

# National Weather Service



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## Next Generation Warning Services

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Severe Storms Services  
NOAA National Weather Service

National Severe Weather Workshop  
March 5-7, 2009

# How to Improve Warning Services?

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- Where we are today
- Technology on the horizon
- Understanding user needs
- Next Generation Warning Services Workshop



# Where we are today

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- Tornado warning lead time at 14 minutes
- Private sector meteorology businesses
  - From ~\$940M in 1995 to > \$2B in 2007\*
- Weather frequently used to draw customers to web sites



Results ... **35,700,000** for [Local Weather](#)

- In numerous broadcast markets, viewers select local news based on the on-air meteorologist

\*From: The Private Sector in Meteorology – An Update  
David B. Spiegler, AMS 2007

# Where we are today

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- Weather accounts for 70% of all air traffic delays within the U.S. airspace
  - The FAA determined two thirds of this is preventable with better weather information



Flight	Gate	Remarks
FR3916	42	Canceled
FR2372	41	Delayed
FR3002	54	Canceled
FR232	53	Canceled
FR901	58	Canceled
FR434	45	Delayed
FR034	55	Delayed
FR2314	48	Canceled
FR203	44	Canceled
FR584	56	

- *“The total cost of domestic air traffic delays to the U.S. economy was as much as \$41 billion for 2007.”\**

\*From: Your Flight Has Been Delayed Again;  
Congressional Joint Economic Committee; May 2008



# How do we improve warnings services? Better Technology

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- NEXRAD Dual Polarization Upgrade
- Multi-radar, Multi-sensor Grids
- AWIPS II
- Mesoscale and Stormscale Ensemble Models
- Boundary layer radars
- Phased array radar
- NPOESS
- GOES R
- MADIS
- And so on



Multi-function Phased Array Radar Depiction

# How do we improve warnings services? Understanding User Needs

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- Highly mobile society
  - World's population of mobile phone users to increase from 50% to 80% by 2013 (5.8 billion people)
- Need for instant access
  - Recent survey - 50% would rather use a mobile device (i.e., smart phone) to access Internet than desktop/laptop
- Weather savvy consumers
- Greater accessibility to technology



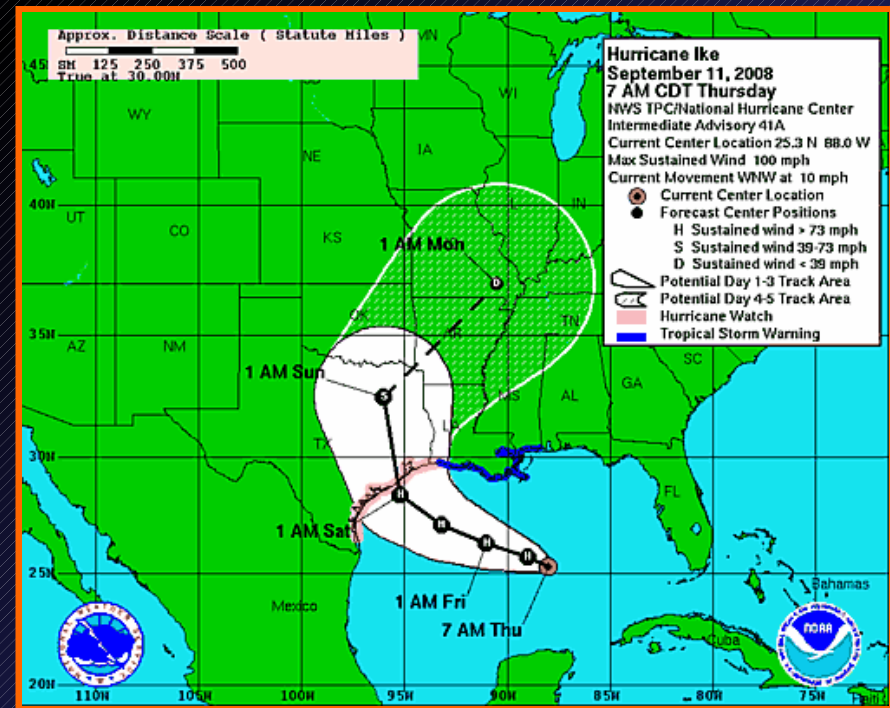
From: The Private Sector in Meteorology – The Next Ten Years  
Maria A. Pirone, AER, Inc., 2008

# How do we improve warning services? Understand User Needs

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- Higher expectations
  - Demand for more local weather
  - Demand for better forecasts

- Public awareness of disaster impacts
- Population growth along the weather sensitive coastlines and fire prone areas



# Next Generation Warning Services Workshop

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- Goals
  - Enable the public and partners to:
    - Fully participate in requirements
    - Share details on new technologies & capabilities
    - Maximize satisfaction with the quality, usability and flexibility of NWS' future warning services

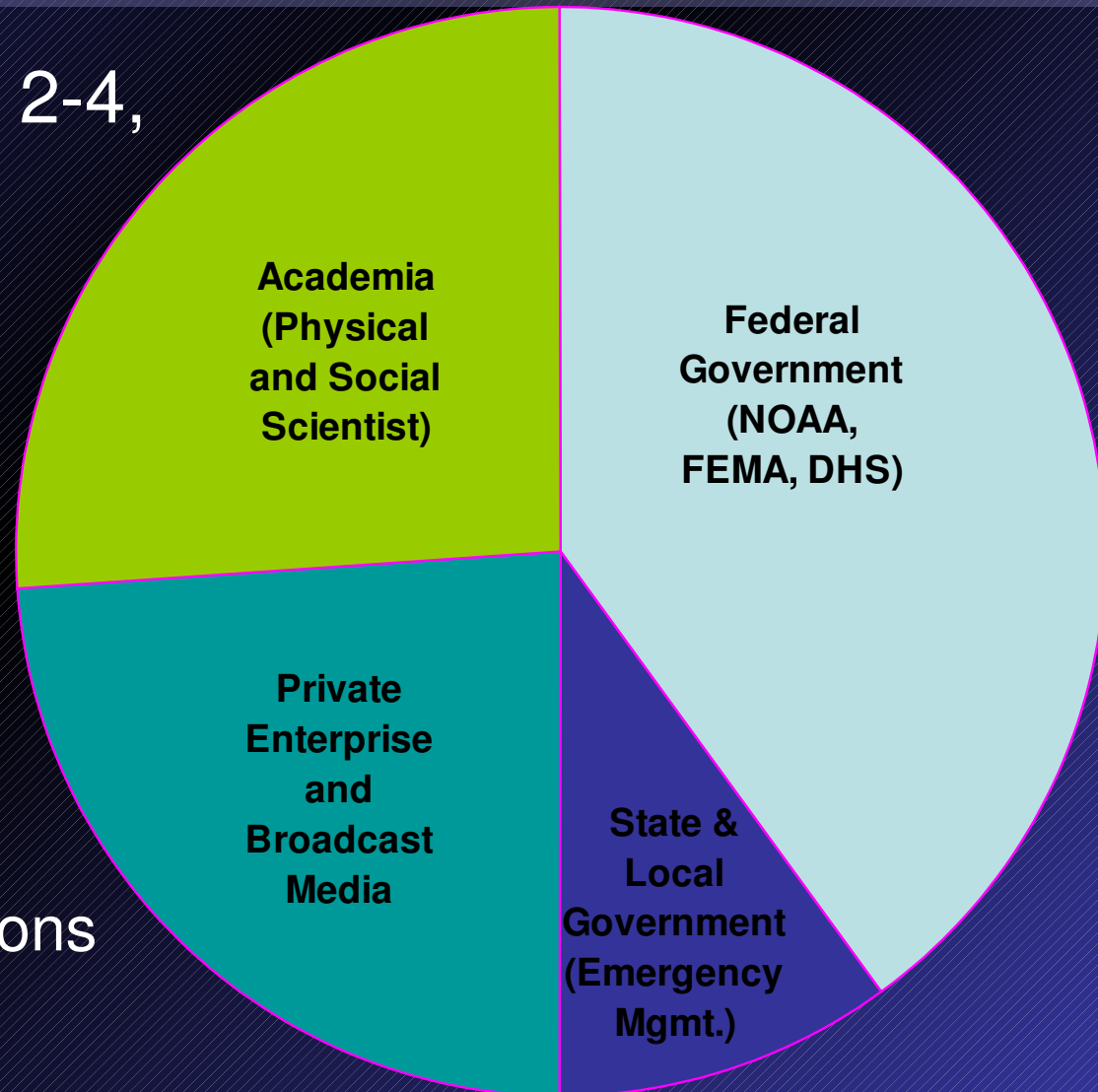




# Next Generation Warning Services Workshop

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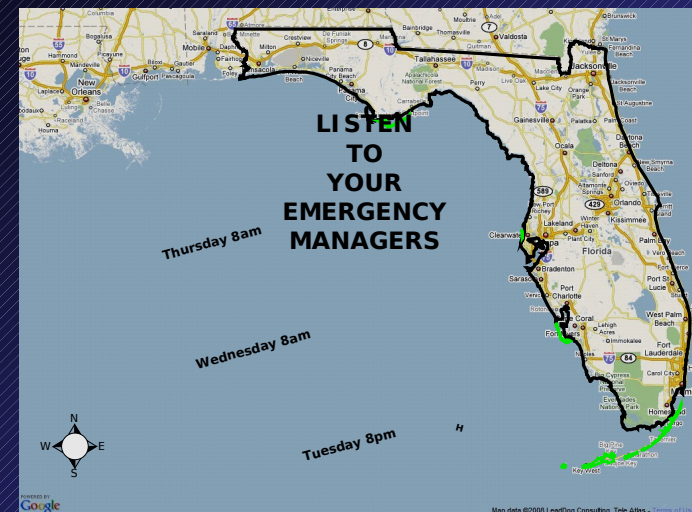
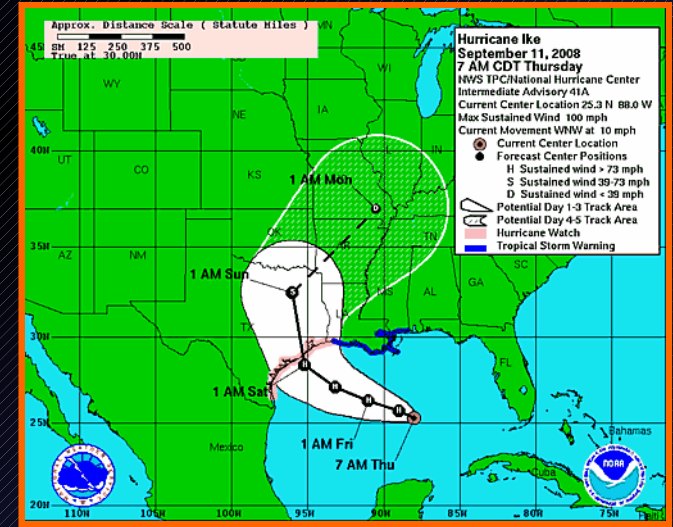
- 2 ½ days – Dec. 2-4, 2008
- 135 Participants
- Pre-workshop feedback
  - Content
  - Communication Style
  - Dissemination Capability
  - Partner Interactions



# Day 1 – Where we are

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- NWS Perspective
- Partners Perspectives
- Social Science Perspective
- GIS Perspectives
- Science & Technology Impacts



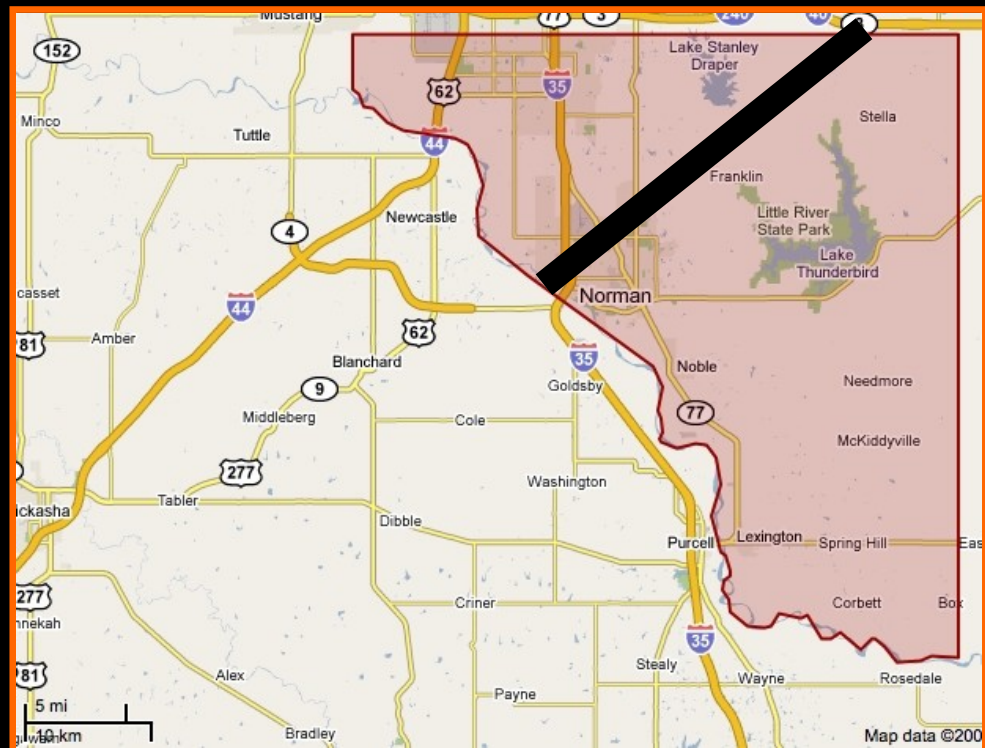
# Slide Courtesy of Chuck Doswell

## Meaning of a warning ...

- Cleveland County - 536 mi<sup>2</sup>
- Tornado: 1 mi wide, 20 mi long, 20 mi<sup>2</sup>
- Doesn't affect 516 mi<sup>2</sup> = 96% of the county

Was the warning a  
“false alarm” for  
96% of the county?

Public perception  
may not equal the  
NWS verification  
scheme!





# Slide Courtesy Lisa Vitols

## Results from Intermediate Report

Decision-makers want:

- Personal contact
- Value-added information
- Greater detail
- Timing is critical
- Want new forecast elements added
- Internet / e-warnings are the main access points





# Day 2 – Where we need to go

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- Roll Up Sleeves
- Break into 6 Groups
- Discuss commonalities in pre-workshop feedback
- Define requirements for modernized warning services
- Develop a vision of how future NWS warning service should evolve



# Day 3 – Summarize Workshop Outcomes “Items of Consensus”

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1. Involve social scientists
2. Educate and inform public on hazard impacts, products and services
3. Coordinate with a wide spectrum of users prior to making policy changes
4. Expand “Hazard-based” (e.g. polygon) warnings to additional weather elements

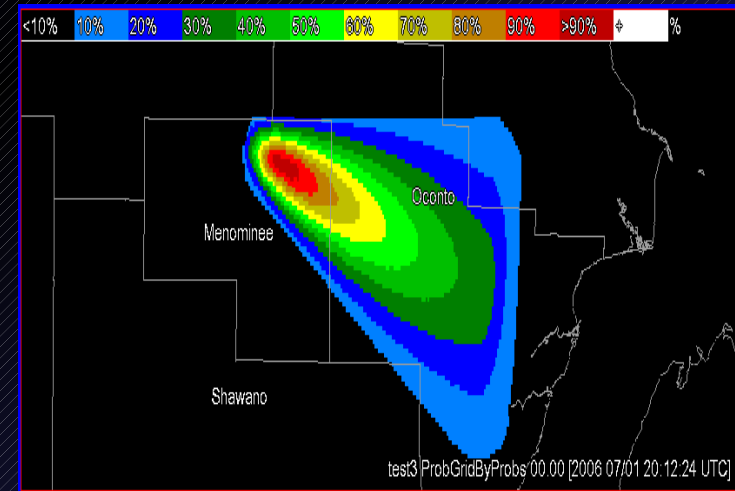


# Workshop Outcomes

## “Items of Consensus”

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1. Improve text based products
2. Use Chat-based software for communication with media and emergency managers
3. Provide graphical hazard data in raw format for partners to easily ingest/utilize.
4. Focus warnings to cover "What", "Where", "When", and "Intensity" in a clearly delineated format



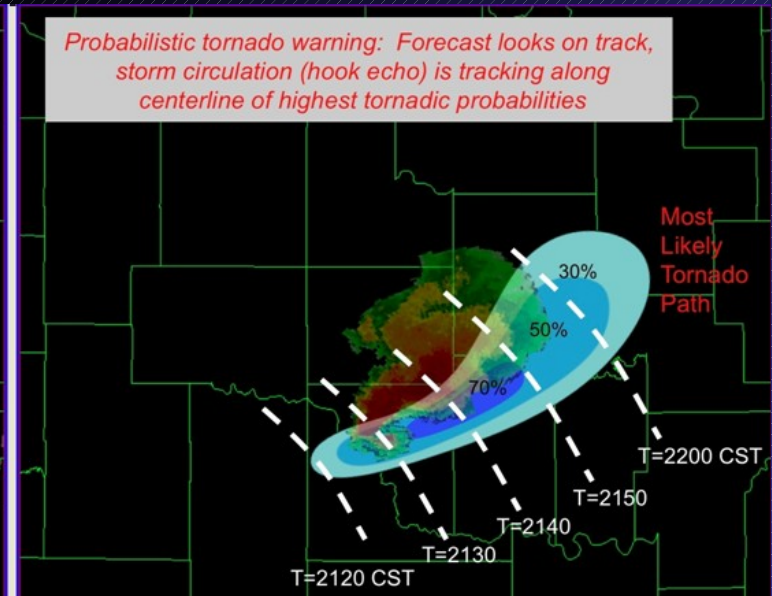
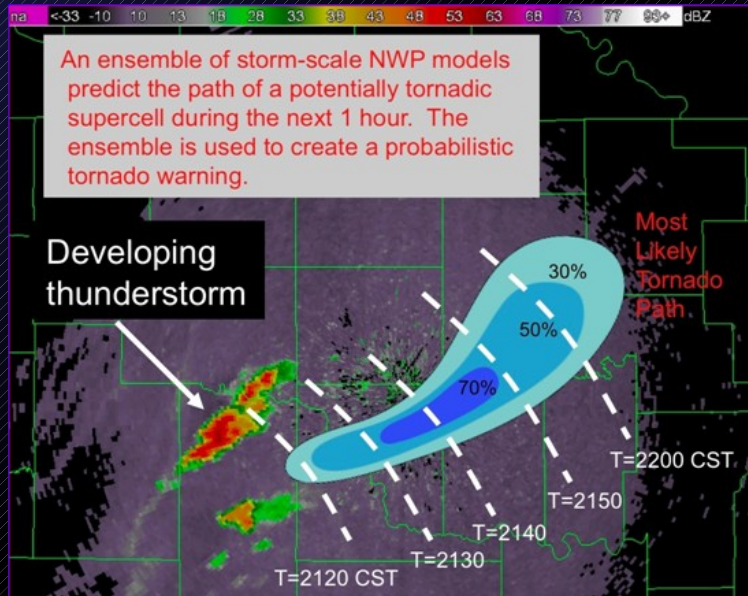
1 hour threat swath

# Workshop Outcomes

## “Items of Some Debate”

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- Alternatives to Watch/Warning/Advisory
- Use of Probabilistic Hazard Information
- Quantitative Criteria vs Impact-Based Criteria
- Need for “Calls-to-Action” in Warnings





# Workshop Follow-on Activities

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- Actions developed from outcomes and posted on web-site
- Blog, List Server, or Discussion Board



# Next Generation Warning Services Workshop

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<http://www.weather.gov/warningworkshop/>



The screenshot shows the National Weather Service website. At the top, the NOAA logo is on the left, the text "National Oceanic and Atmospheric Administration's" is in the center, and the "weather.gov" logo is on the right. Below this is the "National Weather Service" logo. A navigation bar contains "Site Map", "NewsOrganization", a search box, and radio buttons for "NWS" and "All NOAA" with a "Go" button. The main content area has a "Home>" link and a large blue banner with the text "National Weather Service Next Generation Warnings Workshop". Below the banner, it says "University of Oklahoma, Norman OK December 2-4, 2008". A row of four images shows: 1) workers in safety gear, 2) a bus overturned in a snowy field, 3) a storm with palm trees, and 4) a weather radar map. A "What's New:" section at the bottom lists: "Presentations are now available!" and "First draft of meeting outcomes are now available!". A left sidebar contains links for "Brochures (PDF)", "Presentations", "Presentations(PDF)", "Outcomes", "Outcomes(PDF)", and "Venue", along with the "USA.gov" logo.

weather.gov

National Oceanic and Atmospheric Administration's

**National Weather Service**

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**National Weather Service**  
**Next Generation Warnings Workshop**

University of Oklahoma, Norman OK  
December 2-4, 2008

Brochures (PDF)  
Presentations  
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Outcomes  
Outcomes(PDF)  
Venue

USA.gov  
Government Made Easy

**What's New:**

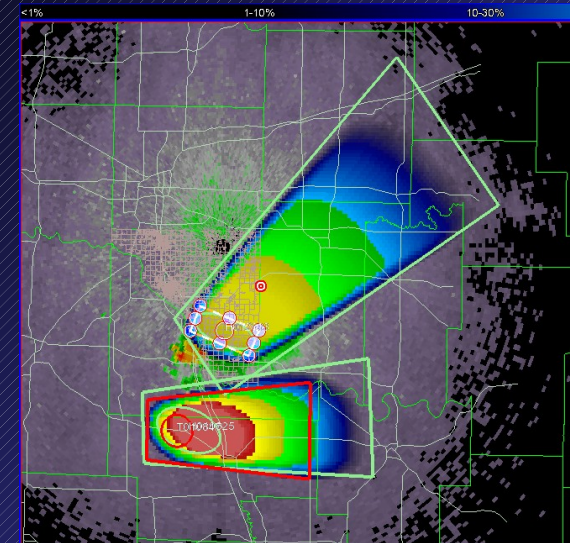
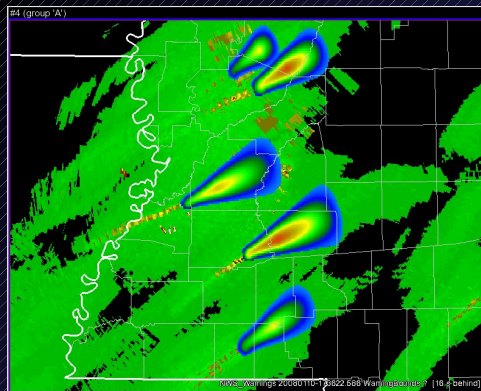
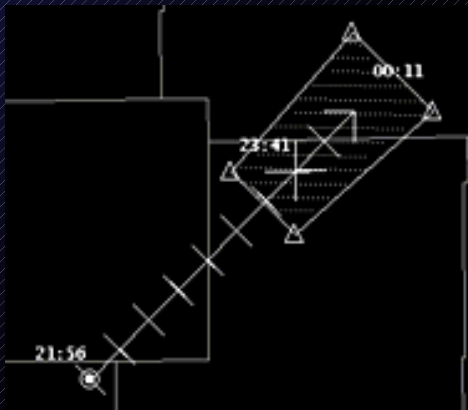
- Presentations are now available!
- First draft of meeting outcomes are now available!

# Next Generation Warning Tool Vision

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A new application or suite of applications that

- Fully supports the watch, warning, advisory mission
- Meets new operational requirements
- Satisfies partner and customer needs for accurate, accessible, and timely watch, warning, and advisory information





# Next Generation Warning Services Summary

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- Accurate and timely warning services for high-impact events are critical to NWS success
- How do we get better?
  - Better technology
  - Keep track of major trends
    - Mobile Internet Devices, GIS, GPS, Social Networking, etc.
  - Meet user and partner needs





# Contact Information

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