

GAO

Report to the Subcommittee on
Economic Development, Public
Buildings, and Emergency Management,
Committee on Transportation and
Infrastructure, House of Representatives

September 2009

EMERGENCY PREPAREDNESS

Improved Planning and Coordination Necessary for Modernization and Integration of Public Alert and Warning System



GAO

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Highlights of [GAO-09-834](#), a report to the Subcommittee on Economic Development, Public Buildings, and Emergency Management, Committee on Transportation and Infrastructure, House of Representatives

Why GAO Did This Study

A comprehensive system to alert the American people in times of hazard allows people to take action to save lives. The Federal Emergency Management Agency (FEMA) is responsible for the current Emergency Alert System (EAS) and the development of the new Integrated Public Alert and Warning System (IPAWS). In this requested report, GAO examined (1) the current status of EAS, (2) the progress made by FEMA in implementing an integrated alert and warning system, and (3) the challenges involved in implementing an integrated alert and warning system. GAO conducted a survey of states, reviewed FEMA and other documentation, and interviewed industry stakeholders and officials from federal agencies responsible for public alerting.

What GAO Recommends

To ensure a consistent direction for the public alert and warning system, GAO recommends, among other things, that FEMA develop strategic goals and processes for deployment of IPAWS and report periodically on program progress. In response, the Department of Homeland Security (DHS) agreed with all of the recommendations and provided examples of actions aimed at addressing the recommendations. However, FEMA's planned actions to address some of the recommendations might be insufficient. DHS and the Federal Communications Commission (FCC) provided technical comments which have been incorporated in the report.

View [GAO-09-834](#) or [key components](#). For GAO survey results, view [GAO-09-880SP](#). For more information, contact Mark Goldstein at (202) 512-2834 or goldsteinm@gao.gov.

EMERGENCY PREPAREDNESS

Improved Planning and Coordination Necessary for Modernization and Integration of Public Alert and Warning System

What GAO Found

As the primary national-level public warning system, EAS is an important alert tool, but it exhibits longstanding weaknesses that limit its effectiveness. EAS allows state and local officials limited ability to produce public alerts via television and radio. Weaknesses with EAS include lack of reliability of the message distribution system; gaps in coverage; insufficient testing; and inadequate training of personnel. Further, EAS provides little capability to alert specific geographic areas. EAS does not ensure message delivery for individuals with hearing and vision disabilities, and non-English speakers. FEMA has projects under way to address some of these weaknesses with EAS. However, to date, little progress has been made and EAS remains largely unchanged since GAO's previous review, completed in March 2007. As a result, EAS does not fulfill the need for a reliable, comprehensive alert system.

Initiated in 2004, FEMA's IPAWS program is intended to integrate new and existing alert capabilities, including EAS, into a comprehensive "system of systems." However, national-level alert capabilities have remained unchanged and new technologies have not been adopted. IPAWS efforts have been affected by shifting program goals, lack of continuity in planning, staff turnover, and poorly organized program information from which to make management decisions. The vision of IPAWS has changed twice over the course of the program and strategic goals and milestones are not clearly defined, as IPAWS operated without an implementation plan from early 2007 through June 2009. Consequently, as state and local governments are forging ahead with their own alert systems, IPAWS program implementation has stalled and many of the functional goals of IPAWS, such as geo-targeting of messages and dissemination through redundant pathways to multiple devices, have yet to reach operational capacity. FEMA conducted a series of pilot projects without systematically assessing outcomes or lessons learned and without substantially advancing alert and warning systems. FEMA does not periodically report on IPAWS progress, therefore, program transparency and accountability are lacking.

FEMA faces coordination issues and technical challenges in developing and implementing IPAWS. Effective public warning depends on the cooperation of stakeholders, such as emergency managers and the telecommunications industry, yet many stakeholders GAO contacted knew little about IPAWS and expressed the need for better coordination with FEMA. FEMA has taken steps to improve its coordination efforts, but the scope of stakeholder involvement is limited. FEMA also faces technical challenges related to systems integration, standards development, the development of geo-targeted and multilingual alerts, and alerts for individuals with disabilities. For example, the standard intended to facilitate integration of systems is still under development and is not widely used. As a result of these coordination and technical hurdles, integration with state and local systems will likely be a significant challenge due to potential incompatibility, and FEMA does not yet have logistical plans to integrate these systems.

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Abbreviations

AMBER Alerts	America's Missing: Broadcast Emergency Response
CAP	Common Alerting Protocol
CAP Profile	IPAWS CAP v1.1-EAS Profile
CMAS	Commercial Mobile Alert System
CMSAAC	Commercial Mobile Service Alert Advisory Committee
DEAS	Digital Emergency Alert System
DHS	Department of Homeland Security
EAS	Emergency Alert System
FACA	Federal Advisory Committee Act
FCC	Federal Communications Commission
FEMA	Federal Emergency Management Agency
GTAS	Geo-Targeted Alerting System
IPAWS	Integrated Public Alert and Warning System
NEMA	National Emergency Management Association
NOAA	National Oceanic and Atmospheric Administration
NWR	National Weather Radio
NWS	National Weather Service
PEP	Primary Entry Point
PEPAC	Primary Entry Point Administrative Council
WARN	Web Alert and Relay Network
WARN Act	Warning, Alert, and Response Network Act of 2006

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United States Government Accountability Office
Washington, DC 20548

September 9, 2009

The Honorable Eleanor Holmes Norton
Chair
The Honorable Mario Diaz-Balart
Ranking Member
Subcommittee on Economic Development, Public Buildings, and
Emergency Management
Committee on Transportation and Infrastructure
House of Representatives

A comprehensive system to warn Americans about public safety emergencies allows people to take actions designed to save lives and reduce damage. The current Emergency Alert System (EAS) provides the President and authorized officials with limited capability to transmit emergency messages to the public via television and radio. The antiquated methods employed by EAS date back to 1963, exposing the system to weaknesses, including questionable reliability and versatility. In 2006, an executive order gave the Department of Homeland Security (DHS) the responsibility of modernizing the public alert and warning systems to ensure the capability of distributing alerts through varied telecommunications modes and based on factors such as geography. The Federal Emergency Management Agency (FEMA), the entity within DHS responsible for the program, is working on the Integrated Public Alert and Warning System (IPAWS), which is intended to eventually integrate EAS into a larger warning network. When completed, EAS is expected to be superseded by the IPAWS “system of systems,” which will form the country’s comprehensive public alert system. In March 2007, we reported on identified limitations of EAS and the challenges of developing the new integrated system.¹ Building on our previous work, you asked us to provide information on the status of the nation’s emergency alert and public warning systems and FEMA’s IPAWS program. For this report, we examined (1) the current status of EAS, (2) the progress made in FEMA’s efforts to modernize and integrate alert and warning systems, and (3) the issues and challenges involved in implementing an integrated public alert and warning system.

¹GAO, *Emergency Preparedness: Current Emergency Alert System Has Limitations, and Development of a New Integrated System Will Be Challenging*, [GAO-07-411](#) (Washington, D.C.: Mar. 30, 2007).

To meet these objectives, we conducted a Web-based survey of emergency management directors in all 50 states and the District of Columbia in March and April 2009, with 46 states and the District of Columbia responding for an overall response rate of 92 percent. The survey asked questions regarding public alert capabilities at the state and local level, the FEMA IPAWS program, and stakeholder coordination. This report contains selected results from the survey. To view the survey and a more complete tabulation of the results, access the following link: <http://www.gao.gov/cgi-bin/getrpt?GAO-09-880SP>. We met with officials from FEMA, the Federal Communications Commission (FCC), DHS, and the National Oceanic and Atmospheric Administration (NOAA). We also interviewed representatives of state and local emergency management offices; industry stakeholder organizations; public and private sector alert and warning experts; and private sector stakeholders, including broadcasters, the wireless industry, emergency alert technology companies, emergency management associations, and consumer advocacy groups. In addition, we conducted interviews with state participants in FEMA's IPAWS pilot programs. We examined federal agency documentation including planning, program status, and financial information; agency orders and rules; testimony statements; and briefings from FEMA, FCC, and NOAA. We also reviewed relevant literature on public alert and warning from public and private stakeholders.

We conducted this performance audit from September 2008 through September 2009, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. A more detailed discussion of our scope and methodology appears in appendix I.

Background

EAS, the nation's primary alerting system, provides capacity for the United States to issue alerts and warnings to the public in response to emergencies. FEMA is responsible for administering EAS at the national level, while FCC manages EAS participation by media-related communications service providers.² FCC provides technical standards and

²FCC manages EAS participation by media-related communications service providers, including radio and television broadcasters, cable television, satellite radio, and television and IP-based video services offered by wireline companies. See, 47 C.F.R. 11.2(c).

support for EAS, rules for its operation, and enforcement within the over-the-air broadcast, cable, and satellite broadcasting industries. Presidential, or national-level, EAS alerts use a hierarchical distribution system to relay important emergency messages. As the entry point for national level EAS messages, FEMA is responsible for distributing presidential EAS alerts to National Primary stations, often referred to as Primary Entry Point (PEP) stations. Broadcasts of these national-level alerts are relayed by the PEP stations across the country to radio and television stations that rebroadcast the message to other broadcast stations and cable systems until all EAS participants have been alerted. This retransmission of alerts from EAS participant to EAS participant is commonly referred to as a “daisy chain” distribution system. FCC rules require EAS participants to install FCC-certified EAS equipment. Radio and television broadcast stations, cable companies, wireless cable companies, direct broadcast satellite, and satellite radio generally must participate in the system and transmit alerts initiated by the President. State and local governments determine the content and transmission procedures of their alerts, in conjunction with local broadcast radio and television stations. These procedures are specified in state EAS plans filed with FCC. In 2007, FCC adopted a Further Notice of Proposed Rulemaking to explore EAS-related issues, such as how non-English speakers may best be served by national, state, and local EAS; and to reexamine the best way to make EAS accessible to persons with disabilities.³

Organizations that participate in EAS planning and administration include the Primary Entry Point Administrative Council (PEPAC), the Society of Broadcast Engineers, and associations such as the National Association of Broadcasters and individual state broadcasting associations. States and localities organize emergency communications committees whose members often include representatives from broadcasters or local television and radio stations. These committees agree on the chain of command and other procedures for activating EAS alerts.

In June 2006, the President issued Executive Order 13407, entitled *Public Alert and Warning System*, effecting a policy that the U.S. have a comprehensive integrated alert and warning system, and detailing the responsibilities of the Secretary of Homeland Security in meeting this

³*Review of the Emergency Alert System; Independent Spanish Broadcasters Association, the Office of Communication of the United Church of Christ, Inc., and the Minority Media and Telecommunications Council, Petition for Immediate Relief, Second Report & Order and Further Notice of Proposed Rulemaking*, 22 FCC Rcd 13275 (2007).

requirement.⁴ The order also specified the level of support expected from other departments and agencies in meeting the requirements for a more robust federal warning system. The Secretary of Homeland Security was ordered to “ensure an orderly and effective transition” from current capabilities to the system described by the executive order, and to report on the implementation of the system within 90 days of the order, and on at least a yearly basis, thereafter. The FEMA IPAWS program was initiated in 2004 and the development and implementation of IPAWS has become the programmatic mechanism to carry out the executive order. IPAWS is defined by FEMA as a “system of systems,” which is intended to eventually integrate existing and new alert systems, including EAS. That is, EAS is expected to be superseded as the nation’s primary alert function by IPAWS, with EAS acting as one of its component parts and as one of IPAWS’s mechanisms to disseminate alerts. Another intended partner system is NOAA’s National Weather Radio (NWR). NWR broadcasts National Weather Service forecasts and all-hazard warnings. Non-weather emergency messages are broadcast over NWR at the request of federal, state, and local officials in time-critical situations when public safety is involved.

The Warning, Alert, and Response Network Act of 2006 (WARN Act)⁵ required FCC to adopt relevant technical standards, protocols, procedures, and other technical requirements to enable commercial mobile service providers (wireless providers) to issue emergency alerts. The act established an advisory panel called the Commercial Mobile Service Alert Advisory Committee (CMSAAC),⁶ to recommend the technical specifications and protocols that will govern wireless providers that participate in emergency alerting. The CMSAAC was chaired by then-FCC Chairman Kevin J. Martin and included 42 other members, representing stakeholders in all levels of government and the private sector. FCC adopted most of the recommendations made by the committee regarding

⁴Exec. Order 13407, 71 Fed. Reg. 36975 (June 26, 2006).

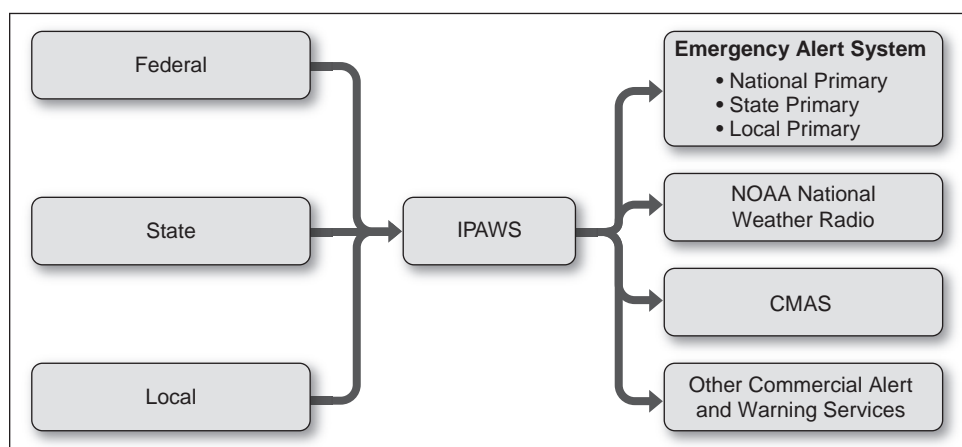
⁵The Warning, Alert, and Response Network Act was enacted on October 13, 2006, as title VI of the Security and Accountability for Every Port Act, Pub. L. No. 109-347, 120 Stat. 1884 (2006).

⁶Section 603(c) of the WARN Act required that FCC establish the CMSAAC to develop and recommend technical standards and protocols for the voluntary transmission of emergency alerts by Commercial Mobile Service Providers within one year from the date of enactment of the WARN Act (i.e., by October 12, 2007).

the required capabilities of wireless providers to transmit alerts, as well as the proposal to develop a Commercial Mobile Alert System (CMAS).

Figure 1 displays the conceptual architecture of IPAWS, with EAS, NWR, and CMAS as mechanisms for disseminating alerts.

Figure 1: IPAWS Conceptual Architecture



Source: FEMA.

The Common Alerting Protocol (CAP) is an open, non-proprietary digital message format being used as a standard for new, digitized alert networks using multiple technologies. CAP is compatible with multiple applications and telecommunication methods, and has been developed for use by emergency management officials in sending all types of alert messages. CAP can be used as a single input to activate multiple warning systems, and is capable of geographic targeting and multilingual messaging. FEMA—required by the executive order to adopt alert standards and protocols—intends to adopt CAP and to publish its IPAWS CAP v1.1-EAS Profile (CAP Profile) standard. In an FCC report and order released in July 2007, FCC promulgated new rules, including a requirement for all mandatory EAS participants to accept messages using CAP, no later than 180 days after FEMA adopts the CAP standard.⁷

⁷22 FCC Red 13275 (2007). In July 2008, FEMA announced its intention to adopt CAP in the first quarter of calendar year 2009, but has since revised its plans to adopt CAP in fiscal year 2010.

EAS Remains the Nation's Primary Public Alert and Warning System, But Unaddressed Weaknesses Limit its Effectiveness

EAS remains the primary national-level public alert system and serves as a valuable public alert and warning tool. It remains available as a mechanism for the President to issue national warnings, and it allows state and local governments to generate weather warnings, America's Missing: Broadcast Emergency Response (AMBER) Alerts,⁸ and other public emergency communications. Nonetheless, as we previously reported, EAS exhibits longstanding weaknesses that continue to limit its effectiveness.⁹ In particular, the reliability of the national-level relay system—which would be critical if the President were to issue a national-level alert—remains questionable due to a lack of redundancy among key broadcasters, gaps in coverage, insufficient testing of the relay system, and inadequate training of personnel. Further, EAS alerts have limited coverage, dissemination means, and geographical specificity. FEMA has several projects under way to address some of these weaknesses, but little progress has been made and EAS remains effectively unchanged since our last report, issued in March 2007.

EAS Remains Available as a Means to Broadcast National-Level Alerts, but Is Primarily Used by State and Local Governments

Although EAS was established to allow the President to communicate with the public, it primarily serves as a means of disseminating emergency alert and warning information at the state and local level. EAS has never been used to transmit a national-level alert, but instead has evolved into an important public alert and warning tool for state and local governments. State and local emergency operations managers can request activation of EAS for state and local public alert and warning needs. EAS participants transmit state and local alerts via radio and television or other media facilities, such as cable or satellite. These alerts include weather warnings, AMBER Alerts, or other emergency communications, such as evacuation notices. EAS participants may decide individually whether to transmit alerts that originate at the state or local level. Approximately 90 percent of all EAS messages are weather alerts generated by NOAA's National Weather Service (NWS). NWS broadcasts forecasts, warnings, watches, and other non-weather hazard information, and supplies such information to broadcast and cable entry points designated in approved EAS state and local plans.

⁸The AMBER Alert Program is a voluntary partnership between law-enforcement agencies, broadcasters, transportation agencies, and the wireless industry to activate an urgent bulletin in the most serious child-abduction cases.

⁹[GAO-07-411](#).

Weaknesses in Alert Distribution and Dissemination Hinder EAS

EAS has longstanding weaknesses that have not been resolved since we reported on them in March 2007.¹⁰ These weaknesses continue to limit the effectiveness of EAS and include (1) a lack of redundancy, (2) gaps in coverage, (3) a lack of testing, and (4) inadequate training for EAS participants. In addition to these weaknesses, EAS is also hampered by how alerts are disseminated to the public.

Lack of redundancy. FEMA lacks alternative means of reaching EAS participants should its primary connection fail. Specifically, FEMA can distribute national-level alerts to 35 PEP stations (which serve as the entry points for Presidential alerts) and to 860 public radio stations across the country via EAS phone lines and satellite connectivity, respectively. However, FEMA lacks an alternative means of reaching these participants if those primary connections fail. Furthermore, if a primary connection to a PEP station failed, all of the other EAS participants that rely on that station via the daisy chain relay system would fail to receive alerts. This lack of redundancy could have serious consequences. For example, if a PEP station were disabled during a disaster in a major metropolitan area, an EAS alert would likely fail to reach a sizable portion of the population because FEMA, potentially, would not have access to other stations in that area.

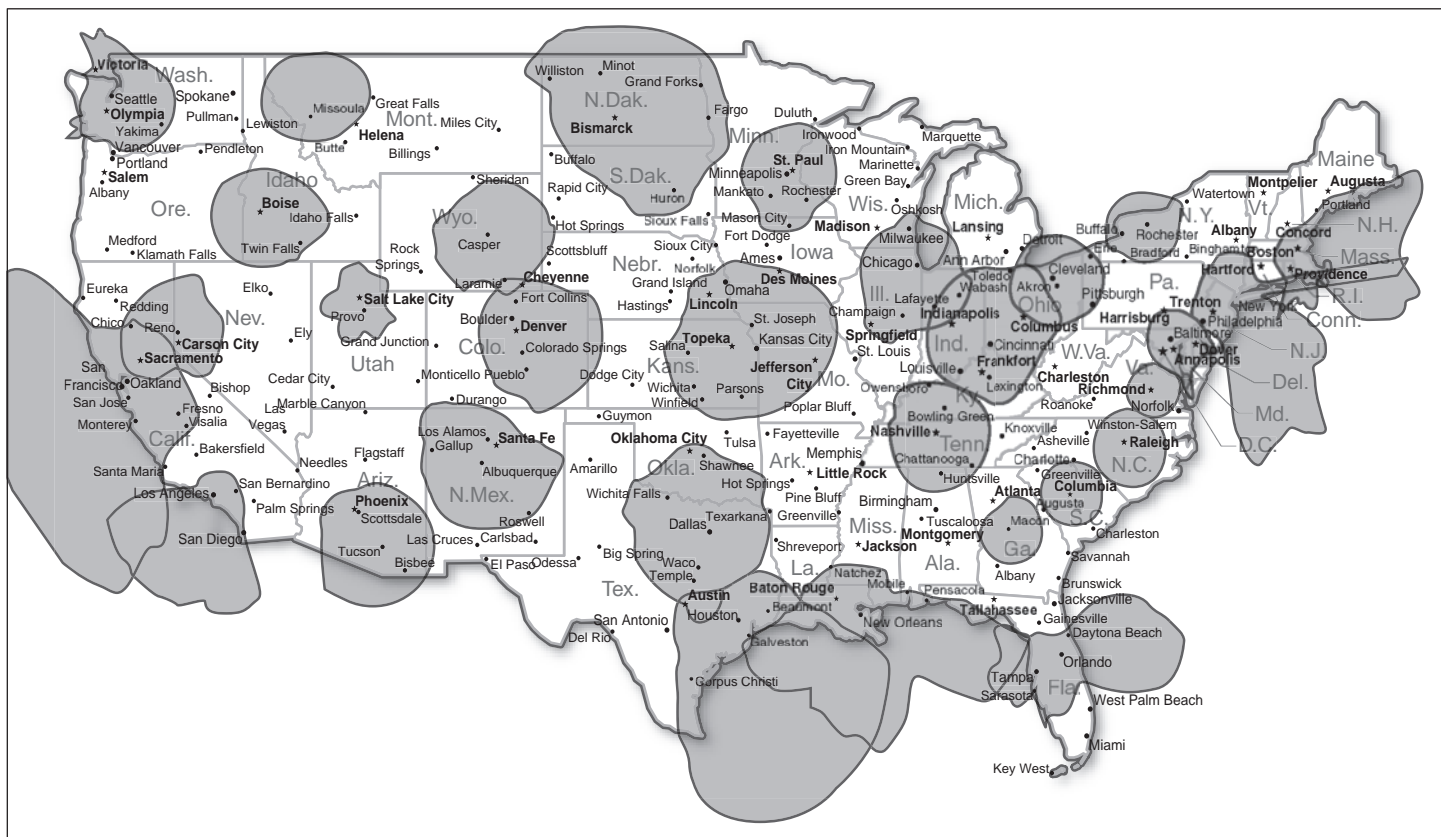
Gaps in coverage. Gaps in PEP station broadcast coverage could hinder the successful dissemination of EAS alerts, as some broadcast stations might have difficulty in monitoring their assigned PEP station because the station is geographically distant. Some states, such as Maine, are not covered at all by the PEP system and would have to pick up a national-level message from an alternate source, such as Public Radio.¹¹ This might not be a fully reliable option, however. Unlike PEP stations, public radio stations do not necessarily have extra fuel and generators on-site to help ensure continuous operations following a disaster. Some broadcasters we contacted expressed concern that other factors might impede their ability to receive alerts from PEP stations. For example, some PEP broadcast signals are too weak to overcome geographical impediments, such as mountains; due to interference, broadcast signals generally do not travel as well during the day as at night and, therefore, have inconsistent EAS

¹⁰GAO-07-411.

¹¹The State of Maine uses the Maine Public Broadcasting microwave system as its primary EAS backbone. Each station in the Maine EAS distribution system can receive national-level EAS alerts via National Public Radio.

coverage; and high definition radio signals can overpower or distort PEP broadcast signals. Some states, such as Washington, have developed systems to augment the PEP network to ensure that EAS messages are disseminated throughout the state, but not every state has taken such action. As shown in figure 2, PEP daytime broadcast coverage leaves large geographic areas uncovered by EAS. FEMA officials noted that there is a significant difference between daytime and nighttime coverage. FEMA estimated that 82 percent and 75 percent of the population are covered by nighttime and daytime PEP signals, respectively.

Figure 2: PEP Station Daytime EAS Coverage Areas



Sources: FEMA and GAO; Map Resources (map).

Lack of testing. FEMA does not perform ongoing national-level tests of the daisy chain relay system to ensure that it would work as intended during a national-level alert. FCC requires stations to test their EAS equipment¹² and FEMA is required to perform weekly tests of connections to the 35 PEP stations, but there is no requirement for a national-level test of the relay system. In January 2007, in response to our ongoing work at that time, FEMA conducted a national-level EAS test. According to FEMA, the test demonstrated an effective satellite connection to public radio stations. However, three PEP stations failed to receive and effectively rebroadcast the national-level test message due to hardware and software issues, which FEMA stated have since been resolved. FEMA has not held another test since 2007, although DHS agreed with the intent of our previous recommendation that FEMA develop and implement a plan to verify the dependability and effectiveness of the relay distribution system. DHS had also stated that FEMA would begin to conduct new quarterly “over-the-air” tests, but these have not taken place. In addition, FEMA has no plans for testing the relay distribution system. Consequently, there is no assurance the national-level relay would work should the President need to activate EAS to communicate with the American people. The recent failure of an accidental national-level alert suggests that problems remain in the relay system. In this incident, a national-level (Presidential) alert, intended as a test, was inadvertently initiated in Illinois. Despite this false alarm, as intended for a national-level alert, the broadcast airways were “seized.” However, the alert failed to be properly disseminated by all EAS participants. In particular, cable companies, which should disseminate such an alert in an emergency situation, failed to receive it. According to FEMA officials and industry stakeholders, the failure was due to a malfunction of cable providers’ EAS equipment. While FEMA officials say this situation has since been rectified, no testing has been done to confirm that the equipment used by cable companies would work properly. Coupled with the results from the January 2007 test, these events raise concerns about the national-level relay system and further highlight the need for additional testing.

Inadequate training for EAS participants. Another longstanding weakness of EAS is inadequate training for EAS participants, both in using EAS equipment and in drafting EAS messages. In 2007, we reported that several EAS stakeholders, including state and local officials, identified inadequate training as a limitation of EAS and cited a need for additional

¹²47 C.F.R. § 11.61.

instruction in equipment use and message creation. Our current work indicates that such training is still lacking. For example, a state official told us that users and message originators need additional training to know how to properly craft and initiate a message, especially since emergency managers vary in their level of expertise. Similarly, a number of respondents to our state survey of emergency managers cited a need for training. For example, one state emergency management representative suggested that training courses be established for emergency managers, broadcasters, and cable providers. To address training inadequacies, we previously recommended that FEMA develop a plan to verify that EAS participants have the training and technical skills to issue effective EAS alerts. DHS agreed with the intent of the recommendation and noted that FEMA would improve training for EAS operators, as well as make the system more user-friendly. According to FEMA, it is currently analyzing and assessing EAS operator training needs, but it has not yet implemented any new training initiatives.

In addition to the aforementioned weaknesses, EAS is also hampered by how alerts are disseminated to the public. Much as gaps exist with PEP-station coverage and through weaknesses in EAS participants' distribution, large portions of the population remain uncovered because EAS relies on certain media, such as radio and television broadcast, to provide alerts. Specifically, EAS's reliance on broadcast and other media currently exclude other communications devices, such as cell phones. In addition, it remains difficult for EAS to reach distinct segments of the population. For example, alerts are typically provided only in English and alerting mechanisms provide unequal access for persons with disabilities. In particular, individuals with hearing and vision disabilities may be subject to inconsistent aural and visual information in EAS alerts. Further, effective public alerting via EAS is also hindered by its limited ability to target alert messages to specific geographic locations. For example, a local emergency manager told us that a message generated by his county would be automatically sent to 10 neighboring counties, potentially causing unnecessary alarm for alert recipients in surrounding areas.

FEMA Has Introduced Projects to Address Some of EAS's Operational Weaknesses, but Little Progress Has Been Made

FEMA officials stated that projects are under way to address some of EAS's operational weaknesses. For example, to improve EAS coverage, FEMA is planning to expand the number of PEP stations from 35 to 69 by 2011. However, since the PEP expansion effort was initiated in 2006, of three PEP stations scheduled for addition in 2007, FEMA completed only one in 2008, with the other two only partially completed.¹³ At the time of our review, FEMA had selected six additional area locations for new PEP stations and initiated negotiations with radio stations in three of the areas. FEMA cited several challenges in expanding the number of PEPs. Specifically, officials told us that the process is often slowed by negotiations with broadcast stations, soil sampling, and construction. In addition, PEPAC representatives said regulatory procedures, such as those requiring stations to house fuel on-site, lengthen the process.

To add redundancy and improve the reliability of the relay system, FEMA is also developing the Digital Emergency Alert System (DEAS). DEAS is expected to provide additional connections with EAS entry points—the PEP stations—and provide for the direct transmission of a voice, video, or text alert to stations using the public broadcast system satellite network. According to FEMA, DEAS was successfully piloted twice. However, despite concluding the pilots in 2007, FEMA had not begun implementing DEAS at the time of our review. FEMA planned to deploy DEAS in 2008 to 13 states and 1 territory, including those that participated in the second pilot; followed in 2009 by a deployment to 16 additional states prone to weather hazards, and then to all states. However, DEAS deployment did not occur and FEMA did not provide an explanation for this delay. Currently, FEMA plans to implement DEAS using a phased approach beginning in mid-2009.

Other FEMA initiatives related to EAS include the integration of XM satellite transmission paths and the implementation of CAP. Specifically, FEMA plans to deliver national-level EAS messages from FEMA to PEP stations by establishing a satellite connection via XM Satellite Radio to complement its existing phone connection. FEMA targeted completion of XM satellite connectivity to key EAS sites by 2007; however, it is now scheduled for completion in 2009. While no reason was provided for the apparent delay, FEMA noted that it is currently working on certification and accreditation issues. Separately, FEMA is working to develop and

¹³FEMA officials told us that one station was fully complete, but two others still required circuits in order to be fully operational.

implement the CAP Profile; however, FEMA has not defined how CAP will work within EAS, including how EAS participants will rebroadcast a CAP message.¹⁴ Further, CAP is not currently capable of carrying a live audio message. Alternatively, to satisfy the requirement to carry a presidential message, EAS participants will be required to link to a FEMA server to stream audio messages. Finally, broadcasters expressed concern that CAP is not ready to be used with EAS, thereby leading broadcasters to question its utility, as well as the necessity of obtaining CAP-compliant equipment.

While FEMA Has IPAWS Initiatives Under Way, Progress in Implementing an Integrated Alert System Has Been Limited

FEMA began initiatives related to IPAWS in 2004, yet national-level alert capabilities have remained unchanged and new standards and technologies have not been adopted. IPAWS has operated without a consistent strategic vision and has been adversely affected by shifting program vision, lack of continuity in planning and program direction, and poorly organized program information from which to make management decisions. Therefore, as state and local governments are forging ahead with their own alert systems, IPAWS program implementation has stalled and many of its functional goals have yet to reach operational capacity. Additionally, FEMA's investment in the IPAWS pilot projects—seed initiatives intended to test alert technologies and form the foundation of IPAWS—has resulted in few lessons learned and few advances in alert and warning systems. Furthermore, FEMA does not report on IPAWS spending or progress in achieving goals, which limits transparency and accountability for program results.

FEMA Has Begun Some Projects, but Has Yet to Integrate Alert Systems or Adopt New Technologies and Standards

Although IPAWS has existed since 2004 with the original objective of modernizing and integrating public alert and emergency warning systems across federal, state, and local governments, national-level alert system capabilities remain unchanged and have yet to be integrated. In June 2006, Executive Order 13407 specified the responsibilities of DHS and FEMA with respect to a public alert and warning system, establishing 10 functions for the Secretary of Homeland Security. Since the executive order, FEMA has launched or continued, under the IPAWS program, several projects intended to address the 10 functions specified in the order. Table 1 displays the functions of the executive order, FEMA's

¹⁴According to FEMA officials, FEMA is developing a CAP Profile Implementation Guide that will define how CAP will work within EAS. The DHS Directorate for Science and Technology has been tasked with developing CAP to EAS translation specifications.

ongoing projects aimed at satisfying those functions, and the status and progress of the projects.

Table 1: Executive Order 13407 (2006) Functions of the Secretary of Homeland Security and Projects Carried Out by FEMA

Function	FEMA projects	Status/progress/timeline
Inventory and assess existing alert infrastructure	IPAWS Inventory and Evaluation Survey, beginning 2009.	Information collection has yet to begin. Completion of inventory scheduled for 2012.
Develop alert standards and protocols	CAP Profile standard adoption proposed early 2009.	Limited use of CAP was intended for 2007. CAP Profile under review, pending approval and adoption in fiscal year 2010.
Geo-targeted, risk-based alerts	FEMA/NOAA Geo-Targeted Alerting System (GTAS) Demonstration Project. CMAS under development.	GTAS project continued through June 2009. CMAS scheduled for 2012 completion.
Alerts for non-English speakers and the disabled	No projects currently under way.	In 2010, IPAWS intends to engineer, plan, and begin implementation of these capabilities.
Augment infrastructure	DEAS for redundant EAS distribution path. PEP station expansion. Satellite distribution of EAS messages. Integration of NOAA Weather Radio.	DEAS initiated in 2004, plans to be implemented in 9 states in 2009. PEP expansion initiated in 2007 with 1 station added in 2008; expansion to 69 stations to be complete in 2012. Initial NOAA alert integration, beginning in 2009, targeted to be complete in 2013.
Conduct training and testing	Partnership with FEMA Resource Center and NOAA to provide alert and warning message origination training.	No training or national-level system testing to date. NOAA conducting training independently.
Provide public education on uses and access to the public alert and warning system	Launched IPAWS Web site	Limited changes to IPAWS Web site completed March 2009. No additional public education projects planned.
Consult, coordinate, and cooperate with private sector	Federal, Practitioner, and Industry Working Groups formed to discuss CAP Profile.	Working groups' scope will be expanded to gather input on development and implementation of IPAWS.
Administer EAS as component of public alert and warning system	FEMA acts as executive agent for EAS, maintaining the PEP stations in cooperation with PEPAC.	Continue ongoing administration of EAS.
Ensure Presidential alert and warning capability under all conditions	Maintain EAS and PEP stations, integrate NOAA network with IPAWS.	Status of presidential alert and warning capability is undetermined: A Presidential alert has never been issued, nor nationally tested.

Source: Executive Order 13407 and GAO analysis of FEMA documentation.

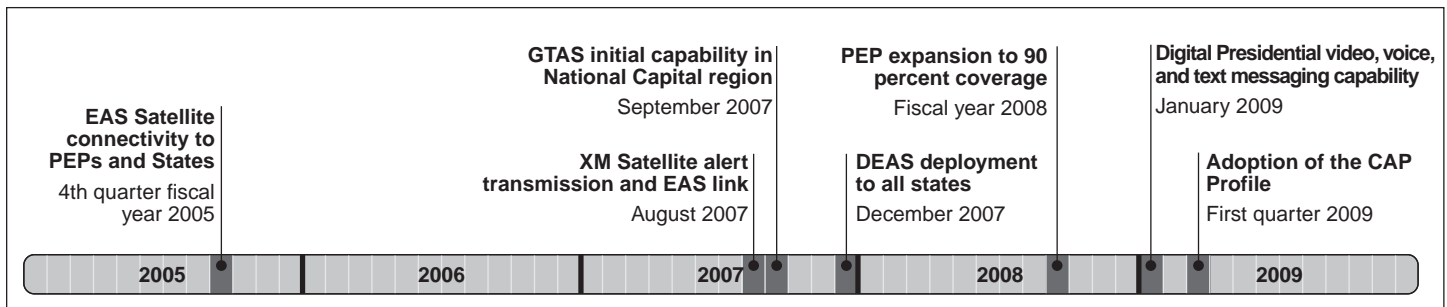
While there are IPAWS projects under way designed to meet the requirements of the executive order, these projects have shown little progress. Many IPAWS initiatives have been ongoing for several years with little functional contribution to the improvement or modernization of public alert and warning. In fact, some of the projects cited by FEMA as initiatives satisfying the requirements of the executive order have been under development since the inception of IPAWS and have yet to be

completed. For example, one intention of IPAWS is to integrate various alert systems into a “system of systems.” There are both federally- and locally-operated alert systems, which are to be integrated under IPAWS. On the federal level, NOAA directs the NWS alerting network; and at the state level, 42 emergency management directors who responded to our survey reported existing or planned systems in their state. According to FEMA briefings and documents, it is the intention that local, state, and tribal systems be interoperable with IPAWS; however, states and localities operate their own distinct systems. In fact, of the 42 state survey respondents with alert systems, only 11 have systems that have been integrated with or are automatically triggered by the existing EAS. At present, the extent of efforts to integrate state and local systems is a nationwide inventory of systems and there are not yet any architectural or logistical plans to integrate these systems. In effect, as deployment of state and local alert systems continues, integration into the IPAWS system could become increasingly complicated and difficult.

As another example, FEMA’s efforts to have IPAWS deliver warnings through diverse media have been limited. As early as 2005, FEMA planned efforts to provide warning messages to subscribers via email and to telephones, text message devices, cell phones, pagers, and Internet desktops. These capabilities were tested under various IPAWS pilot projects, but the development and implementation of the methods were discontinued when the pilots were completed. At present, IPAWS efforts to expand alert dissemination through methods other than standard radio and television broadcast are limited to participation in CMAS, a cellular broadcast text alert initiative. FEMA has accepted the responsibility for collecting and disseminating alerts, but it is unclear, at this point, how CMAS will be integrated with IPAWS.

FEMA has missed numerous timelines that it set for IPAWS initiatives. Various projects were originally intended to be completed to form the foundation of IPAWS, but have experienced delays and are still not yet functional. Figure 3 demonstrates some of the IPAWS programs whose timelines were surpassed and have still yet to be realized.

Figure 3: Examples of Incomplete IPAWS Projects with Missed Timelines



Source: GAO analysis of FEMA information.

Aside from implementing an integrated public alert and warning system, FEMA has responsibility for providing training on and testing of alert and warning systems; public education on use and access to the system; and consultation, coordination, and cooperation with public and private sector stakeholders. According to emergency management and industry stakeholders, FEMA has not sufficiently met this responsibility. About half of the state survey respondents reported that FEMA had not provided them with a clear understanding of the IPAWS vision or program goals and 66 percent were somewhat or very dissatisfied with FEMA’s level of consultation and coordination. Ultimately, among states, there is a general lack of satisfaction with FEMA’s outreach and a clouded understanding of what IPAWS actually is. Although survey respondents generally evaluated FEMA as having done little to no outreach, education, and coordination, FEMA has made recent progress in these efforts. FEMA officials have convened federal, industry, and practitioners’ “working groups” to discuss the adoption of the CAP Profile, which they plan to expand to include broader discussions about public alert and warning. In interviews, public and private sector stakeholders have expressed frustration with the lack of communication and coordination with IPAWS in the past, but have also noted recent improvements.

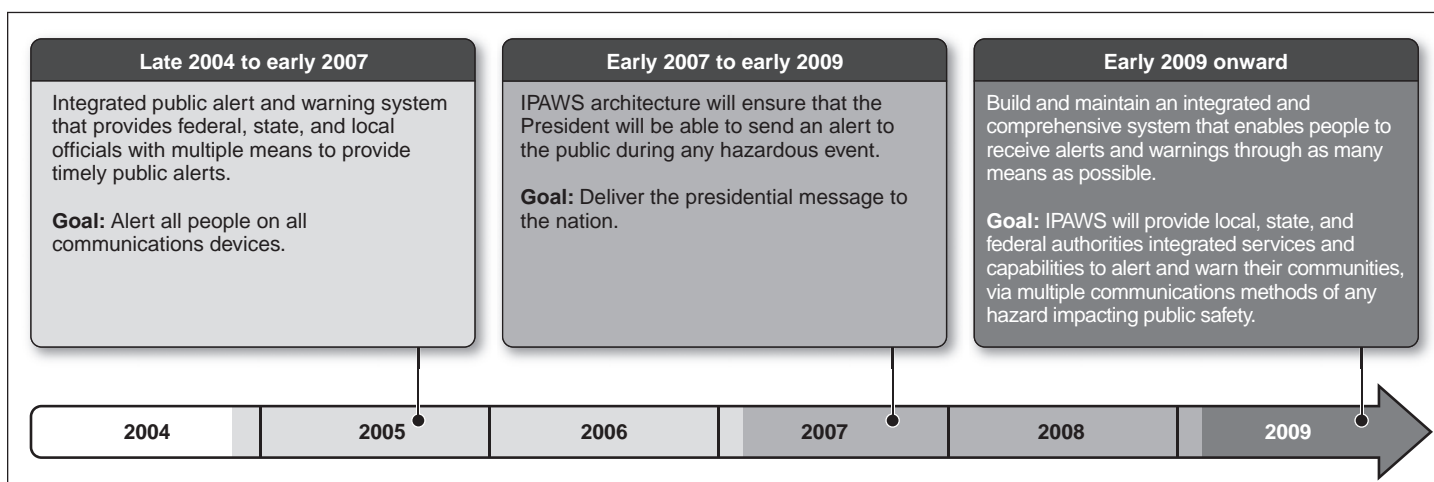
Shifting Program Vision and Lack of Continuity in Planning Have Adversely Affected Efforts to Modernize and Integrate Alerts

FEMA’s efforts to create an integrated and modernized alert and warning system have been affected by (1) shifting program vision, (2) a lack of continuity in planning and program direction, (3) a lack of collection or organization of program information from which to make management decisions, and (4) staff turnover.

Shifting program vision. The IPAWS program vision has changed several times, slowing progress toward an integrated system. FEMA originally

planned to build an infrastructure to deliver state and local alerts through multiple pathways. However, according to FEMA officials, in the second quarter of calendar year 2007, the vision changed to focus exclusively on dissemination of presidential messages and setting alert and warning technical standards. In early 2009, the vision of the program shifted to again focus on a comprehensive system that included infrastructure for state and local alerts. Figure 4 shows the evolution of the IPAWS vision.

Figure 4: FEMA’s Shifting Vision for IPAWS



Sources: FEMA and GAO.

Lack of continuity in planning and program direction. FEMA’s efforts to create an integrated and modernized alert and warning system have encountered difficulties in program planning and management. As we have reported, effective project planning involves establishing and maintaining plans; defining the project mission, scope and activities; and determining overall budget and schedule, key deliverables, and milestones for key deliverables. It also involves ensuring that the project team has the skills and knowledge needed to manage the project and obtaining stakeholder commitment to the project plan. Furthermore, agencies can use performance information to make various types of management decisions to improve programs and results.¹⁵ Although the executive order requires an implementation plan to be updated yearly, from early 2007 through June 2009, the IPAWS effort operated without a designated

¹⁵GAO, *Managing For Results: Enhancing Agency Use of Performance Information for Management Decision Making*, GAO-05-927 (Washington, D.C.: Sept. 9, 2005)

implementation plan and no specific processes for systems development and deployment.¹⁶ The current implementation plan, completed in June 2009, does not adequately satisfy the project management and planning practices essential for effective program execution. In contrast to the plan from 2006, this plan provides few program details. Additionally, the new plan includes only a vague overview of IPAWS initiatives, few definitive milestones toward reaching program goals, and a lack of clarity in how IPAWS systems will be integrated. Other planning documentation that exist—consisting mostly of briefing slides outlining IPAWS initiatives or broad, conceptual program requirements—indicate a lack of continuous overall strategic vision with disparate projects not tied together by a cohesive plan.¹⁷

Lack of collection or organization of program information from which to make management decisions. We found organized IPAWS program information that officials might use for decisionmaking and establishing project plans is also lacking. Throughout the course of our work, FEMA officials told us that many key IPAWS documents did not exist or were irretrievable. Moreover, a consultant¹⁸ at FEMA who is assessing IPAWS has found that there is no cogent organization system to locate program information, that information exists in multiple locations across FEMA office spaces, and that data searches on program information take an inordinate amount of time and effort. The consultant also found more robust and realistic documented internal controls are necessary.

We requested documentation on FEMA and DHS reporting requirements or performance measures for which the IPAWS program prepared documented updates of its progress. However, neither FEMA nor DHS regularly report on IPAWS.¹⁹ FEMA was able to provide a performance information worksheet and spreadsheet, but this documentation provided only vague program parameters, without progress updates on reaching

¹⁶The executive order required the Secretary of Homeland Security to submit to the President an implementation plan no later than 90 days after the date of the order and, thereafter, to submit a report not less than once each year.

¹⁷FEMA indicated that a strategic plan is under development, and that it has other documentation and processes for system design that were in the process of internal coordination when our review was being completed.

¹⁸In October 2008, FEMA contracted with a professional services firm providing management, assurance, and financial services.

¹⁹The DHS performance and accountability reports do not include information on IPAWS.

specific goals or milestones. FEMA has taken steps to assess the IPAWS program and has contracted with a consultant to perform a full assessment of the IPAWS program and to implement internal controls and performance measures. However, the absence of accurate periodic reporting on IPAWS leaves valuable program information unavailable. Such information would help increase program transparency, establish greater program accountability, and assure a reasonable assessment of return on financial investments. Additionally, periodic reporting on IPAWS would provide FEMA's private sector partners and those in government at the federal, state, and local level with information necessary to help establish an integrated alert and warning system. Such reporting would also assist the Congress as it oversees issues related to public alert and warning.

Staff turnover. Progress toward an integrated alert system has also been slowed by frequent changes in organizational leadership of the IPAWS program office and other staffing related issues. During our review, IPAWS was operating under an acting director—its third director since the program began—and at the time of our review was searching for a permanent director. According to FEMA, a new director took charge of the program on August 3, 2009. Additionally, according to FEMA officials, high turnover of program staff has made it difficult to consistently manage IPAWS programs. FEMA's heavy use of contract employees has also resulted in concerns from stakeholders. In one state, emergency management officials participated in an IPAWS project, relying solely on contract staff without actually knowing that FEMA was involved. Another state official said that IPAWS is dominated with outside contractors who do not fully understand alert and warning needs. At the program office itself, there is a preponderance of contract staff. As of June 2009, 27 contractor staff and 5 FEMA IPAWS staff positions were filled out of 11 noncontract full-time equivalent positions that were available.

Limited Program Accountability for IPAWS Projects Has Contributed to Inconclusive Results and Lessons Learned

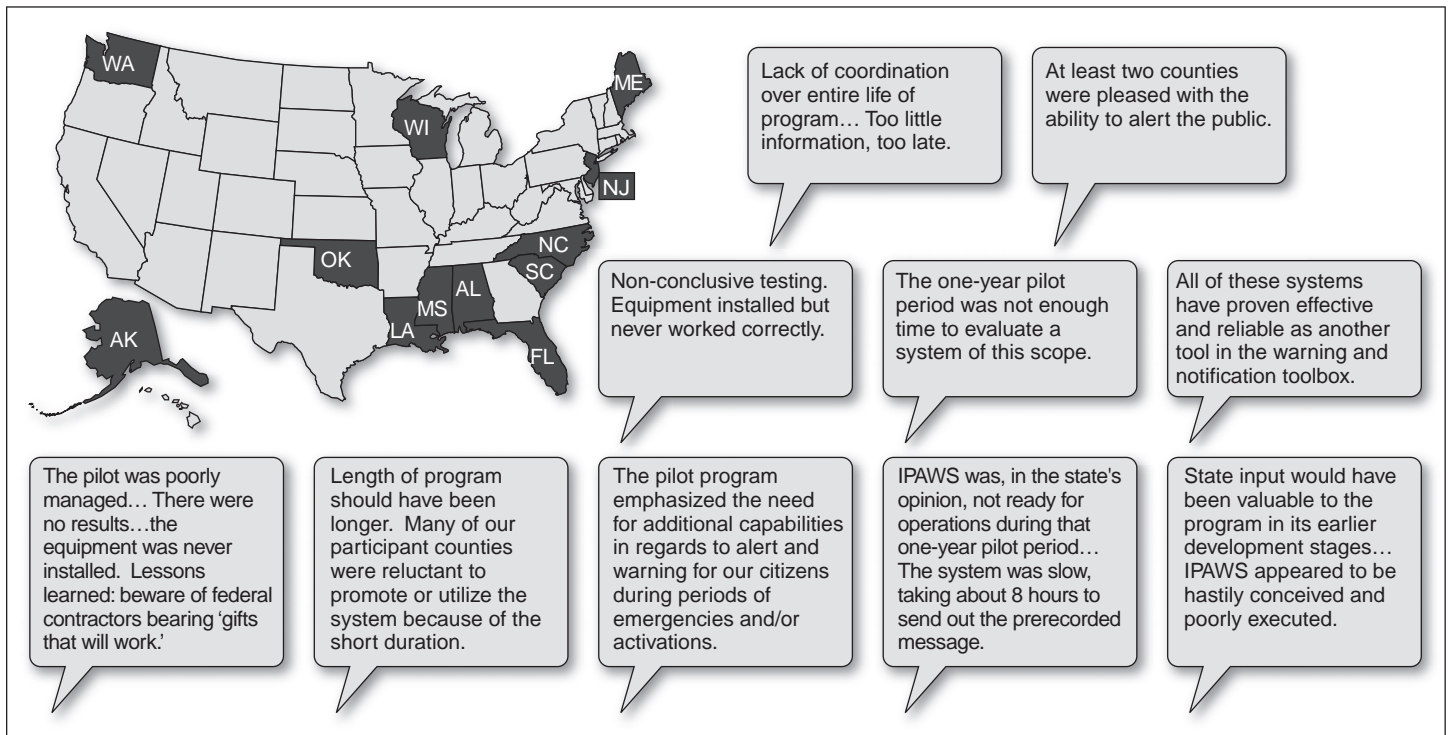
To demonstrate the integration and expansion of new alerting technologies, and to work toward the functionality described in the executive order, FEMA has implemented a series of IPAWS pilot projects, but they have ended inconclusively, with few documented lessons learned. The IPAWS pilots were first introduced in 2004, prior to Executive Order 13407, and focused on testing various alerting systems in different areas of the country with the intent that successfully piloted technologies could eventually be used in a fully integrated "system of systems." At various stages of our work, FEMA provided different accounts of the number and breadth of the pilot projects, as well as inconsistent documentation on the

goals, costs, and results of the full IPAWS pilot programs. Specifically, FEMA documents and interviews revealed inconsistent information on the purpose of the pilot programs and how they supported broader IPAWS goals. According to FEMA officials, the pilot projects were intended to be discrete tests of alert capability, with clear goals and specified durations. However, there is a dearth of documentation describing the actual plans and results of the pilots. Although we requested reports documenting the plans, lessons learned, and technological or operational outcomes, for most pilot projects, such formal documentation was never produced.²⁰ Rather, the extent of the documentation FEMA provided on the pilots includes general briefing slides with broad program descriptions. FEMA equipment deployed during the pilots was left, for the most part, unused with pilot participants. According to FEMA officials, there is an inventory accounting for the equipment and the equipment is intended to be repurposed in the future. As a result of the lack of project assessments, reporting, and documentation, it is unclear which aspects of the IPAWS projects, if any, are currently being utilized or are planned to be utilized in the future or whether the projects informed actions or decisions with respect to IPAWS programming. Initial findings from an IPAWS program assessment, performed by a FEMA consultant, revealed that, in most cases, key project deliverables, for which the government contracted, could not be accounted for. FEMA's consultant was unable to locate or verify the status of deliverables for 18 of the 28 projects it identified. The consultant was able to verify only partial completion of 6 other projects, while the status of deliverables for the 4 other projects was incomplete, ongoing, not available, or unknown.

Responses from our survey of state emergency management directors indicate that most of the 12 states that reported participating in the pilot projects reacted unfavorably when asked about the outcomes and lessons learned from the pilots. Lack of coordination, poor management, incomplete execution, and short project duration were cited, among other things, as lessons learned or outcomes from the pilots. Figure 5 identifies the states who reported participating in IPAWS pilot projects, including select open-ended feedback provided by states.

²⁰Sandia National Laboratories was contracted to implement the Web Alert and Relay Network (WARN) pilot. Sandia produced a final report for the second phase of the pilot, WARN2, whose results, according to FEMA officials, were not accepted by the FEMA IPAWS program management office.

Figure 5: Survey Responses on IPAWS Pilots Projects from State Emergency Management Directors



Source: GAO; Map Resources (map).

Some states cited positive outcomes and were generally more optimistic about their participation. For example, one state was encouraged by the promise of new alerting technology being pilot tested and said that the pilot technologies proved effective and reliable and should be components of an overall strategy. Another emphasized the need for additional capabilities to alert and warn citizens during emergencies.

FEMA Faces Coordination Issues and Technical Challenges in Implementing IPAWS

FEMA faces coordination issues in successfully implementing IPAWS. While there is broad consensus regarding the need for coordination among diverse stakeholders, many stakeholders we contacted generally lack specific knowledge of IPAWS and would like more opportunities to interact with FEMA on public alert and warning issues. FEMA also faces technical challenges related to integrating state and local systems; adopting standards; and the development of geo-targeted, risk-based, multilingual, and disabled population alerting capabilities. These elements are required aspects of the public alert and warning system and are crucial to IPAWS implementation, yet remain largely unresolved.

Coordination Among Diverse Stakeholders is Necessary, but Has Been Insufficient According to Many Stakeholders

To effectively develop and implement IPAWS, FEMA depends on the efforts and expertise of diverse stakeholders, yet coordination was cited as the primary challenge facing the implementation of IPAWS. Specifically, FEMA relies on partners such as the DHS Directorate for Science and Technology, NOAA, the Organization for Advancement of Structured Information Standards, and CTIA - The Wireless Association, an association of wireless telecommunications providers, which is involved in the development of CMAS. In addition, given that the IPAWS vision relies heavily upon state and local investment in CAP-based warning systems, organizations at these levels of government have a range of interests in IPAWS planning efforts. In fact, many respondents to our state survey seek opportunities to contribute to IPAWS planning and consider collaboration among all levels of government to be imperative to the delivery of public alerts and warnings.

Executive Order 13407, in laying out FEMA's IPAWS role, recognized the need for stakeholder involvement for an effective alert system to work and required FEMA to "consult, coordinate, and cooperate with the private sector, including communications media organizations, and federal, state, territorial, tribal and local governmental authorities, including emergency response providers." Many stakeholders we contacted from various levels of government and the private sector expressed support for a collaborative, consensus-based forum that could increase the flow of information and best represent stakeholder interests. In March 2007, we recommended that FEMA establish a forum for stakeholders involved with emergency communications to discuss issues related to IPAWS, with representation from federal agencies, state and local governments, private industry, and the affected consumer community.²¹ DHS agreed with the intent of this recommendation, noting that FEMA would continue to work with stakeholders through meetings, conferences, and other forums. As recently as May 2008, FEMA said it intended to create a stakeholder subcommittee under an appropriate DHS departmental advisory committee in compliance with the Federal Advisory Committee Act (FACA).²² Also, FEMA informed us of plans to establish state advisory committees. However, FEMA subsequently told us that neither the federal advisory subcommittee nor state advisory committees have been implemented and there are no current plans to establish such groups.

²¹[GAO-07-411](#).

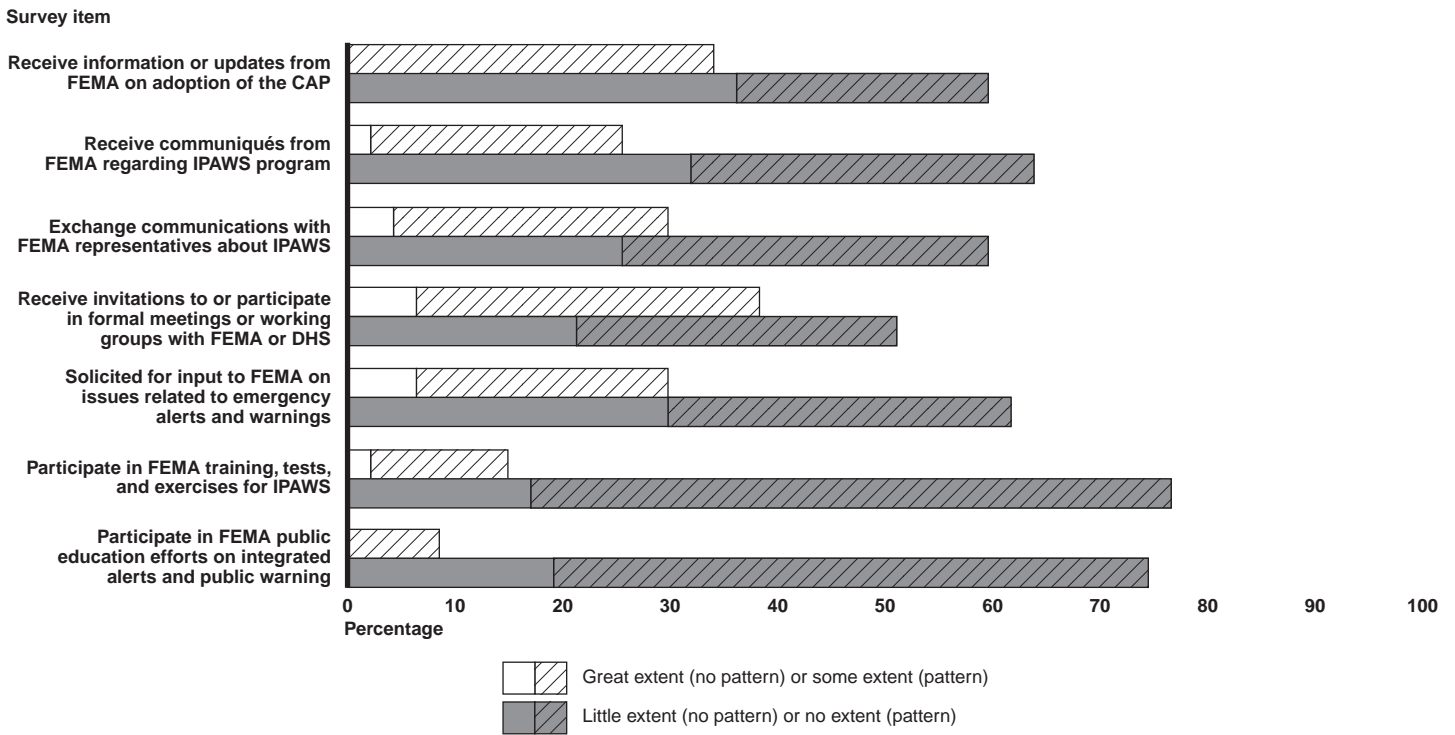
²²FACA sets requirements regarding how agencies establish federal advisory committees and how the activities of the committees are conducted. 5 U.S.C. App. 2.

While there is broad consensus regarding the need for coordination, FEMA's efforts to date have been insufficient, according to many stakeholders we contacted. For example, broadcaster associations and local government officials were unaware of IPAWS program goals and milestones. Also, the majority of our state survey respondents received little to no information from FEMA and communicated with FEMA to little or no extent. Further, only one survey respondent indicated that FEMA's communication and coordination efforts have provided him with a clear understanding of the IPAWS vision and program goals, with the majority of respondents having little or no understanding of the program. Local officials we contacted had little to no communication with FEMA, were generally unaware of the IPAWS program, and overall, lacked an understanding of the CAP alert standard.

FEMA officials acknowledged that they have, thus far, insufficiently engaged state-level stakeholders and have recently taken steps to increase their communication and collaboration efforts. Many of FEMA's recent initiatives are driven by its July 2008 – September 2009 IPAWS Stakeholder Engagement Plan, which describes FEMA's strategy for establishing, developing, and maintaining partnerships with alert and warning stakeholders. Among other things, this plan details FEMA's intent to continue its participation in alert and warning and emergency management conferences; to engage relevant congressional committees; to build relationships with FEMA Regions, which can pass information to state and local government officials; and to build relationships with other organizations and media outlets. In addition, FEMA launched an updated Web site in March 2009, which allows users to submit questions regarding the IPAWS program. The Web site lacks detailed program information, however.

In figure 6, we display the survey responses of state emergency management directors on the extent to which they believe FEMA officials adequately communicated or coordinated with state and local governments with respect to public alert and warning programs. States largely reported inadequate levels of training, testing, and alert exercises, as well as inadequate public education efforts. The survey results indicate that a set of stakeholders crucial to establishing a public alert and warning system do not believe FEMA is communicating and collaborating adequately.

Figure 6: Survey Responses of State Emergency Management Directors on FEMA IPAWS Information, Training, Communication, and Coordination



Source: GAO survey of state emergency management directors.

According to our survey results, overall, 31 states were either somewhat dissatisfied or very dissatisfied with the level of consultation, coordination, and communication shown by FEMA with respect to its public alert and warning programs. Many stakeholders we contacted and respondents to our state survey desire greater dialogue with FEMA and want FEMA to better coordinate its efforts with public and private partners. Some of these sentiments were echoed by federal partners, such as NOAA, which noted that coordination could be improved. The DHS Office of Science and Technology, which cited its relationship with FEMA as a primary challenge to developing an integrated alert system, told us that FEMA’s frequent periods of transition made planning difficult. To improve federal coordination and assert its lead role in federal alert and warning programs, FEMA has established memorandums of agreement and understanding with federal partners and meets regularly with them. The IPAWS stakeholder engagement plans call for FEMA to host annual alert and warning summits with its federal partners, starting as soon as the first quarter of fiscal year 2009, and FEMA also formed three working

groups to review and validate requirements for the CAP Profile.²³ FEMA said it plans to eventually expand the scope of these working groups beyond CAP to solicit feedback on the continued development and implementation of IPAWS.

Although some of FEMA's communication and coordination efforts appear promising, their effectiveness is not yet clear. For example, one survey respondent has been encouraged by his state's inclusion in FEMA's Practitioner's Working Group, yet nonetheless reported a lack of communication and coordination with FEMA. The scope and range of stakeholder involvement in each new effort is limited and, as such, FEMA remains without a mechanism to bring together all interested stakeholders. This raises the possibility that many stakeholders will remain uninformed of FEMA's efforts pertaining to IPAWS and leaves FEMA without a means to thoroughly collaborate on a range of alert and warning issues.

Technical and Other Challenges Have Not Been Fully Addressed

FEMA faces an array of technical and other challenges in developing and implementing IPAWS that have not been fully addressed. These challenges include (1) integrating systems; (2) adopting CAP standards; and (3) developing and implementing geo-targeted and risk-based alerting, alerts for individuals with disabilities, and multilingual alerts.

Integrating IPAWS with state and local systems. As states and local governments develop and deploy their own alert systems, a key challenge, according to stakeholders, is the integration of IPAWS with these disparate alert systems. In our survey, 42 states responded that they have implemented or plan to implement alternate methods to disseminate emergency alert information outside of EAS, such as email or text alerts. Current and planned capabilities vary widely, however. In addition, 20 state respondents indicated that their states have no plans to wait for information or guidance from the federal government before investing in emergency alert and warning systems. States that are moving ahead without federal guidance and investing in alert methods cited a responsibility to provide their citizens with emergency communications. The prevalence of alternate alerting methods at the state level that lack

²³Through DHS, FEMA formed a Federal Working Group, Practitioner Working Group, and Industry Working Group consisting of federal partners, emergency managers and broadcast community members, and broadcast vendors, respectively.

compatibility with federal investments could lead to increased diversity among systems, making future integration more difficult. To address challenges related to integrating IPAWS with state and local alert systems, FEMA is planning to inventory and evaluate federal, state, local, territorial, and tribal alert and warning capabilities by surveying approximately 3,500 emergency operations centers. This effort, initiated in late 2008, is required by the 2006 executive order, and will be carried out over a 3-year period ending in 2012, according to FEMA.

Adopting CAP standards. Integration of IPAWS and state and local systems hinges largely on whether these systems use the same alert standards. FEMA intends to adopt CAP as the standard by which information will be transported among alerting systems. Currently, only 10 respondents to our state survey are using CAP, indicating that the prospect for seamless integration of existing systems may be limited. However, 42 states responding to our survey plan to use CAP in future investments in emergency alert and warning equipment, suggesting that the use of CAP will expand. Several survey respondents cited funding as an obstacle to CAP usage and system integration, reporting that further investment would be required to make necessary system upgrades. Additional challenges to integration exist at the local level due to the potential diversity among systems and similar financial constraints. For example, one state survey respondent indicated that cities are purchasing notification systems, yet the state has set no standards for such systems. FEMA officials acknowledged that federal grant programs would likely be necessary to support IPAWS deployment, and are currently exploring the use of grant programs to make funding available to states and local jurisdictions for the procurement of CAP-compliant equipment.

Developing and implementing tailored alerting: geo-targeted and risk-based alerting, alerts for individuals with disabilities, and multilingual alerts. CAP messages can be disseminated with the multiple streams of information necessary to facilitate tailored alerting, and according to FEMA, adoption of the CAP Profile is the first step in developing the flexibility to provide such alerts. However, the current CAP Profile under consideration does not address multiple languages or special needs.²⁴ Risk-based alerting—that is, the capability to tailor alerts based on a person’s threat risk or level of danger—is a requirement of the executive order, yet

²⁴According to FEMA officials, IPAWS intends to address multiple languages and special needs in future revisions of the CAP Profile.

FEMA does not have plans to address this functionality.²⁵ FEMA noted that state and local practitioners have developed innovative warning systems and methods for alerting those with disabilities and non-English speakers. To address these challenges, in 2009 and 2010, FEMA intends to plan, engineer, and implement capabilities to extend alerts to these groups.

Conclusions

Emergency communications are critical in crisis management and for protecting the public in situations of war, terrorist attack, or natural disaster; yet, FEMA has made limited progress in implementing a comprehensive, integrated alert system as is the policy of the federal government. Management turnover, inadequate planning, and a lack of stakeholder coordination have delayed implementation of IPAWS and left the nation dependent on an antiquated, unreliable national alert system. FEMA's delays also appear to have made IPAWS implementation more difficult in the absence of federal leadership as states have forged ahead and invested in their own alert and warning systems.

The IPAWS program has been slowed and has suffered setbacks due to a lack of consistent program goals, clear performance measures, and program management information. In the absence of systematic performance measures, project milestones and schedules have been left undefined and little progress has been made in achieving the objectives of Executive Order 13407, which called for a comprehensive solution in the way public alert and warning is conducted in the United States. In order that IPAWS achieve the federal government's public alert and warning goals, it is essential that FEMA define the specific steps necessary in realizing a modernized and integrated alert system. While the executive order requires an implementation plan to be updated yearly, separately, periodic reporting on progress toward achieving an integrated public alert and warning system would improve program transparency and accountability. Such reporting would match program goals to their respective timelines and provide government and private sector stakeholders with information necessary to help establish an integrated alert and warning system.

²⁵FEMA signed an interagency agreement with NOAA to perform a Geo-Targeting Alert System Demonstration Project, which, according to FEMA officials, contains a risk-based alerting component. The GTAS Demonstration Project continued through June 2009.

EAS, one of the mainstays for public alerting, and the only operational aspect of IPAWS, has remained largely unchanged since our previous review in 2007. Although projects are under way to address longstanding weaknesses, the lack of reliability of alert distribution and dissemination functions to the public limits EAS's effectiveness. Specifically, a lack of training and national-level testing raises questions about whether the relay system would actually work during a national-level emergency. Previously, we recommended that FEMA work in conjunction with FCC to develop and implement a plan to verify (1) the dependability and effectiveness of the EAS relay distribution system, which is used to disseminate national-level alerts; and (2) that EAS participants have the training and technical skills to issue effective EAS alerts. As sufficient action on EAS testing and training has not been taken and since IPAWS is years away from full implementation, these recommendations remain applicable to help ensure EAS is capable of operating as intended. Further, as IPAWS is developed and deployed, it is important that the dependability of those systems be verified and that IPAWS participants are adequately trained.

Effectively implementing an integrated alert system will require collaboration among a broad spectrum of stakeholders, including those at the federal, state, and local levels; private industry; and the affected consumer community. Executive Order 13407 requires such collaboration. As states and localities invest in their own alert systems in advance of IPAWS deployment, it is critical that FEMA coordinate with stakeholders to help facilitate the integration of these alert systems. We previously recommended that FEMA establish a forum for the diverse stakeholders involved with emergency communications to discuss emerging and other issues related to the implementation of an integrated public alert and warning system. While FEMA has established stakeholder "working groups," a robust forum of diverse public alert stakeholders does not exist and further action on stakeholder engagement is necessary. As technology continues to evolve and states implement their own systems, it is all the more relevant that a permanent collaborative body be put in place to support the development and implementation of IPAWS.

Recommendations for Executive Action

In order that the public alert and warning system be conceived of, designed, and implemented, we recommend that the Secretary of Homeland Security direct the Administrator, FEMA to take the following actions:

- To improve program management and align IPAWS's vision with the requirements established in the executive order, implement processes for

systems development and deployment, including (1) updating IPAWS strategic goals and milestones, implementation plans, and performance measures; (2) prioritizing projects in consultation with stakeholders; and (3) creating the necessary documentation on system design and specific release schedules for IPAWS.

- To improve program transparency and accountability, report periodically to the Congress and the Secretary of Homeland Security on progress toward achieving an integrated public alert and warning system. The report should include information on ongoing IPAWS projects, financial information on program expenditures, and status updates in achieving performance measures and reaching milestones.
- To help ensure system dependability, as IPAWS is developed and deployed, establish and implement a plan to verify (1) the dependability and effectiveness of systems used to disseminate alerts, and (2) that IPAWS participants have the training and technical skills to make use of IPAWS infrastructure and to issue effective public alerts.

Agency Comments and Our Evaluation

We provided a draft of this report to DHS and FCC for their review and comment. In its comments, DHS focused on the report's recommendations and indicated that it agrees with all our recommendations to improve public alert and warning. DHS provided examples of actions aimed at addressing our recommendations. In particular, FEMA said it is developing an IPAWS Strategic Plan and that existing plans have been modified to align IPAWS with the requirements of Executive Order 13407. FEMA believes IPAWS has documentation and processes for system design and that detailed requirements for specific IPAWS components have been coordinated extensively with federal, industry, and public stakeholders. FEMA noted that it will continue to brief Congress on IPAWS and provide project status updates to DHS on its progress in achieving milestones. FEMA also said as IPAWS is developed, it plans to include testing methods to ensure deployed systems are dependable and effective, and to coordinate with FCC on enforcing new testing procedures without placing an undue burden on industry. FEMA further said that it is working with its Emergency Management Institute to develop specific training for stakeholders.

Although FEMA noted preexisting IPAWS actions as addressing documentation and processes on system design, our performance audit concluded that such actions do not amount to a specific definition of the steps necessary in realizing a modernized and integrated alert system. Additionally, the actions detailed in DHS's response do not fully address

the need for documented plans and a schedule for IPAWS's implementation. Regarding previous reporting on IPAWS projects, expenditures, and status in achieving performance measures and reaching milestones, while FEMA noted that they brief House and Senate appropriation subcommittees, we found during our review that briefing information about IPAWS's overall progress, project status, and program expenditures was vague or non-existent. Given the important role that state and local governments and private-sector stakeholders have in IPAWS, the intent of our recommendation is that periodic reporting information on IPAWS be more broadly available so that stakeholders are fully aware of the IPAWS program's direction and progress. See appendix II for written comments from DHS. In addition to the above comments, DHS and FCC both provided technical comments that we incorporated into the report as appropriate.

As agreed with your offices, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies of this report to the Secretary of DHS, the Chairman of the FCC, and interested congressional committees. In addition, the report will be available at no charge on our Web site at <http://www.gao.gov>.

If you or your staff have any questions concerning this report, please contact me at (202) 512-2834 or goldsteinm@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix III.



Mark Goldstein
Director, Physical Infrastructure Issues

Appendix I: Objectives, Scope, and Methodology

The objectives of this report are to provide information on issues relating to public alert and warning, the Emergency Alert System (EAS), and the Federal Emergency Management Agency's (FEMA) Integrated Public Alert and Warning program (IPAWS); specifically, (1) the operational capability of the nation's current EAS, (2) the progress made in FEMA's efforts to modernize and integrate alert and warning systems, and (3) the issues and challenges involved in implementing an integrated public alert and warning system.

To obtain information related to all three objectives of this report, we conducted a Web-based survey of state emergency management directors. We asked them questions related to public alert and warning capabilities at the state or local level, the current status and integration of EAS with other alert capabilities, the use of the Common Alerting Protocol (CAP), the FEMA IPAWS program, and the level of coordination between FEMA and state officials. The survey was deployed by email to all 50 states and the District of Columbia and was conducted in March and April 2009. Contact information for each state was provided by the National Emergency Management Association (NEMA). We obtained contact information for state directors for whom NEMA did not have correct contact information directly from state departments. We obtained responses from 47 survey recipients (92 percent). Despite repeated inquiries, the emergency management directors from California, New Mexico, Tennessee, and Texas did not respond to the survey. The survey was also deployed, in text form, to select local emergency management agency officials whose contact information was provided to us as a part of the state survey. The results of local surveys were not included in the state survey results in this report. Additionally, this report does not contain all of the results from the survey. The survey and a more complete tabulation of the results can be viewed by accessing the following link: <http://www.gao.gov/cgi-bin/getrpt?GAO-09-880SP>.

To obtain information on the operational capability of the current EAS and the progress that has been made in FEMA's efforts to plan and implement a modernized and integrated alert and warning system, we reviewed and analyzed relevant documentation and literature, interviewed public and private sector stakeholders, and collected information from our survey of state emergency management agencies. We examined federal agency documentation, including planning, program status, and financial documents; agency orders and rules; testimony statements; and briefings from FEMA and the National Oceanic and Atmospheric Administration (NOAA). We also reviewed relevant literature on public alert and warning from public and private sector stakeholders, including the Congressional

Research Service and various industry consortia. We interviewed federal officials from FEMA, FCC, the Department of Homeland Security (DHS), and NOAA. We also spoke with representatives of state and local emergency management offices, industry stakeholder organizations, and public and private sector alert and warning experts. Stakeholders we interviewed included the Society of Broadcast Engineers, the Primary Entry Point Advisory Committee, the National Center for Accessible Media, the Association of Public Safety Communications Officers, the Emergency Interoperability Consortium, the EAS-CAP Industry Group, the Association of Public Television Stations, the Telecommunications Industry Association, and CTIA - The Wireless Association.

To obtain information on the challenges of implementing FEMA's IPAWS, we interviewed a broad set of government and industry stakeholders, as indicated above, and obtained information through our survey of state of emergency management directors. In addition to stakeholders previously mentioned, we conducted interviews with state and local officials and with organizations involved with the public alert and warning, such as the International Association of Emergency Managers. We also conducted interviews with officials from state participants in FEMA's IPAWS pilot programs and state emergency managers. Additionally, we interviewed private sector stakeholders and participants in public alert and warning, including broadcasters, the wireless industry, emergency alert technology companies, and consumer advocacy groups. Information on IPAWS challenges from each state was collected as part of our survey of state emergency management directors and select local emergency management officials.

We conducted this review from September 2008 to September 2009, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient and appropriate evidence to provide a reasonable basis for our findings and conclusions based on our review objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Comments from the Department of Homeland Security

U.S. Department of Homeland Security
Washington, DC 20528



**Homeland
Security**

August 24, 2009

Mr. Mark Goldstein
Director, Physical Infrastructure Issues
Government Accountability Office
441 G Street, NW
Washington, DC 20548

Dear Mr. Goldstein:

The Department of Homeland Security (DHS) appreciates the opportunity to review and comment on the Government Accountability Office's (GAO) report, GAO-09-834, *Emergency Preparedness: Improved Planning and Coordination Necessary for Modernization and Integration of Public Alert and Warning System*. The GAO makes three recommendations to improve the public alert and warning system. We agree with all three of the recommendations and have provided recommendation specific explanations.

RECOMMENDATION 1: The GAO recommends that the Secretary of Homeland Security direct the Administrator, Federal Emergency Management Agency (FEMA) to improve program management and to align Integration of Public Alert and Warning System's (IPAWS) vision with the requirements established in the executive order, implement processes for systems development and deployment, including (1) updating IPAWS strategic goals and milestones, implementation plans, performance measures, (2) prioritizing projects in consultation with stakeholders, and (3) creating the necessary documentation on system design, and specific release schedules for IPAWS.

DHS RESPONSE: FEMA generally concurs with this recommendation. The new IPAWS Program Director, Defense Acquisition Workforce Improvement Act (DAWIA) Level III certified with over 20 years experience as a Program Manager, took charge of the program on August 3, 2009, and will lead the necessary actions to improve program management. An IPAWS Strategic Plan is currently under development and will be completed within 90 days, codifying the strategic focus of the program and aligning it with Executive Order 13407. In addition, the IPAWS Mission Needs Statement and Operational Requirements Documents have been modified to more comprehensively align the IPAWS vision with requirements established in Executive Order 13407.

The program has documentation and processes for system design -- including a Concept of Operations (CONOPS), Program Management Plan (draft), and a System Engineering Management Plan and Architecture Analysis Report -- many of which were in the process of internal coordination as of the writing of the report. Our documents are reviewed and

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approved by a Change Control Board internally first, and then, if necessary, are shared with key stakeholders before being submitted to the Program Manager and program sponsors for signature. Additionally, we have briefed preliminary plans to industry conferences (the EAS Summit in March and the Society of Broadcast Engineers meeting at the National Association of Broadcasters Show in April), and plan further briefings at major stakeholder conferences in the fall.

In addition, detailed requirements for specific IPAWS components have been coordinated extensively with federal, industry, and public stakeholders. For example, the Common Alerting Protocol (CAP) IPAWS Profile document was defined via several federal, practitioner and industry working groups. The IPAWS profile is undergoing public comment and validation through the Organization for the Advancement of Structured Information Systems (OASIS) standards process. OASIS is an internationally recognized standards body, which will ensure the broadest spectrum of comments are received. FEMA, along with our supporting partner DHS Science and Technology (S&T), closely coordinated with the commercial cellular industry to develop requirements for the Commercial Mobile Alert Service (CMAS) interface, and are now beginning work with practitioners to refine the capabilities that the IPAWS CMAS component will make available to emergency managers. Additionally, we are prototyping a Geo-Targeted Alerting origination capability with State emergency operation centers to gather feedback on the capability, and refine the models and interfaces to better suit emergency manager needs.

RECOMMENDATION 2: The GAO recommends that the Secretary of Homeland Security direct the Administrator, FEMA to improve program transparency and accountability, report periodically to the Congress and the Secretary of Homeland Security on progress toward achieving an integrated public alert and warning system. The report should include information on ongoing IPAWS projects, financial information on program expenditures, and status updates in achieving performance measures and reaching milestones.

DHS RESPONSE: FEMA generally concurs with this recommendation. IPAWS continues to be a program of interest with the House and Senate and quarterly briefings and updates are provided to their respective appropriation sub-committees. IPAWS has been identified as a program of interest by FEMA and DHS and is part of the FEMA Acquisition Review Board (ARB), which follows DHS Acquisition Directive 102-01 guidance. IPAWS will continue to report through the ARB process to refine project status updates to the Secretary of DHS or designee regularly on our progress in achieving milestones.

RECOMMENDATION 3: The GAO recommends that the Secretary of Homeland Security direct the Administrator, FEMA to help ensure dependability, as IPAWS is developed and deployed, establish and implement a plan to verify (1) the dependability and effectiveness of systems used to disseminate alerts, and (2) that IPAWS participants have the training and technical skills to make use of IPAWS infrastructure and to issue effective public alerts.

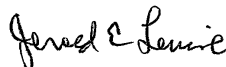
DHS RESPONSE: FEMA concurs with this recommendation. As IPAWS continues its integrated systems development, we plan to incorporate this recommendation to ensure deployed systems are dependable and effective. The target architecture will include testing methods and means to verify coverage areas served. While this does not eliminate the need for testing the responses of operators, it will provide IPAWS the capability to conduct automated end-to-end testing of the system in a way that is not presently supportable by the

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legacy Emergency Alert System. We will work with the Federal Communication Commission (FCC) to define ways to enforce new testing procedures without placing an undue burden on industry. To address IPAWS participant training, IPAWS is working with the Emergency Management Institute (EMI) to develop specific training for stakeholders. The training, which is on target to begin development by the end of fourth quarter FY2009, will be web-based and available to emergency managers through standard internet access. Once the training package has been developed and validated, the long range plan is to incorporate IPAWS training into the FEMA National Incident Management Systems (NIMS) training pipeline.

Again, DHS appreciates the opportunity to review and comment on this draft report and we look forward working with you on future homeland security issues.

Sincerely,



Jerald E. Levine
Director
Departmental GAO/OIG Liaison Office

Appendix III: GAO Contact and Staff Acknowledgments

GAO Contact

Mark L. Goldstein, (202) 512-2834 or goldsteinm@gao.gov

Staff Acknowledgments

In addition to the contact above, other key contributors to this report were Sally Moino, Assistant Director; Ryan D'Amore; Simon Galed; Andrew Stavisky; and Mindi Weisenbloom.

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