Advanced Weather Interactive Processing System (AWIPS)

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Ronla Henry, AWIPS Program Manager
NOAA/NWS, Office of Science and Technology
Agenda

• AWIPS Team
• AWIPS Overview
• AWIPS Status
• Vision for the future
AWIPS Team

- Mr. John Murphy – Director, Office of Science & Technology
- Mr. Ben Kyger – Director, NCEP Central Operations/Central Processing Portfolio Lead (Acting)
- Ms. Ronla Henry – AWIPS Program Manager
- Mr. Kenneth Brumfiel – AWIPS Contracting Officer; NOAA/AGO Eastern Acquisition Division
- Ms. Marion Cavanaugh – Branch Chief for National Weather Service; NOAA/AGO Eastern Acquisition Division
- Mr. Mark B. Miller – Chief, Program Management Branch
- Mr. Steve Schotz – AWIPS Deputy Program Manager, Product Improvement
- Mr. John Tatum – AWIPS Deputy Program Manager, O&M
- Mr. Lee Phillips, P.E. – AWIPS Chief Architect
- Ms. Julie Raugh – AWIPS Information System Security Officer
- Mr. Beraq Azeem – AWIPS Contracting Officer’s
- Mr. Jim Calkins – AWIPS IT Specialist
- Mr. Peter Pickard – AWIPS Engineering Specialist

AWIPS technical library
https://vlab.ncep.noaa.gov/web/awips-technical-library/home/
AWIPS is the NOAA/NWS cornerstone IT system used to ingest, analyze, forecast, & disseminate operational weather data, including time-sensitive, high-impact warnings to protect life and property ….. 24/7/365
AWIPS Overview

Customers

• National Centers:
  • Delivers national and global weather, water, climate and space weather guidance, forecasts, warnings and analyses to its Partners and External User Communities.

• Weather Forecast Offices:
  • To effectively use all available science and technology to provide with the highest degree of professional service accurate and timely watches, warnings, advisories, and forecasts for hazardous weather conditions affecting our customers.

• River Forecast Centers:
  • Produce timely and accurate water forecasts and information using the best available scientific principles to integrate and model water, weather, and climate information.

• Center Weather Service Units:
  • To constantly strive to provide the most accurate and dependable weather information possible to our Federal Aviation Administration (FAA) customers, both in-house and off site, contributing to the safest and most efficient use of our nation's National Airspace System.
**AWIPS Overview**

**Scope & IT Footprint**

- **Network Control Facility (NCF) operations**
  - 24/7 Helpdesk, trouble shooting, repair, HW/SW installation support, continuous monitoring, and security patching

- **AWIPS Communications**
  - Satellite Broadcasting Network (SBN): Up to 70Mbps satellite broadcast network; primary and backup Master Ground Station plus 167 site ground stations
  - LAN: IPv6 ready; Managed by AWIPS NCF
  - WAN: Private VPN over OpsNet *not part of AWIPS contract.*
    - AWIPS Bandwidth: 768kbps or half of a T1 circuit

- **Hardware Maintenance & Refresh**
  - 172 systems at 150 sites; over 3500 servers and workstations; hundreds of routers, firewalls, storage arrays and network switches

- **Software Maintenance and Support**
  - 8 million of lines of AWIPS I code under CM control
  - 8 million lines of AWIPS II code under CM control
    - Includes 2 million lines of code for legacy applications

- **Configuration Management**
  - AWIPS Configuration Control Board reviews and authorizes all Requests for Change to the AWIPS IT enterprise
## AWIPS Status

### Hardware

<table>
<thead>
<tr>
<th>Component</th>
<th>WFO Baseline</th>
<th>RFC Baseline</th>
<th>NC Baseline</th>
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<tbody>
<tr>
<td>Data Server (DX) 1-2</td>
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<td>Data Server (DX) 3-4</td>
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<td>Data Server (DX) 5-6</td>
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<td>Processing Server (PX) 1-2</td>
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<td>Satellite Comms Processor (CPSBN) 1-2</td>
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<td>Direct Attached Storage (DAS)</td>
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<td>Archive Server (AX)</td>
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<td>Local Data and Dissemination Servers (LDAD) 1-2</td>
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<td>Workstations (LX/XT)</td>
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<td>River Ensemble Processors (1-2)</td>
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*Anchorage and Honolulu WFOs include DX5-6 due to domain and products/services similar to a NC
**CPSBNs at Guam WFO are remotely hosted at Pacific Region HQ due to line of site limitations associated with SBN
***Amount of available storage larger at NCs verses WFOs/RFCs
****Recent refresh project increase number of REPs from 2 to 3 at each RFC
AWIPS Status
Software

• AWIPS is
  – A tool kit used to support a variety of hydro-meteorological service areas: Severe Weather; Tropical; Aviation; Marine; Public; etc.
  – Customizable to support unique needs of national, regional, and local operational units

• Infrastructure
  – Service Oriented Architecture based on FOSS packages
  – Major Components:
    • EDEX: Backend capabilities to ingest and process data; Handles messaging between backend capabilities and GUI
    • CAVE: Visualization component of AWIPS
    • Re-hosted: Legacy applications not migrated to SOA
• CAVE Perspectives
  • Display Two-Dimensional (D2D)
    • Warngen
    • Flash Flood Monitoring Program (FFMP)
    • System for Convection Analysis and Nowcasting (SCAN)
  • Graphical Forecast Editor (GFE)/Graphical Headline Generator (GHG)
  • HydroView
  • Multisensor Precipitation Estimates (MPE) Editor
  • Aviation Forecast Preparation System (AvnFPS)
  • National Centers Perspective (NCP)
• Re-hosted
  • RiverPro
  • Climate
  • Hourly Weather Roundup
Vision for Future
Objectives

• Establish a stable (uniform/consistent) cost model that sustains high quality O&M services while introducing new technology, and capabilities to support evolving NWS needs and requirements.

• Provide 24/7/365 O&M support to all NWS operational entities, including the 122 Weather Forecast Offices, 13 River Forecast Centers, 8 National Centers, 2 Tsunami Warning Centers, 22 Center Weather Service Units, and National Water Center. Operational support shall meet or exceed the Service Level Agreements (SLAs) specified in Table 1.

• Implement and maintain mechanisms to enhance, manage, and maintain AWIPS baseline software to meet or exceed SLAs in Table 1. AWIPS baseline software includes all software and scripts necessary to build, execute and support the system including AWIPS specific applications, COTS, FOSS, and OS. Software should be extensible, so that it is readily expandable, well documented, and updated regularly through interactions with the larger research community.
Vision for Future

Objectives

• Maintain interoperability with other NWS and Government systems to support AWIPS operations; including, but not limited to, communication systems, observation systems, satellite systems, radar systems, and modeling and data systems. A list of such known systems may be found in the AWIPS Technical Library.

• Establish necessary governance, processes, work flows, and/or tools via NWS Virtual Lab (VLab) (https://vlab.ncep.noaa.gov) as the integrator of AWIPS baseline software, and provide an AWIPS development environment that supports distributed and collaborative development and testing of AWIPS software amongst the Offeror, NOAA/NWS Government and contractor developers, other Government organizations (such as Labs in NOAA’s Office of Oceanic and Atmospheric Research or NASA), and collaborative partners (such as academia). Any required and/or recommended changes to NWS VLab governance, processes, work flows, and/or tools will be implemented via the AWIPS program and VLab management.
Vision for Future

Objectives

• Develop a proposal and implementation plan that reduces the AWIPS hardware footprint such that the proposed solution meets or exceeds the established SLAs in Table 1, improves Service Backup and Continuity of Operations (COOP), secures remote AWIPS access, drives towards government initiatives such as the 2010 Federal Data Center Consolidation Initiative, and reduces system downtime during installations, while minimizing operational risks, data latency, and required up-front investment.

• Develop a proposal and implementation plan to the AWIPS architecture that allows the users to visualize data required for the mission that is anticipated to increase by a magnitude of at least 12 while meeting or exceeding the SLAs in Table 1. This would include, but is not limited to, gridded model data, radar data, satellite data, lightning data, and the National Digital Forecast Database.
Vision for Future
Objectives

• Maintain open source nature of AWIPS (including, but not limited to, source code, executables, related scripts, utilities, documentation, deliverables, and reports) by providing appropriate data rights and use agreements, as well as enable a smooth transition to another provider, to ensure continuity of service in the event of contract termination, or upon contract re-competition. These rights and agreements will include language which allows the Federal Government to freely distribute AWIPS software (and related materials described above) to its partners and any other interested parties. The AWIPS full data rights should be provided to include all scripts and software needed to build, test, execute, and run the software.

• Develop a proposal and implementation plan to significantly reduce the AWIPS II Discrepancy Report (DR) backlog without sacrificing the support for current operations and newly discovered DRs. The plan should also detail how the Offeror expects to keep the DR inventory sufficiently low and prevent the DR backlog from significantly increasing over time.
Vision for Future
Objectives

• Develop a Transition Plan that describes an approach to perform an orderly transition into and out of the period of performance for this contract.

• Utilize subcontract and teaming arrangements effectively under the Small Business Program, FAR Part 19.
Summary

• AWIPS is an establish IT system that underpins the NWS’ ability to accurately predict weather and enable Impact-based Decision Support Services.

• AWIPS needs to evolve to continue to meet the requirements of a Weather Ready Nation.

Thank You!