



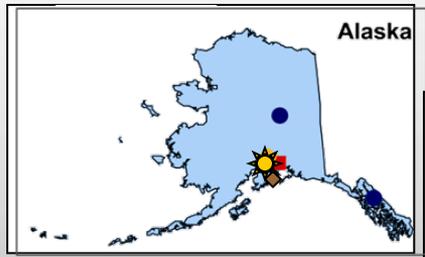
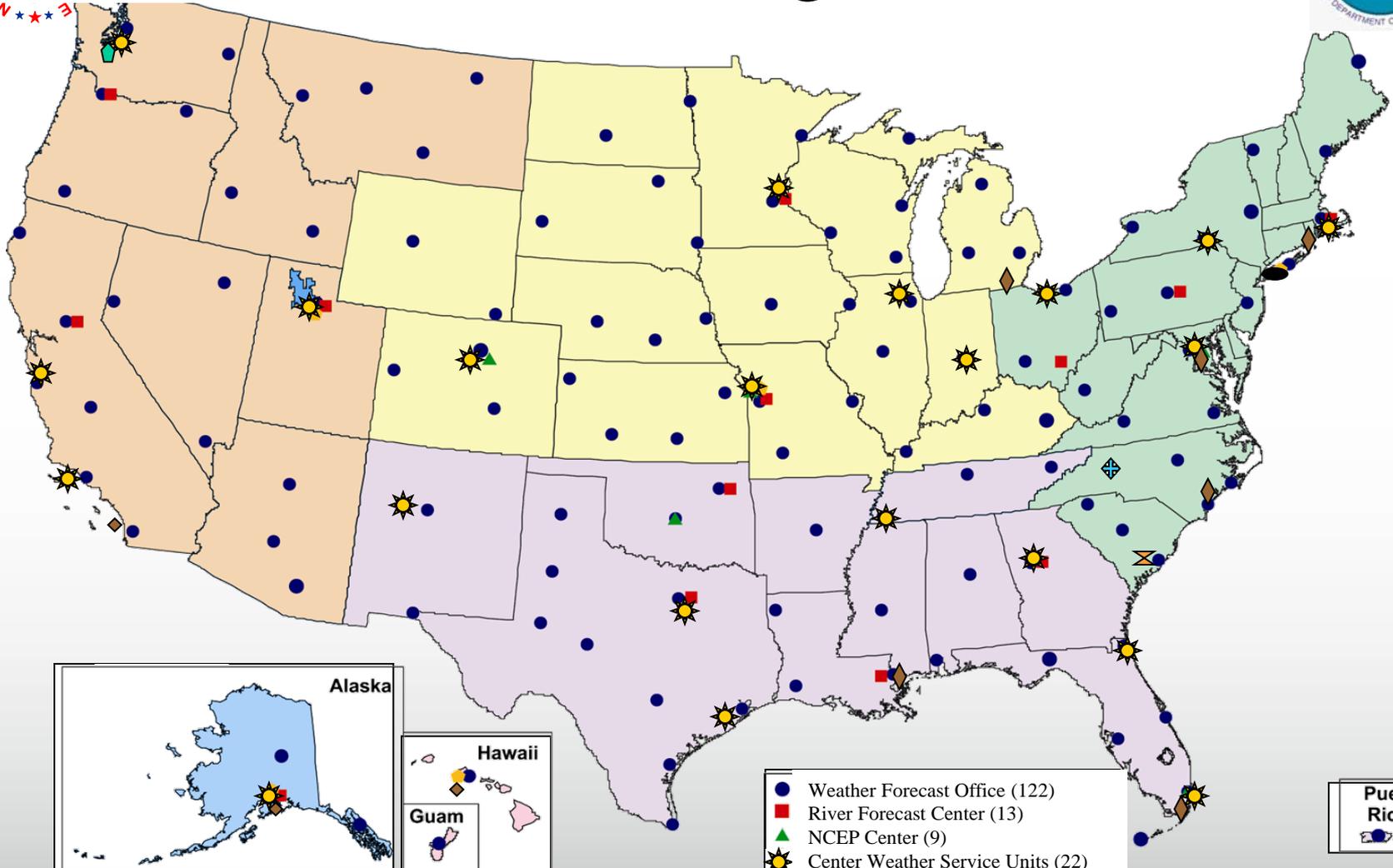
# NOAA/NWS Support for Homeland Security: ATD Modeling

- Structure
- Services
- Cooperative Support

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NOAA *and* HOMELAND SECURITY

# NOAA In Your Neighborhood



- Weather Forecast Office (122)
- River Forecast Center (13)
- ▲ NCEP Center (9)
- ☀ Center Weather Service Units (22)
- ◆ NESDIS CoastWatch Nodes (9)
- ◇ NOS HazMat Office
- ⊠ NOS Coastal Services Center
- ⊞ NESDIS Nat. Climatic Data Center

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# Services Supporting ATD Modeling for Homeland Security



Realtime and archived environmental data support vulnerability and risk analyses

- Long and short-range environmental forecasts support preparation, protection, response, and recovery decisions
- Dispersion forecasts help move people out of harms way
- Event specific support speeds decision making
- Direct public dissemination of critical information speeds evacuations
- Education and coordination ensures effective service use
- Focused research improves service



# Environmental Forecasts



- Monthly and seasonal forecasts
  - support preparedness and long term recovery decisions
  - strengthen economic viability of weather sensitive businesses
- Daily and weekly forecasts
  - support contingency planning
  - illustrate where recovery resources could be diverted
- Forecasts and warnings from minutes to hours safeguard first responders and attack victims.
- Aviation and Marine forecasts support Navy, Coast Guard, and Air Force protection activities



# NOAA/NWS Weather Observations and Forecasts



- Short term warnings and forecasts safeguard first responders
- Daily to seasonal forecasts aid contingency planning
- Site-specific Web pages provide one-stop shopping:
  - forecasts and warnings
  - surface observations
  - radar and satellite images

**OFFICE OF CLIMATE, WATER, AND WEATHER SERVICES**  
Incident Weather Support

Contact: NWS Forecast Office Sterling, VA (703) 556-1700

**Incident Specific Forecasts**

- [Current to Day 7 Forecast](#)
- [Graphical Zone Forecast](#)
- [Digital Tabular Zone Forecast](#) ([How to read it](#))
- [Watches, Warnings, and Forecasts for Arlington and Alexandria](#)
- [1 to 6 Hour Forecast](#) (when available)

**Forecast Map Graphs**

- [1 to 7 Day Fronts, Weather, and Radar](#)

NATIONAL WEATHER SERVICE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
U.S. DEPARTMENT OF COMMERCE

Special Hydrometeorological Summary  
Friday, September 21, 2001

**Recovery Area Forecasts**

**Pentagon**

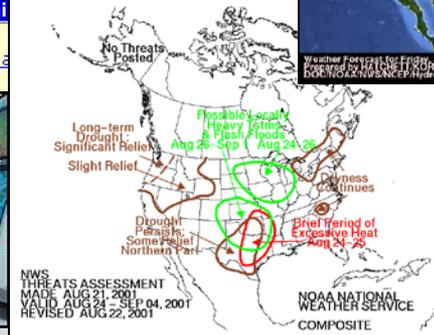
Impacts: Partly cloudy Patchy fog until mid morning. Showers likely Monday and possibly Tuesday.

Dry through Sunday with highs in the upper 70s to low 80s. Overnight lows will be in the 60s. Showers are likely Monday and are possible on Tuesday. Detailed forecast and related information can be found at: <http://www.nws.noaa.gov/om/support>

**Lower Manhattan**

Impacts: Mostly cloudy today through Saturday with a chance of showers late in the day on Saturday. Highs in the upper 70s to low 80s and lows in the low to mid 60s. Winds are expected to be south at 5 to 10 mph. Showers are likely Tuesday and possibly Wednesday.

A chance of showers Saturday. Dry weather is expected Sunday and Monday. Highs Sunday and Monday are expected to be in the 70s. Showers are likely Tuesday and are possible on Wednesday.



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# NOAA Dispersion Forecasts



- CAMEO/ALOHA product suite supports first responder decisions for localized hazardous releases (NOS)
- HYSPLIT model supports planning, response for radiological emergencies (OAR-developed capability; in NWS operations)
- HYSPLIT predicts dispersion of hazardous releases exceeding a 10km area. (OAR-developed capability; in NWS operations)
- HARM model predicts dispersion of hazardous releases for selected sites (OAR)

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# Operational Dispersion Forecasts: HYSPLIT/ Eta-12



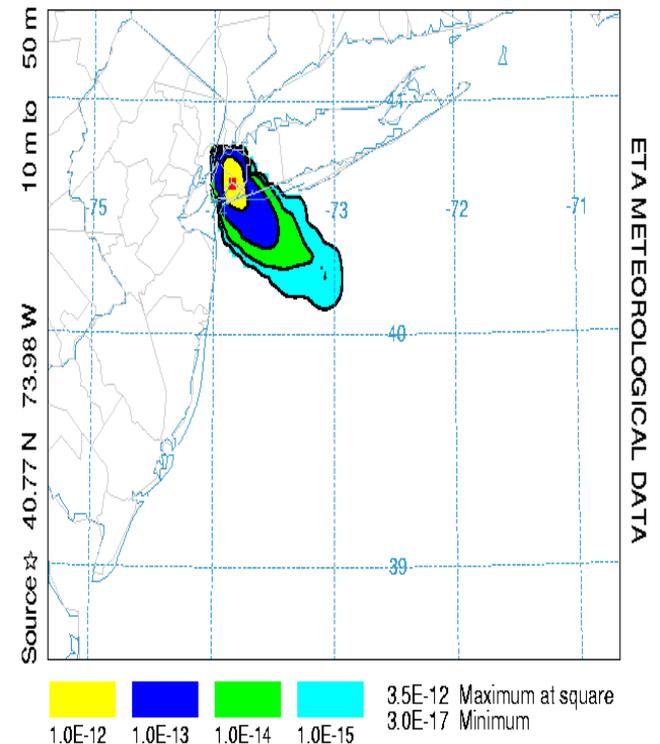
- HYSPLIT run at NCEP, linked to NCEP's highest resolution mesoscale NWP model: Eta-12
- Planning: Scenario archive available from 4 X daily simulations for selected locations across the Nation
- On-demand run in addition to regularly scheduled runs
- Response/recovery: WFO forecasters transmit dispersion predictions to emergency managers
  - Contact: nearest WFO (NCEP's SDM can help direct)

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Concentration (mass/m<sup>3</sup>) averaged between 0 m and 500 m

Integrated from 2100 24 Oct to 0000 25 Oct 02 (UTC)

Release started at 1800 24 Oct 02 (UTC)



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# Event Specific Support



- 55 incident meteorologists deploy to event sites.
- 12 HAZMAT scientific support coordinators deploy to hazardous spill and release sites.
- NWS Weather Forecast Offices (WFO) provide onsite support as requested
- NOAA creates incident specific WEB sites.
- Air Resources Lab provides onsite support for FBI Nuclear Emergency Search Teams

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# NOAA Support to Emergency Managers

## *Selected Capabilities*

NWS field forecasters frequently respond to requests by emergency managers for weather information, incident support, and for assistance in disseminating emergency warning information



HAZMAT Science Support Coordinators provided on-site support to USCG to manage Marine pollution events and port security activities



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# Dissemination



## To Emergency Managers:

- NWS Field Forecasters at 122 Weather Forecast Offices provide dispersion forecasts upon request to Emergency Managers

## To the Public:

- Emergency managers/DHS can request civil emergency messages be disseminated over NOAA Weather Radio; the system also carries emergency weather information
  - Alerts public to extreme events and civil emergency messages (CEM)s
  - Activates the Emergency Alert System
- Emergency Managers Weather Information Network (EMWIN) delivers critical information at minimal cost
- NOAA Weather Wire Service and NOAAPORT deliver information to media and other disseminators

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# Education and Coordination



- Service representatives at 121 Weather Forecast Offices and 12 scientific support coordinators nurture local and state officials
- NOAA and FEMA partner on emergency manager courses
- 10,000 users trained on CAMEO worldwide
- NOAA's Coastal Service Center educates users about coastal services

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# Focused Research



- Improve dispersion modeling and fine scale dispersion forecasts

Oklahoma City urban field experiment; DC testing

Vandenburg and Cape Canaveral experiments

- Improve short-term warnings and forecasts

Hurricanes at Landfall initiative

Quantitative Precipitation Forecast initiative

Improved Doppler radar capabilities

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# Cooperative Support

- **River gages - USGS, USACE, Bureau of Reclamation**
- **Doppler radar & surface observing systems - DOD and FAA**
- **Hurricane reconnaissance - Air Force Reserve**
- **Data buoy tending and marine dissemination - Coast Guard**
- **ARGOS data collection system - French Space Agency**
- **Voluntary observations - 168,000 storm spotters, 115,000 marine reports, 1800 voluntary ships**
- **CAMEO product suite - EPA**
- **HYSPLIT and HARM – DOE**
- **Drought Monitor - DOA, National Drought Mitigation Center**
- **National Education Coalition - FEMA, USGS, American Red Cross**

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# Concepts for Integrated Weather/ATD Support for Homeland Security

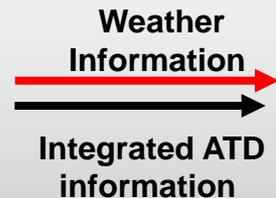
ATD Capabilities:  
NOAA/OAR,  
NOAA/NOS, NRC,  
DOD, DTRA, DOE,  
EPA... (See OFCM's  
JAG/SEATD listing)



Emergency  
Managers



NOAA/NWS  
WFO



DHS/FEMA  
Incident  
Command



Specialized Data:  
Source Terms

Urbanet Data

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NOAA/NWS NCEP

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# Backup

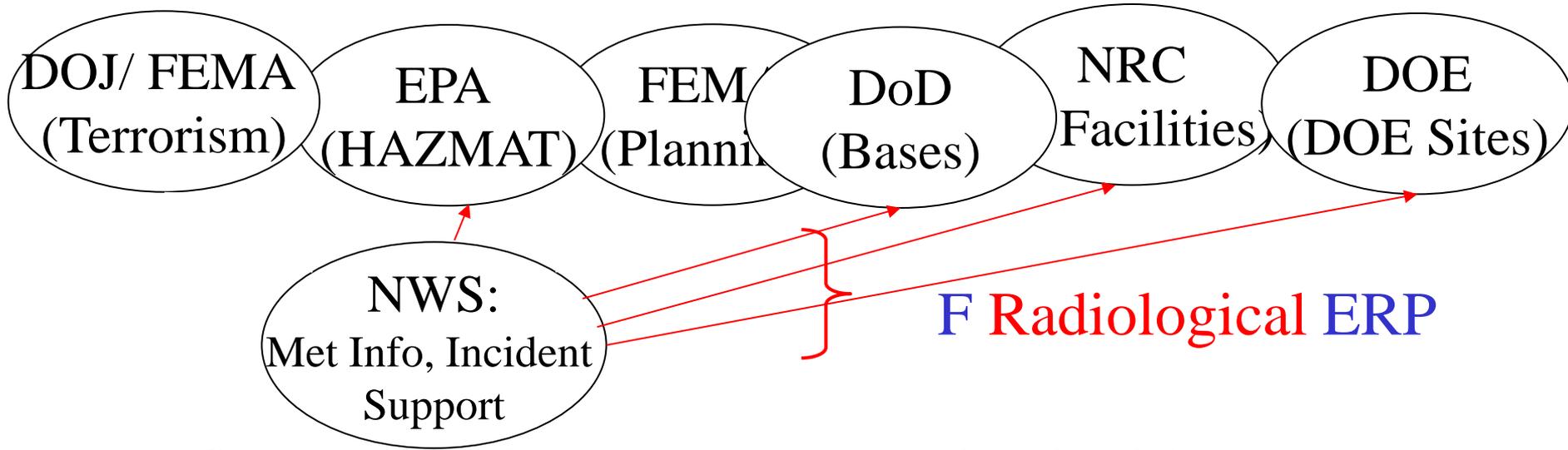


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# Agency Responsibilities

## *Federal Emergency Response Plan (FERP): CBN*



FERP Support Function

Information and Planning

Hazardous Materials

Annex: Terrorism Incident\*\*

Lead Federal Agency (LFA)

FEMA

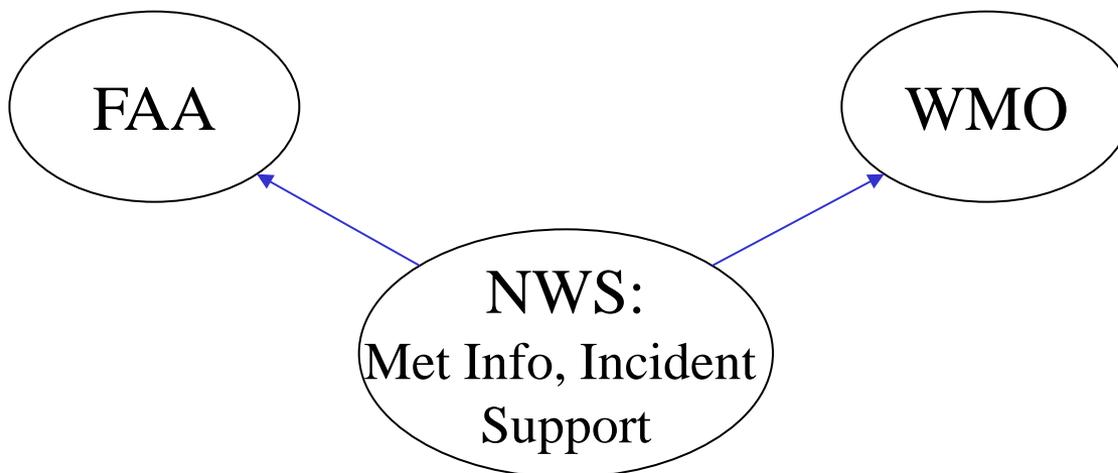
EPA

DOJ/ FEMA

\*\*Through Hazardous Materials responsibilities (EPA lead)

# International Responsibilities

## *NWS: Radiological Release and Volcanic Ash*



### ✓ **Radiological release (WMO):**

- Dispersion model (HYSPLIT) run by NCEP's Senior Duty Meteorologist (SDM)
- Initialized with Eta 12km or AVN models

### ✓ **Volcanic Ash (FAA):**

- Ash trajectory model (VAFTAD) run by NCEP's SDM
  - HYSPLIT also run for ash transport/dispersion, by OAR/ARL



# Backup



- Storm Prediction Center and Aviation Weather Center – Air Force Weather Agency (AFWA)
- Alaska Aviation Weather Unit - Elmendorf Air Force Base
- Washington Volcanic Ash Advisory Center (VAAC) and Regional Specialized Met Center (RSMC) for Radiological Emergencies – Montreal VAAC and RSMC
- NCEP Central Operations - Fleet Numerical, AFWA, and FSL
- Weather Forecast Offices - Partner Office
- NCEP Service Centers - Partner Office



# Environmental Data



## Realtime Observations

- Global data feed NOAA and other agency prediction models
- Local data support first responder dispersion models
- Recovery area overflights assist debris removal

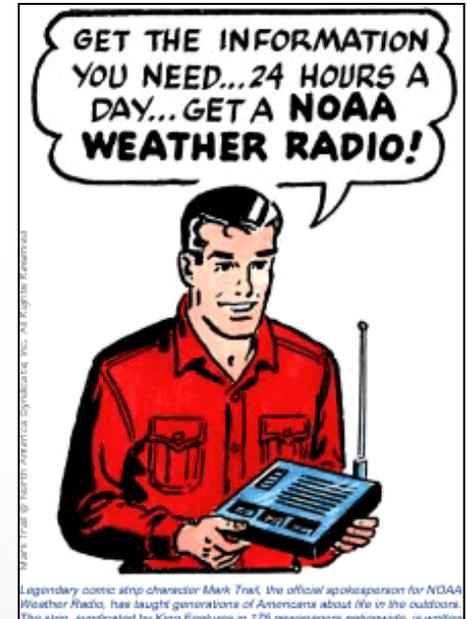
## Archived Environmental Data

- Extreme environmental event statistics support preparedness actions
- Wind, temperature, and precipitation climatologies define hazardous release vulnerabilities
- Dam break scenarios, storm surge and coastal atlases, and dispersion climatologies define at risk populations

# NOAA Weather Radio



- Is the official government source for public warning information
- Covers 85 percent of the population
- Becoming a “All Hazards” warning system for natural and technological hazards
- Disseminates emergency manager Civil Emergency Messages to the public
- Is an entry point to the Emergency Alert System (EAS)



*"I also want to tell you one of my favorite moments was to go down to Crawford and turn on my NOAA radio to get the weather. I don't know whether my guy is a computer or a person. But the forecast is always accurate, and I appreciate that..."*

President Bush February 14<sup>th</sup>, 2002



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# Improvement Opportunities



- Define requirements for effective hazardous release response actions
- Upgrade appropriate dispersion models to meet user requirements
- Implement cost effective high resolution models for dispersion model input
- Acquire more high resolution observations
- Strengthen communications infrastructure
- Strengthen dissemination infrastructure
- Strengthen meteorologists' abilities for hazardous release support
- Strengthen first responders' understanding of evolving services

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# Concepts for Integrated Weather/ATD Support for Homeland Security

