

Why I'm here...



Integrated Operations and Simulations for Effective Decision Support

Jon W. Zeitler
NWS Austin/San Antonio

Kurt Van Speybroeck
NWS Spaceflight Meteorology Group

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*The views presented are the authors and do not
necessarily represent those of NOAA/NWS*



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NWS Southern Region Headquarters**

Overview

- **Emerging Decision Support Services**
 - Past practice
 - Present status and future plans
- **Simulation methodology**
 - Theory
 - WFO Example
 - True Collaboration Plans

Weather Forecast Office (WFO) Support



Winter Weather Advisory

URGENT - WINTER WEATHER MESSAGE
 NATIONAL WEATHER SERVICE NORMAN OK
 429 AM CST WED JAN 23 2008

...BLIZZARD AND LIGHT FREEZING RAIN TODAY IN SOUTHERN OKLAHOMA AND
 NORTH TEXAS...

...A JET STREAM DISTURBANCE WILL ENHANCE WITH INCREASING MID LEVEL
 MOISTURE AND SUB-COOLING AIR NEAR THE SURFACE... TO PRODUCE A
 DEEPER MIXED LAYER OF PRECIPITATION... SLIGHT AND LIGHT FREEZING RAIN
 WILL FALL OVER MUCH OF CENTRAL AND SOUTHERN OKLAHOMA... AND NORTH
 TEXAS. A THIS MASS OF AIR WILL SLOWLY AFFECT PORTS OF THIS
 REGION THIS MORNING... MAKING TRAVEL HAZARDOUS... ICE MAY ENHANCE ON
 ELEVATED SURFACES... ESPECIALLY BRIDGES AND OVERPASSAGE... INTO THE
 EARLY AFTERNOON.

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 /O.OO.OO.OO.W.V.0004-0000070000-0001001000/
 000000-0000-0000-0000-0000-0000-0000-0000-
 INCLUDING THE CITIES OF... NORMAN... LAWRENCE... MARSHVILLE...
 MCKETTA FRANK... OKMULGEE... ARCHER CITY... KALSHAM...
 SARDISVILLE... OKMULGEE.

Severe Thunderstorm Warning

SEVERE THUNDERSTORM WARNING
 NWS000-000-00000-
 /O.OO.OO.OO.W.V.0004-0000070000-0001001000/
 000000-0000-0000-0000-0000-0000-0000-0000-
 INCLUDING THE CITIES OF... NORMAN... LAWRENCE... MARSHVILLE...
 MCKETTA FRANK... OKMULGEE... ARCHER CITY... KALSHAM...
 SARDISVILLE... OKMULGEE.

THE NATIONAL WEATHER SERVICE IN NORMAN HAS ISSUED A
 * SEVERE THUNDERSTORM WARNING FOR...
 BAZLER COUNTY IN SOUTHERN TEXAS...
 WILBARREN COUNTY IN SOUTHERN TEXAS...
 * UNTIL 1200 AM CST

* AT 1004 AM CST... NATIONAL WEATHER SERVICE DOPPEL RADAR INDICATED A
 SEVERE THUNDERSTORM IS NEAR SOUTH OF DUBARACK... MOVING NORTH AT
 40 MPH. RAIN TO THE SIZE OF QUARTERS IS LIKELY. DAMAGED POWER

National Oceanic and Atmospheric Administration
National Weather Service

Graphical Forecast - COMUS Area

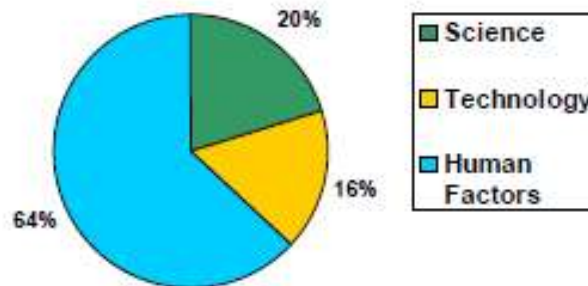
Forecast for the next 10 days. 1000 AM CST WED JAN 23 2008

Info ➡ Forecaster ➡ Product

Where to place effort and resources

Needs: Root Cause Analysis

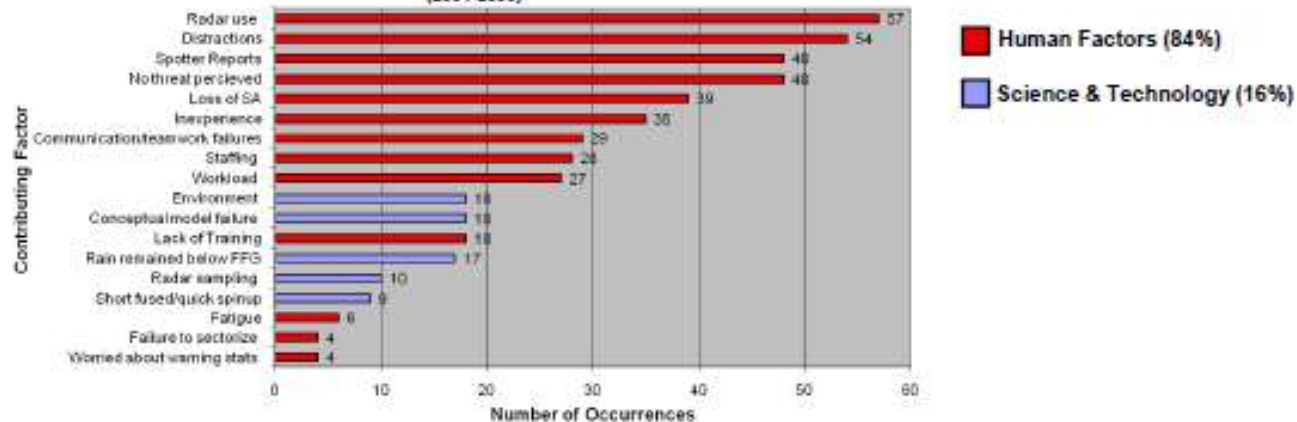
Factors contributing to 127 missed tornadoes (2004-2005)



- Human Factors Causes

- Communication/Teamwork with EM/Spotters/Forecasters
- Incorrect Use of Tools
- Distractions/Loss of SA
- Staffing, Workload, Fatigue, Inexperience

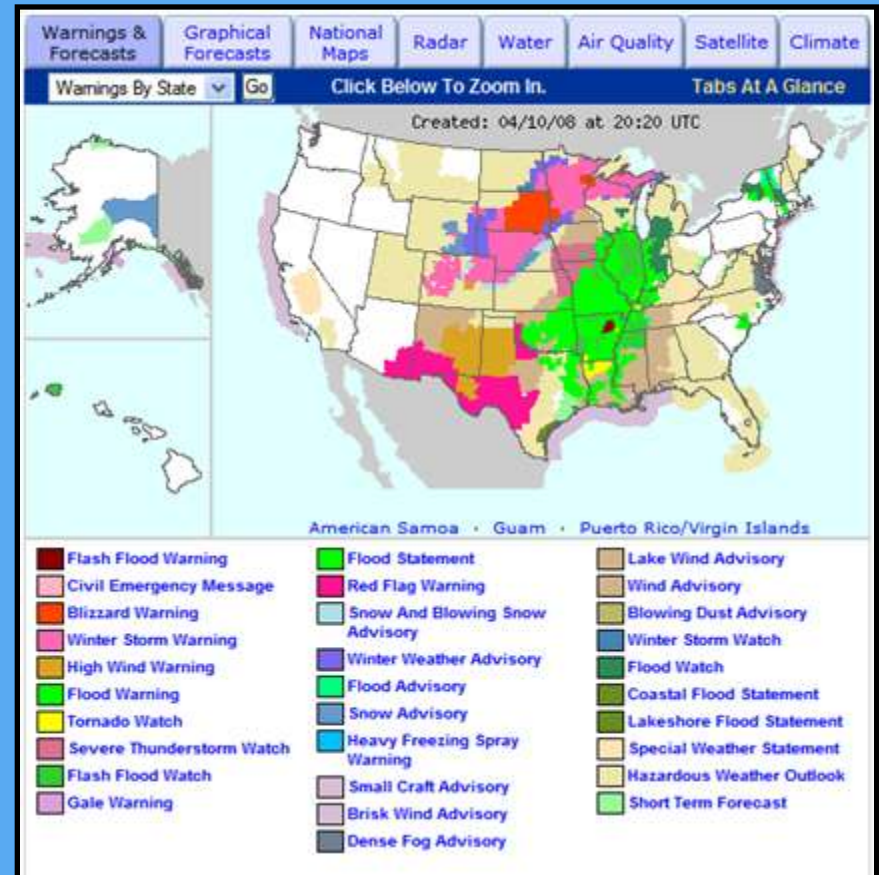
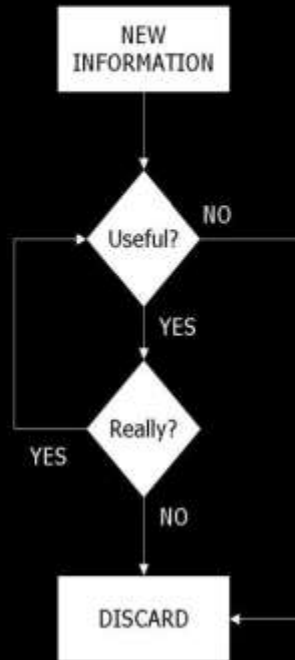
136 RCA Missed Flood Events (2004-2008)



How do you view NWS services?

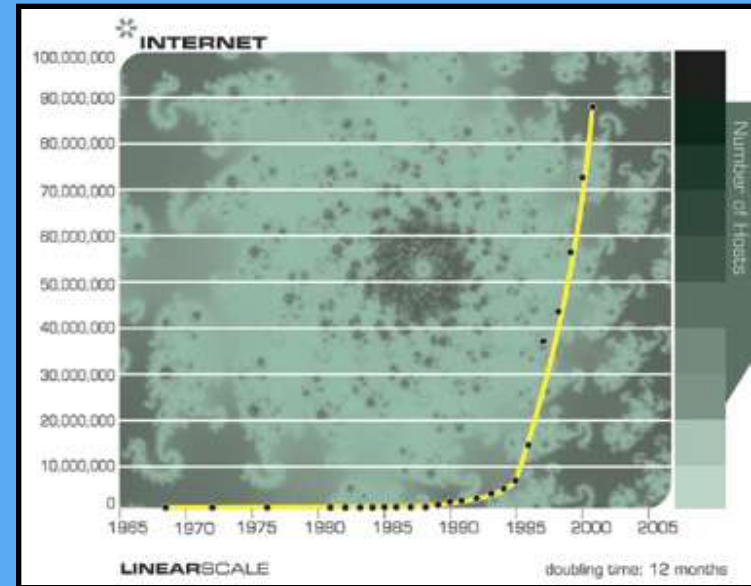
INFORMATION OVERLOAD

HOW TO COPE WITH THE SYMPTOMS OF INFORMATION OVERLOAD



Emerging Interpretive Services

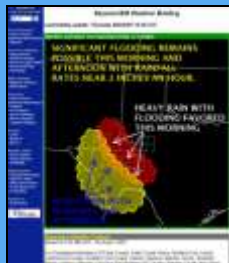
- **Explosion of “information” and devices (smartphones)**
- **Decision makers need concise interpretation**
- **Standardization of decision support systems (ICS, EOC)**
- **Weather data feed directly into DSS (GIS, models)**
- **Value of weather information increasing (accuracy and accessibility)**



Emerging Interpretive Services



Spectrum of Services



Web Briefing



Recorded Briefing



Live Virtual Briefing

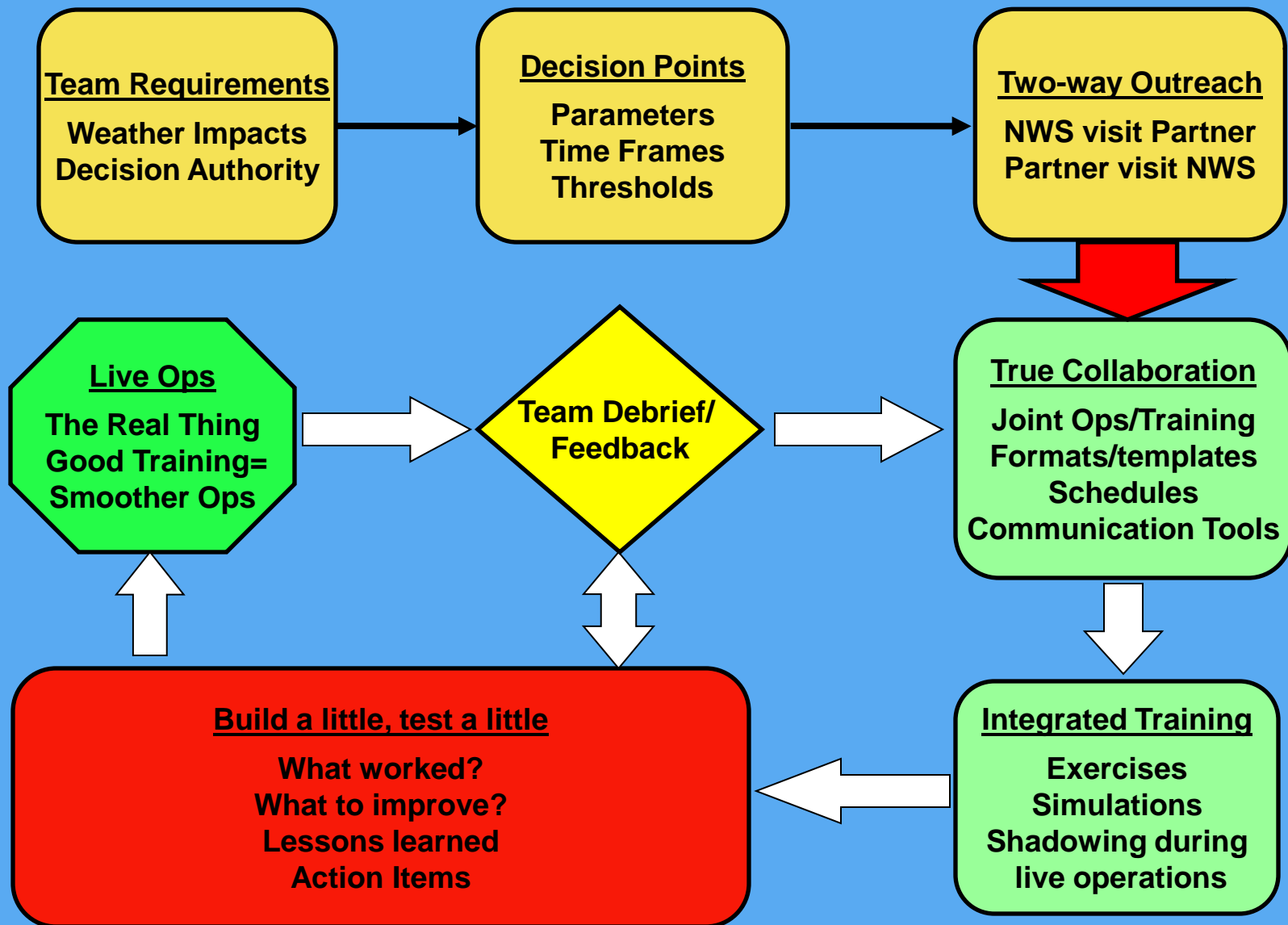


EOC Center (Off- and On-site)



ICS Incident On-site

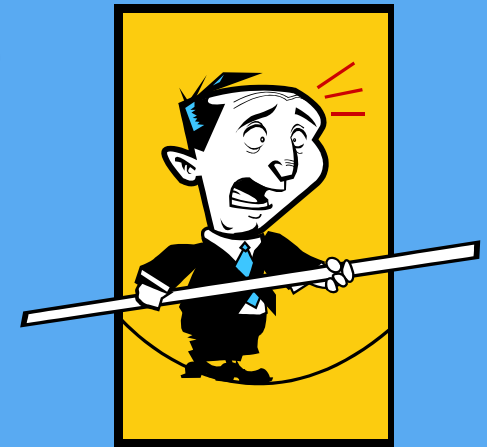
Decision Support Model



Interpretive Services Challenges

External

1. Not co-located with partners
2. Unlimited/unknown event possibilities
3. Multiple partner requirements



Internal

1. All staff not present
2. Face threat (fear of debrief/ evaluation)
3. Limited staff time
4. Current technology limitations (WES)

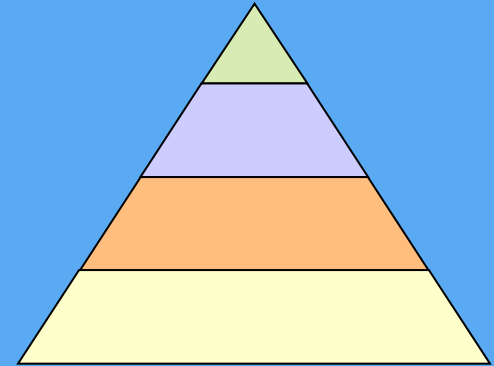
Proposed Simulation Levels

- **Level 0: Training, Professional Development, EOC Visits, NIMS/ICS**
- **Level 1: Developmental Simulation**
 - Verification of plans, procedures, equipment – possibly segmented
 - Can serve as a pre-training opportunity for Level 2
- **Level 2: Internal Simulation (local participation)**
 - 1 - 2 Forecasters training, 1 - 4 hours duration
 - Local Simulation Supervisor
 - Not focused on “training/learning” but working out the kinks before real time ops
- **Level 3: Train with your local decision makers**
 - Use available (local) partners, (1 - 2 forecasters training)
 - Local Simulation Supervisor or one from another forecast office
 - 4 - 8 hour duration
 - Opportunity to interact with the decision maker



Proposed Simulation Levels

- **Level 4: Full WFO Team/Partners**
 - WFO shift team, with partners
 - Play the scenario through to completion
 - Use “real” team members in their roles
- **Level 5: FEMA Table Top (WFO Team/multiple agencies/ROC-SRH)**
 - Full Team (customers, WFO team, SRH ROC, EOC, kitchen sink)
 - Could be a multi-day (most likely would be a FEMA Tabletop with WFO spinning their training into the FEMA big picture)
 - Use all available bodies and any additional that can be loaned
 - Long fuse planning required
 - Major time/resource requirements



Simulation Starters



- **Conducted monthly service backup exercises with WFOs Corpus Christi and Brownsville since 2005**
- **“Build a little, test a little.” Turn small successes into the full program over time.**
- **Full simulation capability in AWIPS/WES2 (including Partner data push)**

Simulation Plan

- Utilize WFO Austin/San Antonio Tropical Cyclone Operations Plan
- Staff work through procedures from 120 hours to landfall for Hurricane Dolly (2008)
- Goals of the Simulation:
 - Test Tropical Cyclone Plan and procedures
 - Test communications systems
 - Evaluate staff briefing skills
 - Develop WFO simulation methodology



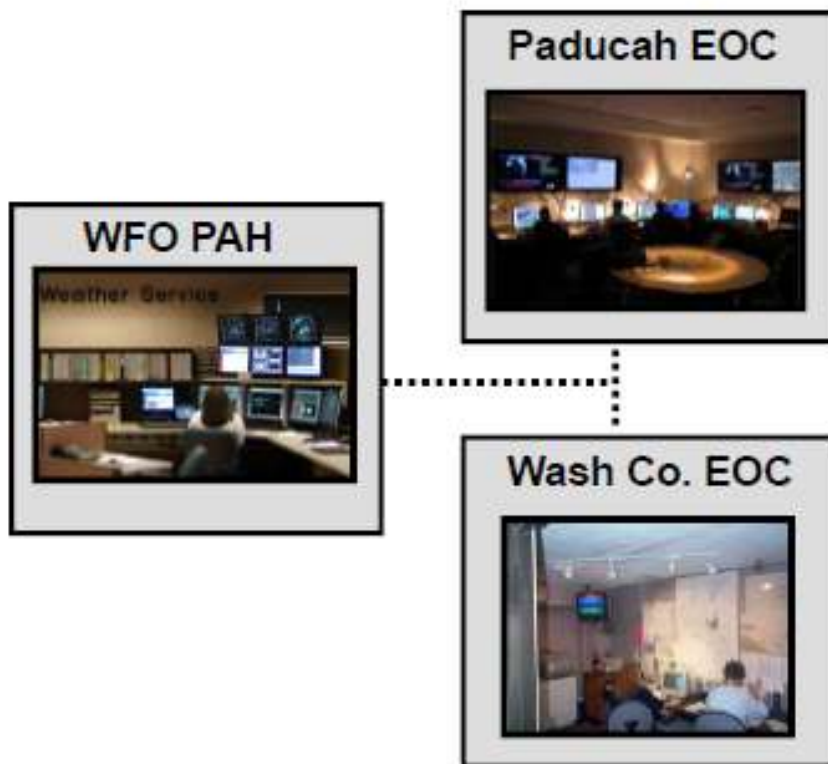
Simulation Timeline

- ~~Identify staff: Fall 2009~~
- Complete Level 1 activities:
February- March 2010
- Complete pre-Level 2 simulation
work: April 2010
- Perform Level 2
simulation: May 2010



End State Vision -- 2014

Examples: Interagency Simulations



- Decision Support
- Weather Support for EM Exercises
- Partnerships
- Polish Communication Skills
- Practice Collaboration prior to Real Events (e.g., FEMA)

- AWIPS2 “Thin Client”
- Web Page populated by AWIPS2 during simulation

THANK YOU!

Questions? Comments?

Jon W. Zeitler
NOAA/NWS

WFO Austin/San Antonio, TX
jon.zeitler@noaa.gov

Kurt Vanspeybroeck
NOAA/NWS

SMG Houston, TX
kurt.m.vanspeybroeck@nasa.gov

