Integrated Public Alert and Warning System (IPAWS) Update

June 2007

Agenda

- History of public alert and warning and IPAWS
- Emergency Alert System (EAS), the Primary Entry Point (PEP) System, and the Digital EAS
- National Warning System (NAWAS)
- NOAA Weather Radio to Schools
- Geo-Targeted Alerting System (GTAS)
- Web Alert and Relay Network (WARN)
- IPAWS Deployable Assets

The nation's public alert and warning system evolution from the 1960s

Emergency Broadcast System (EBS) replaced the nation's first alert and warning system, called CONELRAD. The EBS allowed the President or State and local officials to send out alerts while stations continued to operate on their assigned frequencies. EBS required a "person in the loop" to relay the alerts.

Primary Entry Point Advisory Committee (PEPAC) was established by FEMA to help manage the 34 EBS Primary Entry Point (PEP) stations across the USA.

EAS was initiated in 1994, and fully replaced the EBS by 1997. The PEP stations were retained. NOAA Weather Radio also launched its first computer synthesized voice (Paul) system in 1997 to expedite alerts.

The Integrated Public Alert and Warning (IPAWS) program was initiated in 2004 and established in 2006 according to direction within the Hurricane Katrina Lessons Learned Report and to achieve the end state vision of Executive Order 13407.

The IPAWS mission is … "to have an effective, reliable, integrated, flexible, and comprehensive system to alert and warn the American people in situations of war, terrorist attack, natural disaster or other hazards to public safety and well being."

IPAWS Background

What is IPAWS? (Integrated Public Alert and Warning System)

- DHS program begun in 2004 to improve public alert & warning in partnership with NOAA*, the FCC*, & other public/private stakeholders
- Evolving "system of systems"
  - Emergency Alert System (EAS) upgrades
  - National Warning System (NAWAS) enhancements
  - **New pilots and systems:**
    - Digital EAS (DEAS) program with APTS* and others
    - Web Alert and Relay Network (WARN) pilot with Sandia and others
    - Geo-Targeted Alerting System (GTAS) program with NOAA and others

"DHS should establish an integrated public alert and warning system in coordination with all relevant departments and agencies."

- Hurricane Katrina Lessons Learned Report (2006)

* NOAA = National Oceanic and Atmospheric Administration
FCC = Federal Communications Commission
APTS = Association of Public Television Stations

IPAWS Background: FEMA's Responsibilities

- FEMA provides IPAWS Program Management/Engineering
  - Executive Agent for national-level Emergency Alert System (EAS)
    - Test, operate, maintain, and upgrade national EAS and PEP* system
  - Operate, maintain, and upgrade the National Warning System (NAWAS)
  - Supports the Chemical Stockpile Emergency Preparedness Program (CSEPP) and Radiological Emergency Preparedness (REP) public warning "system of systems"
  - Working closely with NOAA on several joint projects/agreements
  - Conducting several pilot initiatives for improving public warning
- FCC: "EAS and other emergency notification mechanisms, are part of an overall public alert and warning system, over which the Federal Emergency Management Agency (FEMA) exercises jurisdiction."

  [Notice of Proposed Rulemaking (NPRM), 12 Aug 04]

* PEP = EAS Primary Entry Point (PEP) stations

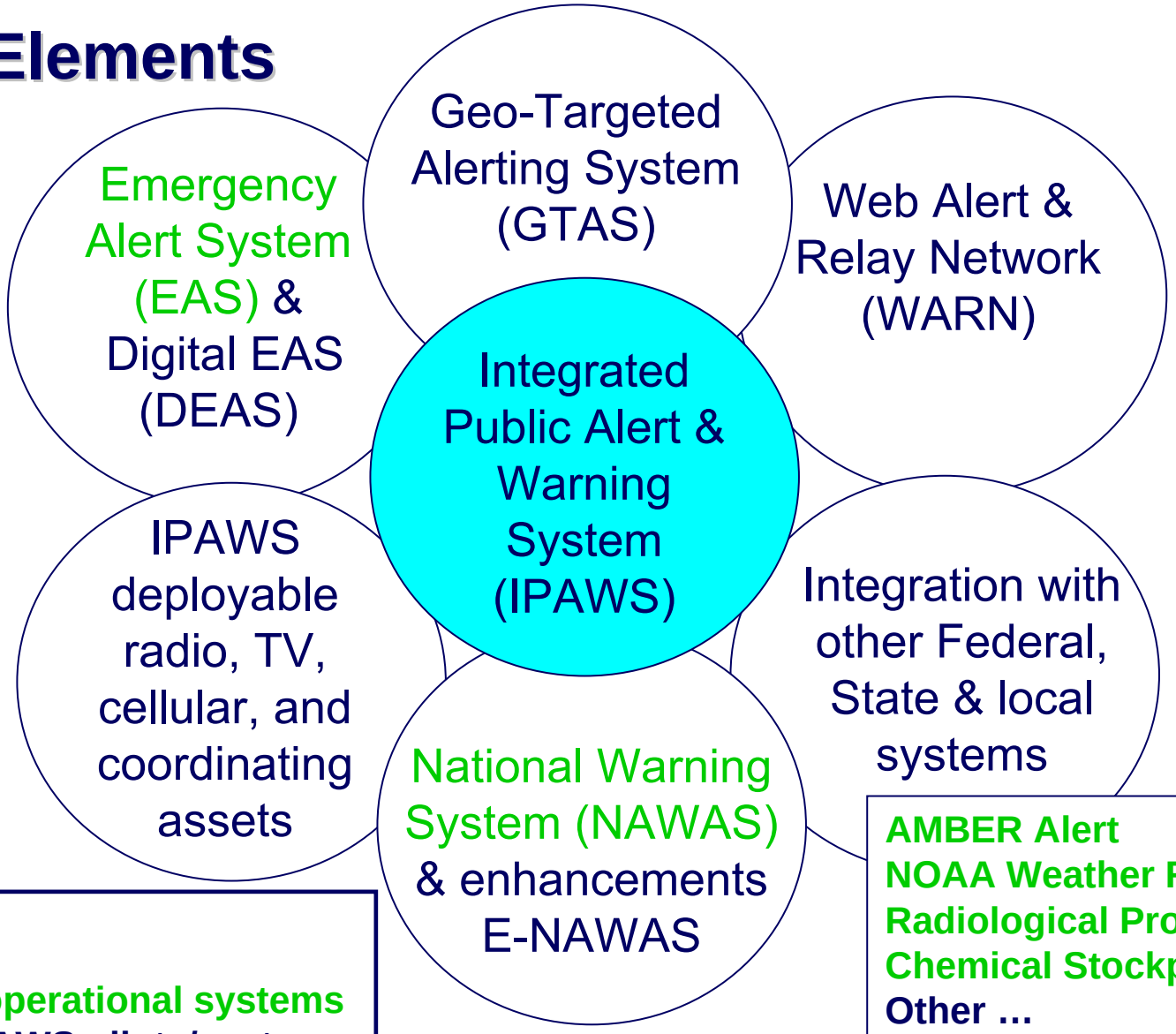
Executive Order 13407 Policy

" It is the policy of the United States to have an effective, reliable, integrated, flexible, and comprehensive system to alert and warn the American people in situations of war, terrorist attack, natural disaster, or other hazards to public safety and well-being (public alert and warning system), taking appropriate account of the functions, capabilities, and needs of the private sector and of all levels of government in our Federal system, and to ensure that under all conditions the President can communicate with the American people."

Executive Order 13407 Requirements

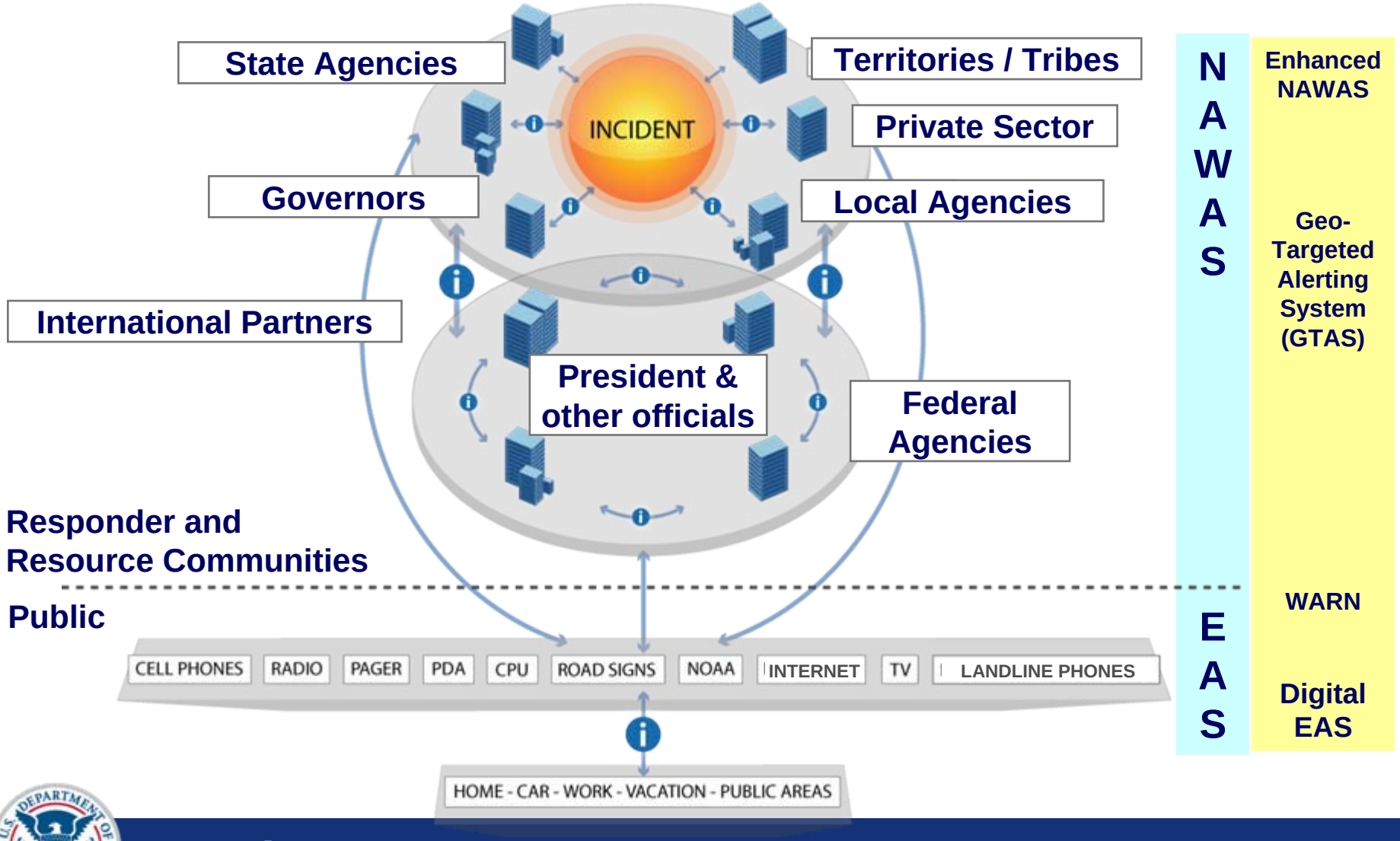
1. Inventory, evaluate, and assess public alert and warning capabilities
2. a. Adopt standards and operating procedures for public alert & warning
   b. Enable secure delivery of messages through many pathways
3. Adapt distribution/content based on location, risks, or user preferences
4. Alert those with disabilities and those without English proficiency
5. Maintain/protect/restore public alert and warning system infrastructure
6. Test, train, and exercise the public alert and warning system
7. Conduct public education
8. Coordinate with the private sector, local government, and first responders
9. Administer the Emergency Alert System (EAS)
10. Ensure that under all conditions the President can alert the public

IPAWS Elements



IPAWS End-State Vision

Rapid and effective alerting over more channels, to more people, anywhere, anytime



Emergency Alert System (EAS) and Digital EAS

Purpose and Scope of EAS

- National-level EAS provides the President & senior officials an assured method for addressing the nation during emergencies
  - Provides unlimited duration audio message; auto-seizes radio/TV networks
  - National-level EAS activation rests solely with President
  - National-level EAS cascades from the FEMA Operations Center (FOC) → Primary Entry Point (PEP) stations → all major radio/TV broadcasters
  - Planned Digital EAS will allow President and senior officials to send text, voice, and video messages; permits a voluntary broadcast option
- State and local EAS activations permitted/encouraged
  - Audio message length of up to two minutes; voluntary broadcast
  - Used frequently; National Weather Service originates ~ 80% of EAS alerts
  - EAS is also used as the main method to disseminate AMBER Alerts

Primary Entry Point (PEP) Stations (part 1)

- Currently 34 Tier 1 EAS PEP stations across USA
  - 30 AM radio stations, 3 FM radio stations, 1 State Operations Center
  - Tier 1 PEP stations requirements:
    - Diesel backup generator with fuel sufficient for 30 days of continuous broadcasting without commercial power
    - Landline, satellite, and HF radio connectivity to FEMA Operation Centers
    - Special EAS Encoder/Decoders (ENDECs) with unique EAS codes
    - Generally located just outside of major city area (improves survivability)
    - Other: Fallout shelter, on-site food, and special lightning protection
  - One mobile AM/FM tunable PEP radio station being procured
- Tier 2 EAS PEP radio stations
  - 3 new PEP stations being provisioned in Alabama, Mississippi, and Florida
  - Meet all requirements of Tier 1 stations except fallout shelter
  - Additional 24 Tier 2 stations planned; at least one for each State/Territory

Primary Entry Point (PEP) Stations (part 2)

- Tier 3 EAS PEP radio stations
  - 2006/7: New direct EAS link between FEMA and Public Radio satellite net
    - Adds direct FEMA EAS link to public radio affiliates
  - 2006/7: New direct EAS link between FEMA and XM Radio satellite net
    - Adds direct FEMA EAS link over XM Radio network channels
    - XM Radio receivers being added to all Tier 1 and 2 PEP stations
  - Tier 3 stations have a direct communications link to FEMA, but otherwise do not have any special provisioning like the Tier 1 and 2 PEP stations
  - Additional Tier 3 stations planned with major media networks

Example PEP: Louisiana's WWL radio station

- **Prior to Hurricane Katrina:**
  - WWL had 30+ days of diesel on-site in a FEMA provided fuel tank
  - FEMA provided the on-site generator ~30 years prior to Katrina
  - FEMA's phone line to site was needed to operate site controls
  - WWL provided 24 hr critical public communications until the end of the emergency—***WWL was the beacon of hope***

- **Since Katrina, FEMA has funded the following upgrades to WWL:**
  - Electrical Generator to replace logistically unsupportable unit
  - Automatic cleaning fuel system to filter and recycle diesel fuel
  - New Transfer Switches
  - Satellite backup communications


New Electrical Generator


New Transfer Switches

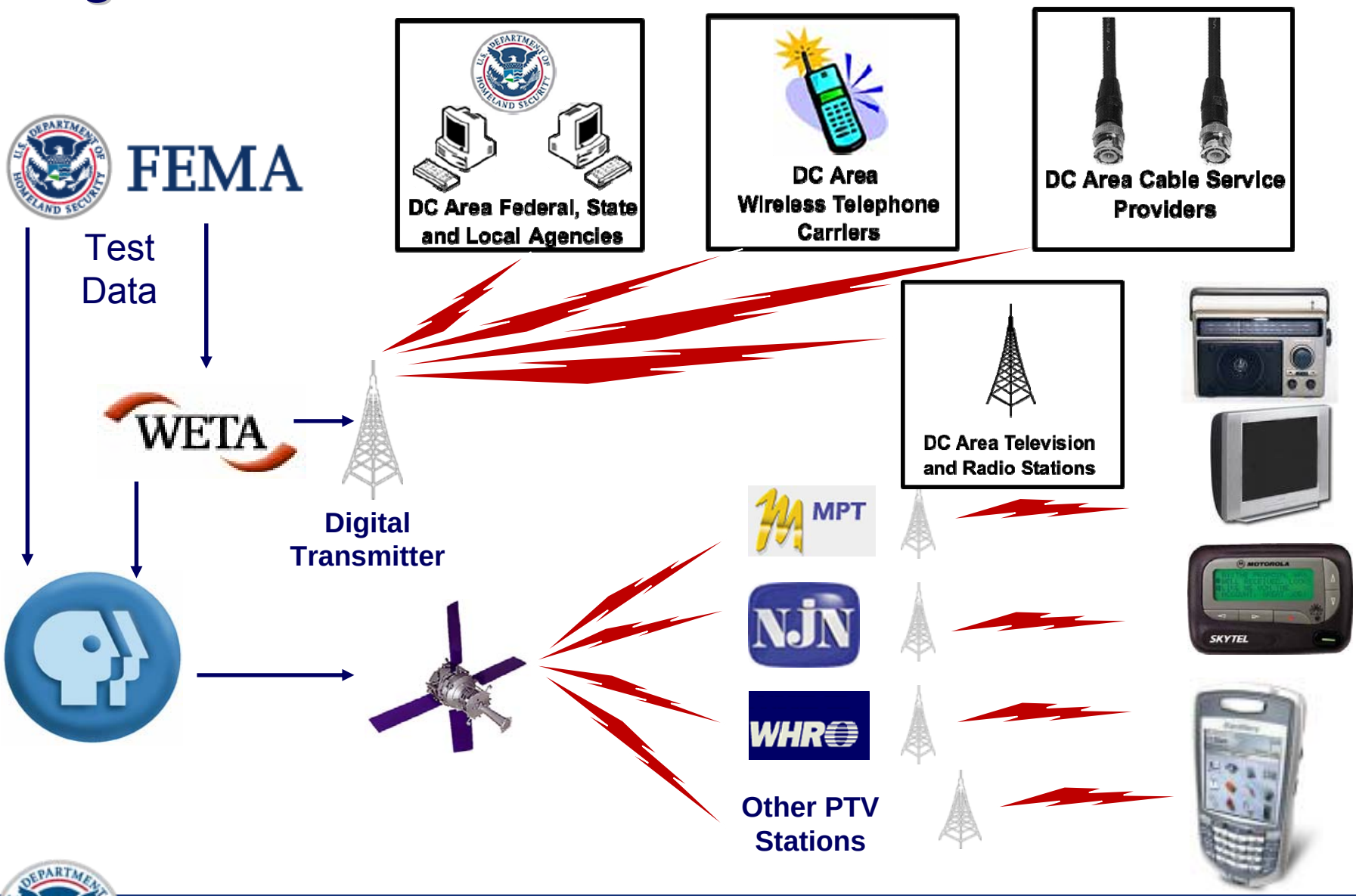
EAS Satellite & Network Upgrades

Satellite connectivity to the following key EAS radio stations in hurricane affected States/ Territories:

1. KTRH	Houston, TX
2. WABC	New York, NY
3. WBAP	Arlington, TX
4. WBAL	Baltimore, MD
5. WBZ	Boston, MA
6. WCOS-FM	Columbia, SC
7. WKAQ	San Juan, PR
8. WMAC	Macon, GA

9. WQDR-FM	Raleigh, NC
10. WRXL-FM	Richmond, VA
11. WSTA	St. Thomas, VI
12. WWL	New Orleans, LA
13. WFLF	Maitland, FL
14. WMSI	Jackson, MS
15. WJOX	Birmingham, AL

Digital EAS Pilot Overview



Digital EAS (DEAS) Program

- **Goal**: Use 21st Century **technologies and standards** to make the EAS more secure, addressable, accessible, survivable, and user-friendly
  - Objective: effectively warn the endangered public and disaster response personnel via DEAS relays to radios, TV, cell phones, and other devices
  - Leverage public television's digital TV broadcast infrastructure (and possibly other infrastructures in the future, such as FM radio and cell phone broadcasts, etc.)
  - Send voice, video, & data alerts/warnings directly to radio, TV, cellular, ... networks
- **Progress/Plans**:
  - Nov 04: Cooperative Agreement signed between Association of Public Television Stations (APTS) and FEMA to launch the DEAS pilot in the National Capital Region
  - Jul 05: Digital EAS pilot successfully demo'd to Senate with voice/video/text alerting
  - Limited DEAS State/Territory level pilot ongoing
  - PBS stations across the USA are being provisioned to relay DEAS messages
  - EDXL and CAP * related profiles to be published in early 2008
  - One transportable DEAS TV station planned for 2008

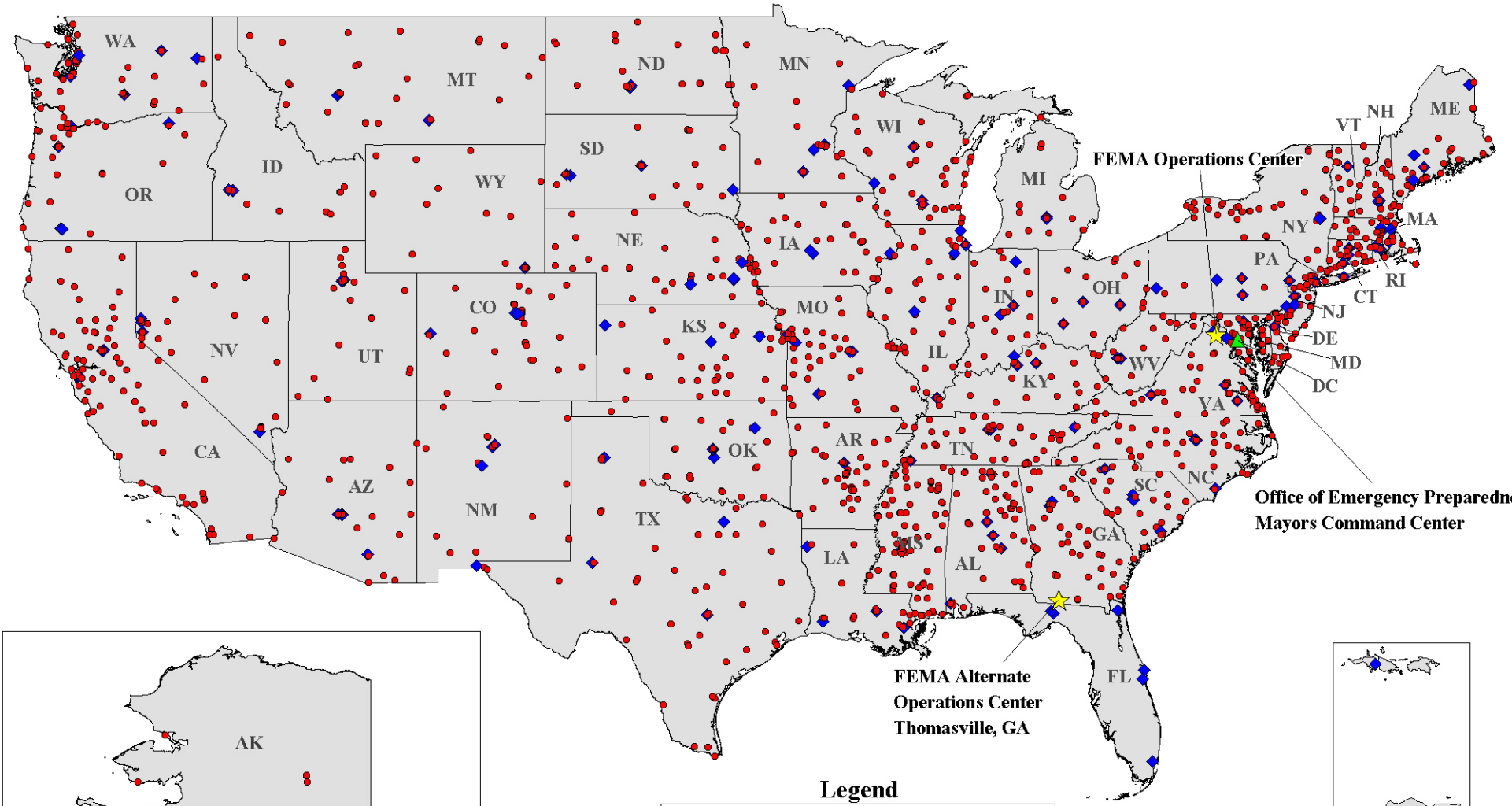
* EDXL = Emergency Data Exchange Language; CAP = Common Alerting Protocol

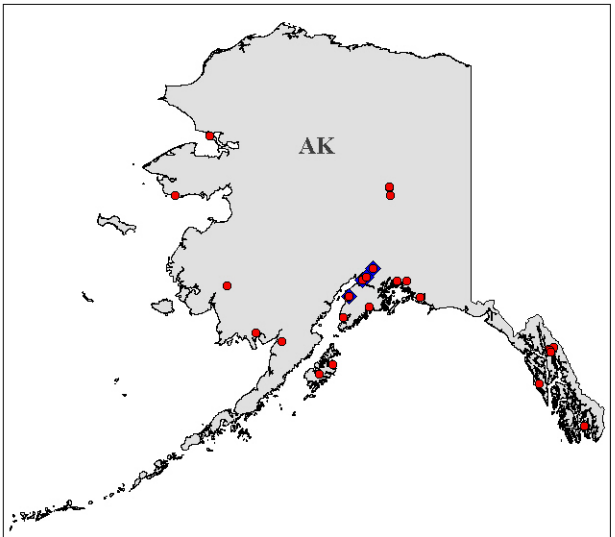
National Warning System (NAWAS)

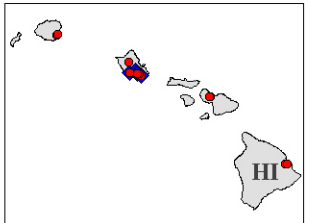
NAWAS and WAWAS

- National Warning System (NAWAS)
  - FEMA funds, operates, and controls
  - Dedicated party-line voice system for emergency managers and military use
  - NAWAS Regional Circuits
    - About 300 special telephone terminals in 10 FEMA regions
    - FEMA Operations Centers can call one or more regions
  - NAWAS State Circuits
    - About 1,700 telephone terminals
    - State Warning Point (SWP) serves as bridge to regional circuits
- Washington D.C. Area Warning System (WAWAS)
  - Owned/operated by FEMA; delegated operations to DC government
  - Connects 119+ Federal, State & local agencies in the National Capital Region

National Warning System







Legend

National Warning System
Connectivity by Circuit Type

- FOC/FAOC Controllers
- Office of Emergency Preparedness
- Regional Warning Points
- State Warning Points

ITS Mapping and Analysis Center

Future Enhanced NAWAS

- **Enhanced - National Warning System (E-NAWAS)**
  - Backward compatible with the existing NAWAS
  - Provide two simultaneous circuits
    - One for full-time monitoring
    - One for ad-hoc point-to-point and conference calls
  - Use IP packets for voice, data, and video collaboration
  - Add capability to rapidly geo-target conference calls & collaboration
  - Use dual-paths (landline and satellite) for greater reliability/resilience
  - Add independent power and radio frequency protection
  - Provide a mobile E-NAWAS capability
  - Allow for EAS activation option

NOAA Partnerships and Joint Programs

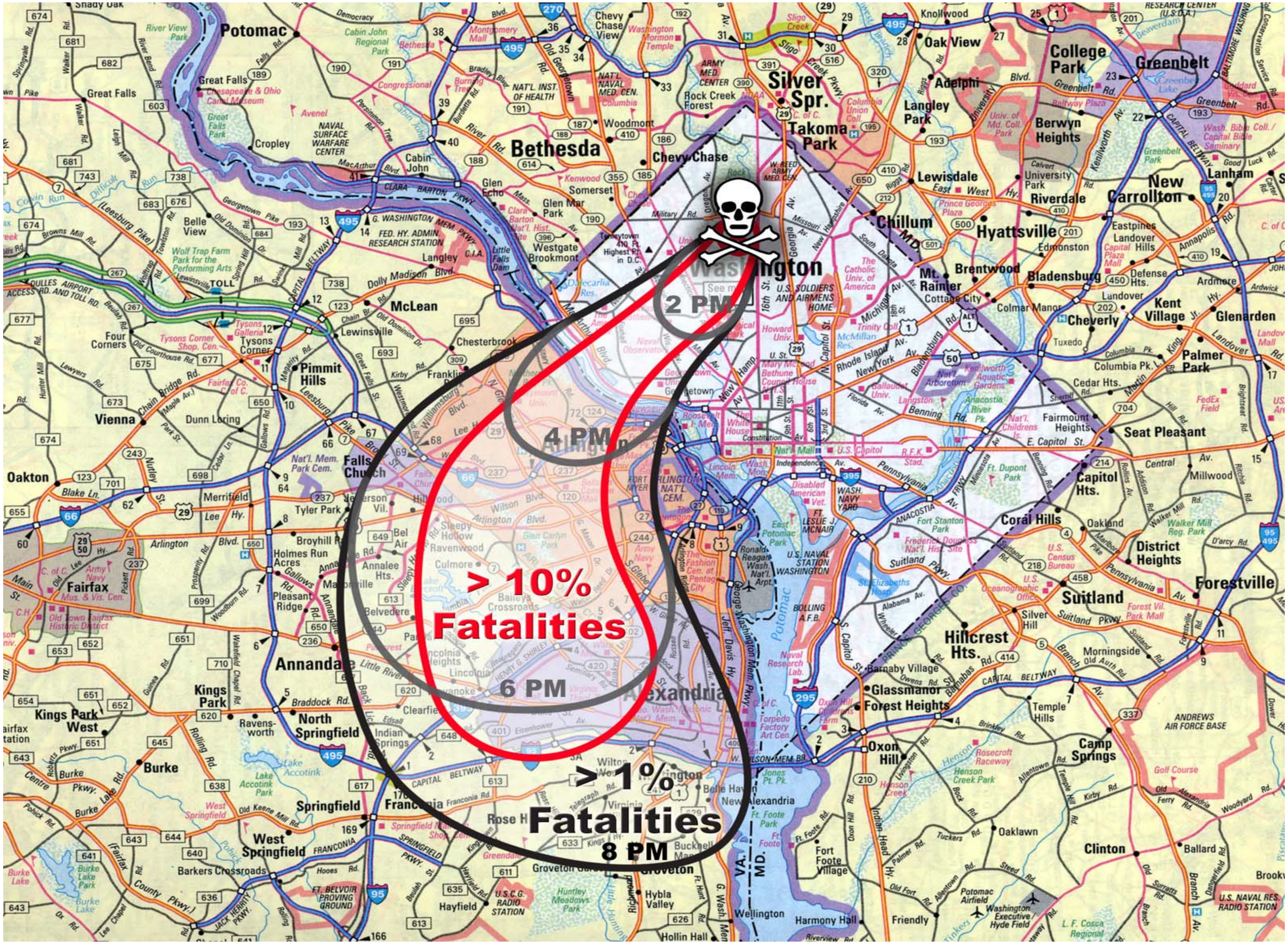
NOAA Public Alert Radios to Schools

- Collaborative effort between DHS, NOAA, and the Department of Education
- September/October 2005 - NOAA, DHS, and the Department of Education provided 16,000 radios to K-12 public schools in the top Urban Area Security Initiative cities, as well as in Alaska and Kentucky
- September/October 2006 – all public schools (97,000) provided with NOAA Weather Radio All Hazards
- Program uses DHS Citizen Corps and NOAA personnel to assist in public outreach and education
- NOAA, DHS/FEMA, and Education procured radios for 42,000 non-public schools and higher education institutions (Universities and Colleges) and 17,000 District school offices

Geo-Targeted Alerting System (GTAS) Pilot

Geo-Targeted Alerting System (GTAS)

- Joint FEMA and NOAA pilot and geo-targeted capabilities within related pilots (WARN, DEAS, and IPAWS Deployable Assets)
- Integrates near-real-time weather and hazard predictions with collaborative alert zone determinations
- Can potentially provide geo-targeted alerting to homes, buildings, neighborhoods, … via:
  - Wireline phones
  - Cell phones
  - Other devices: pagers, desktop computers, sirens, bulletin boards, & other devices with geo-awareness, such as FM data receivers
- Pilot started in 2005 and expected to be completed in 2008
- GTAS testing in the National Capital Region planned for 2007/8

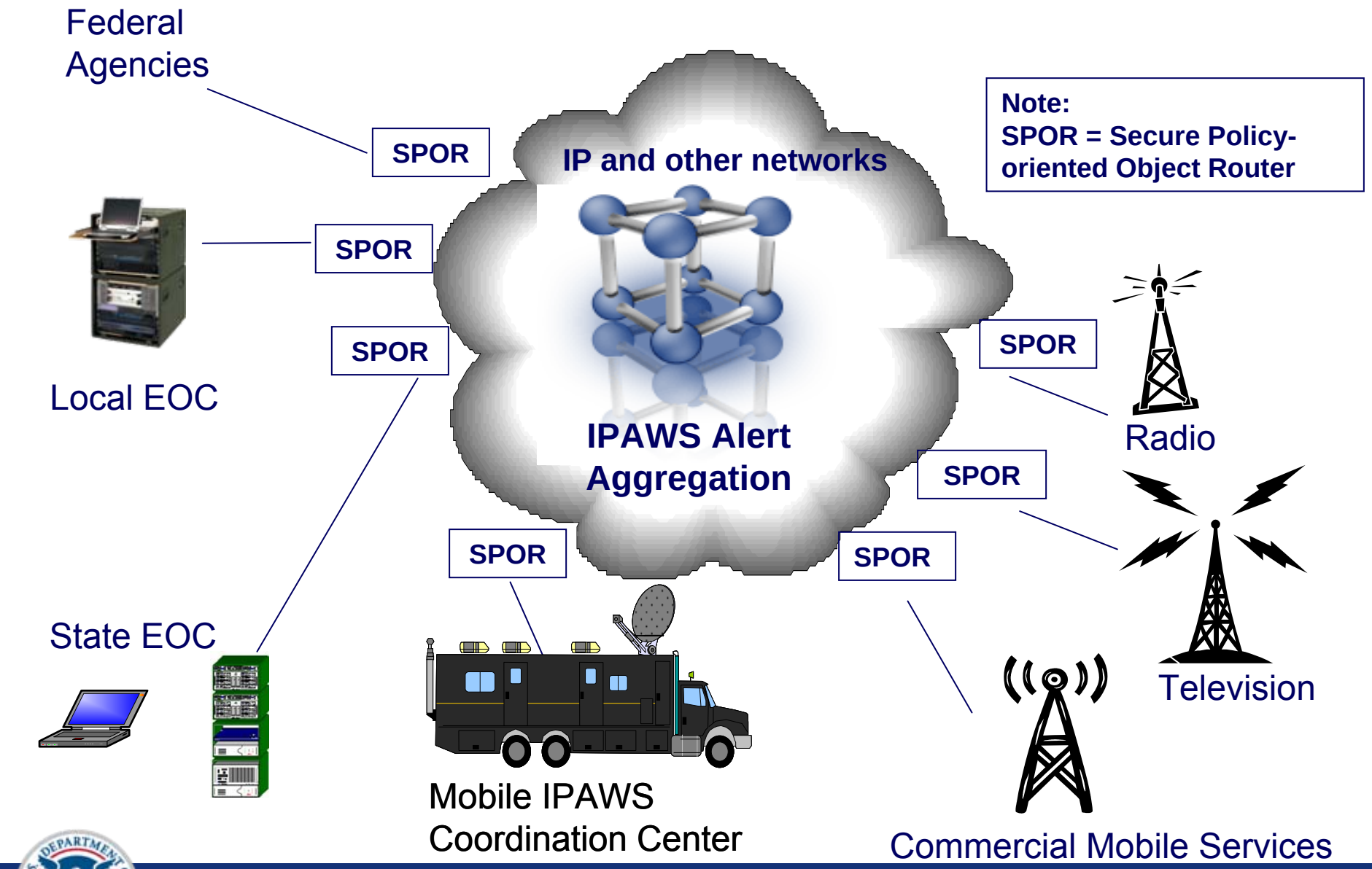

2 PM
4 PM
> 10%
Fatalities
6 PM
> 1%
Fatalities
8 PM

Web Alert & Relay Network (WARN) Pilot

WARN Pilot Overview

- The *Hurricane Katrina Lessons Learned Report* directed DHS to upgrade the EAS to better support the hurricane affected States
- 12 States participating in the pilot
  - Texas, Louisiana, Mississippi, Alabama, Florida, South Carolina, North Carolina, Delaware, New Jersey, New York, Wisconsin, Washington
- Pilot is developing and will test: (1) a Trans-Enterprise Service Grid (TSG) for exchanging protected IPAWS message traffic, (2) a web-based interface for the EAS that permits text-to-speech as well as pre-recorded audio to pass automatically to an EAS Encoder/Decoder (ENDEC), and (3) interfaces to geo-targeted alerting capabilities and websites:
  - Opt-in based on:
    - Location (such as zip code); time of day
    - Type of event (hurricane, earthquakes, tornado, AMBER, etc.)
    - Device to be notified on: cell phones, desktops, pagers, etc.
  - Vetted alert and warning information can be provided on websites

IPAWS Core Architecture



IPAWS Deployable Assets

IPAWS Deployable Assets

- PL 109-234 provided funding for Switch on Wheels (SOWs) and other IPAWS deployable assets
- Current Plans:
  - 1 Mobile AM/FM Radio Station
    - Provides a transportable, tunable AM/FM radio station for disaster areas where radio coverage has been disrupted
  - 1 Mobile Digital EAS TV Station
    - Provides transportable Digital EAS transmitter if PBS digital TV broadcast is interrupted or unavailable in a disaster area
  - 9 Switch on Wheels

Notional Switch on Wheels (SOW)