion – some changes will be unavoidable
  – Flexible timeline for data selection and display
  – Configurable multi-panel
    • Temporal and spatial synchronization
    – User-configurable selection and display
• Flexible national/international display and manipulation of all datasets
• No forced or assumed localization
• Hierarchical set of configuration, site/desk, user/desk
• Leverages Raytheon Technology Services (RTS) base architecture (all data displays are new plugins)
• Added access to legacy GEMPAK files
  – Required for operational archive access (work still in progress)
Migrated Functionality

NSHARP
Ability to compute model diagnostics for ensemble model members on the fly has been incorporated into the National Center Perspective (NCP)
Migrated Functionality
Multi-Panel Data Display

Multi-panel (any M x N configuration)
Configurable at the forecaster level
Migrated Functionality
Miscellaneous Data Types

All data sets (model, radar, observational) currently available in NAWIPS will be available in the National Center Perspective.
Product Generation (PGEN) Environment

- Control Panel
- Hazards on layers
- Temporal filter
- AWIPS2 legend manager
Phased Transition Plan from AWIPS/NAWIPS to AWIPS II

• AWIPS II Hardware Installation at NCEP Centers - FY11Q2-3

• AWIPS II Software Configuration for NCP – FY11Q2-4

• Operational Test and Evaluation (OT&E) of operational scripts, product creation, data display
  – FY 11Q2-4 – Testing AWIPS I functionality in AWIPS
  – FY11 – FY12 – Testing NAWIPS functionality in AWIPS II

• AWIPS II Deployment (FY11Q4-FY12Q1)
  – AWIPS II meets AWIPS I migration requirements / AWIPS I system removal

• AWIPS II Acceptance (FY12)
  – AWIPS II meets NAWIPS migration requirements
  – NAWIPS workstations at forecaster desks can be removed

• Final NAWIPS Legacy Removal - Exact schedule To Be Determined…
Challenges of Migration

• Concurrent software development with Raytheon
  – Raytheon continues to move forward with new software versions
  – NCO continues to move forward with updating the National Center Perspective software; however, the versions between Raytheon and NCO are not usually the same.

• Managing expectations of NCEP Centers
  – Delivery of code will not be perfect with early releases of code
  – Developing a final version of the software is an iterative process that needs repetitive testing between developers and forecasters

• Underestimated the amount of time it would take to install an AWIPS II non-SBN automated data flow

• Future NCEP AWIPS II software requirements will continue to be addressed by the dedicated staff at NCO; however, software deliveries will be through the established AWIPS path of NWS/OST and Raytheon.
Advantages of Migration

- Create one baseline system for WFOs, RFCs, National Centers, and Regional Offices to use to create/display/disseminate their products.

- Foster a more collaborative environment within NWS to increase coordination of watches/warnings/forecasts between the national and local scales.

- Each NWS Office/Center can leverage current product development and data display capabilities.

- Reduce the amount of overhead and support of multiple system hardware/servers/architectures.

- Create an agile and responsive system that meets the needs of NWS.
Evaluation Criteria

As AWIPS II is rolled out to the forecast community, the NCEP Centers and NCO will rigorously evaluate the system for:

• **Functionality** - cover existing functions or improve over those functions
• **Reliability** - be stable over long periods of time under a variety of uses
• **Performance** – ability to perform rapidly under a variety of load conditions

Note – during the early stages of testing, the software and dataflow will be undergoing frequent change. Therefore, the above evaluation criteria may not be fully met until addressed by the development team.
Summary

• The migration from AWIPS I and NAWIPS to AWIPS II is a step forward for the NWS both in meeting the needs of the forecasters and bringing our software to a more agile and robust system.

• The transition from our current systems to AWIPS II will be in a phased approach.
  – Field OT&E for AWIPS I to AWIPS II will begin Summer 2011
  – Field OT&E for NAWIPS to AWIPS II / National Center Perspective will take place in FY12 once an OT&E plan including entrance and exit criteria is agreed upon by NCEP and NWSEO

• No one will be asked to support or use AWIPS II operationally prior to being fully trained on the system.

• NCEP Central Operations will continue to oversee, manage, implement, and deliver NCEP Centers’ software requirements to the AWIPS Program.