Using the Weather Event Simulator

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“Experience is the best teacher, but the most expensive.”

– Fortune cookie
(lucky numbers 20, 47, 32, 15, 12, 7)
“Excellence is an art won by training and habituation. We do not act rightly because we have virtue or excellence, but we rather have those because we have acted rightly. We are what we repeatedly do. Excellence, then, is not an act but a habit.”

- Aristotle (384 BC - 322 BC)
Simulations Deliver Better Understanding and Retention

Source: NTL Institute for Applied Behavioral Science
Learn By Doing
Simulations Improve Job Performance

- Flight Simulators
  - Department of Defense
  - NASA
  - All Major Airlines
  - Flight Schools
Simulations Improve Job Performance

- DOD and DOT simulations have led to performance improvement.
- Private sector has tied simulation use to “bottom line” improvements.
What is the Weather Event Simulator (WES)?

- WES is a data pump
  - *Hides & reveals data using time/data stamp*
  - *Radar base data revealed using simulated VCP*

Offline Linux Workstation + Archived Case and Guide + Build 5.2.2 Linux AWIPS + WES 1.1 Software
Archiving System

- Archive LINUX PC attached to AWIPS
  - Data saved on-site
  - Includes national and local data sets
  - Saved to CD-ROM or DVD
  - Transferred via non-routable network connection to WES
  - Overwritten every 4-7 days
WES Goals

• Improve NWS Products and Services
  – *Provide an Operationally Representative Environment*
  • Apply Science
  • Develop Decision Making Skills
  – “Train as You Fight”
“...feedback offered by the simulator is not enough...the evaluator must provide feedback to help students understand the results caused by their actions.”

» Dr. Roger Schank, Director Institute of Learning Service, Northwestern University

http://www.engines4ed.org/
What Is a Simulation?

- Specific Context
  - Focused Learning Objectives
- Meaningful Task
  - How long?
- Natural or Exaggerated Consequences
- Supporting Resources
Types of WES Simulations

- Real-time simulation
  - *Time critical skills*
- Interval-based simulation
  - *Integrate analysis and decision-making*
- Situation awareness simulation
  - *Practice situational awareness skills*
- Virtual reality simulation
  - *Build problem solving, team work and communication skills*

Same case can be used for all four simulation types!
WES Simulation Guides

• Learning Resource
  – How To Use This Document
  – Simulation Types
  – Event Overview
  – Five or More Prepared Simulations
Best Practices

• Assessing training needs
• Presenting techniques and research findings
• Sharing the experience
• Developing strategies and teamwork
• Gaining experience on new software
• Post event assessments
  – Media Interviews
Assessing Training Needs

• Warning decision based on an individual’s:
  – Knowledge of the science
  – Ability to use the technology
  – Human factors
    • Handle stress
    • Maintain situation awareness
    • Form expectations
    • Work in a team
Assessing Training Needs

- Are there any individual training needs that are common in a majority of the office staff?
  - **Science**
  - **Technology**
  - **Human factors**

- **Group training sessions**
  - **Less time**
  - **Common message**
Presenting Techniques or Research Findings

• Concept of Situated Cognition
  – “Knowledge can’t be known and fully understood independent of context.”

• Analysis and forecast techniques may be difficult to understand out of context.

• Techniques can be demonstrated in either displaced real-time or case study mode.
Presenting Techniques or Research Findings

• Large group
  – Connect the WES to a data projector capable of projecting 1280x1024 resolution.

• Small group
  – Gather around monitor.
Presenting Techniques or Research Findings

• Presentation of an archived example (especially a local example) demonstrating research results improves:
  - **Confidence in the research**
  - **Applicability of the research**
  - **Use in operations**
Sharing the Experience

- Pair experienced with less experienced
  - Convey knowledge not well documented, and difficult to impart under time pressure
  - Discover situations where intervention in an actual event may be necessary
Developing Strategies and Teamwork

- Individual warning strategy
  - Product and overlay choice
  - Use of screen real estate
  - Color selection
  - Procedures

- Develop or modify team warning strategies
Gaining Experience on New Software

- Acceptance of new warning applications is often slow due to potential negative impacts.
- WES provides experimentation without risk
Post Event Assessments

Post-Mortems

Accident Investigations

Root Cause Analysis

Proximal Cause

WB-Graph
(Why-Because)

The National Transportation Safety Board
Post Event Assessments

- Use WES to playback recent events
- Re-create actions to review real-time issues and overall system performance
- Uncover critical aspects of an event that should be:
  - Duplicated
  - Avoided
Post Event Media Interviews

- Use WES to playback recent events.
- Requires WES location in area cameras can be set up.
- Interviewer can operate without impact to operational system.
Research Using the WES

- Case study review mode to study applied science and technology issues
- Displaced real-time mode to research warning decision making processes
  - Event is controlled and predictable
  - Actions and outcomes can be compared and contrasted
Discussion

• Best Practices
  – Assessing Training Needs
  – Presenting Techniques and Research Findings
  – Sharing the Experience
  – Developing Strategies and Teamwork
  – Gaining Experience on New Software
  – Post Event Assessments

• Research

• OTHERS?
Future WES Plans

- Incorporate simulations into curriculum
  - Advanced Warning Operations Course - 2004
- Additional Functionality
  - Scripting Language
  - Warning Applications
    - FFMP & SCAN
- Open WES - 2003
  - Informix Free
Summary

• Primary design goal of the WES was to give forecasters practice issuing warnings while experiencing a sense of urgency

• Others have found additional valuable uses of the WES

• In the near future, we hope to complete development of an “Open WES”
Additional Resources

FAQ’s, Procedures, Volume Browser, Warngen Templates, etc.

- http://www.wdtb.noaa.gov/DLCourses/wes
- http://www.comet.ucar.edu/strc/wes
- WES Help
Questions or Comments?

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