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SUMMARY

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The Integrated Public Alert and Warning System (IPAWS): Primer and Issues for Congress

Emergency alerting is critical to emergency response. Effective dissemination of emergency alerting communications at all stages of an emergency can increase the likelihood that people take protective actions. The government operates and maintains a national alerting system, the Integrated Public Alert and Warning System (IPAWS), which is an internet protocol (IP)-based network that serves as a gateway between official entities that need to communicate an emergency alert and the national communications networks capable of delivering those alerts to relevant public audiences. The President as well as authorized federal, state, local, territorial, and tribal entities can use IPAWS to send national and geographically targeted alerts.

The Department of Homeland Security (DHS) created IPAWS pursuant to Executive Order (E.O.) 13407, signed by President George W. Bush on June 26, 2006. Managed by DHS's Federal Emergency Management Agency (FEMA), IPAWS enables the simultaneous distribution of a single emergency alert across multiple communication networks (e.g., radio, television, cell phone). In 2006, Congress passed the Warning, Alert, and Response Network Act (Title VI of P.L. 109-347), which expanded the reach of IPAWS to include wireless devices and required the Federal Communications Commission (FCC) to adopt technical standards, protocols, and procedures for commercial mobile service providers that voluntarily transmit alerts across their networks to cell phones.

IPAWS operates as an input system that authenticates, validates, and distributes alerts across the following communication pathways: Emergency Alert System (EAS), Wireless Emergency Alerts (WEA), National Weather Radio All Hazards, and internet-based systems. Many of these communications pathways predate IPAWS, and transmitting alerts through each pathway required a separate process. IPAWS integrated the separate pathways into one communications system.

FEMA manages the nationwide activation, tests, and exercises of IPAWS and confirms the functionality of WEA and EAS communication pathways. FEMA also handles the procurement, construction, and improvements of IPAWS. The FCC creates and enforces operational rules for EAS and establishes technical requirements that participating wireless carriers must follow for delivering WEA. The National Oceanic and Atmospheric Administration creates EAS messages for severe weather events, and its National Weather Service issues WEA for severe weather risks.

Congress has maintained interest in FEMA's management of IPAWS, including the system's modernization and adoption by state and local authorities. In 2016, Congress passed the IPAWS Modernization Act of 2015 (P.L. 114-143) to improve IPAWS and ensure that federal, state, local, territorial, and tribal governments can alert and warn the public in a timely and effective manner about natural disasters, acts of terrorism, and other human-made disasters. P.L. 114-143 codified several elements of E.O. 13407, such as requiring IPAWS to be adaptive to people's geographic locations and accessible for people with disabilities and limited-English proficiency and improving the system's resiliency and security. In 2019, Congress passed P.L. 116-92, which required that FEMA develop mandatory minimum requirements for state, local, territorial, and tribal governments participating in and using IPAWS.

IPAWS and the individual emergency alerting pathways on which IPAWS relies may be topics for congressional consideration. Technological advances and changes in the way people consume information may present opportunities (e.g., technological advances that may enhance the accuracy of geotargeted alerts) and challenges (e.g., growing reliance on evolving internet-based applications that may be incompatible with IPAWS) for emergency alerting. Considerations for Congress may include

- updates to existing emergency alerting systems;
- factors influencing user adoption of IPAWS, including asserted concerns about the associated initial and ongoing costs as well as the perceived difficulty and limitations of submitting an alert for distribution via IPAWS; and
- FEMA's implementation of legislative direction, including asserted delays in modernization and efforts to improve the reliability of IPAWS given asserted network connectivity issues and outages.

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Introduction

Emergency alerts, when transmitted quickly and effectively, can increase the likelihood that people take protective actions against existing or impending danger, which may save lives.[1]

The U.S. government maintains a national emergency alerting system—the Integrated Public Alert and Warning System (IPAWS)—created in 2006 pursuant to Executive Order (E.O.) 13407, "Public Alert and Warning System."[2] The President as well as federal, state, local, territorial, and tribal entities can use IPAWS to send emergency alerts. The system, managed by the Federal Emergency Management Agency (FEMA) within the Department of Homeland Security (DHS), is designed to receive and authenticate one alerting message from an authorized alert originator (e.g., local official) and distribute that single alert across many networks at once (e.g., radio, television, cell phone). FEMA works with other federal agencies to distribute IPAWS alerts, primarily the Federal Communications Commission (FCC), which regulates radio and television broadcasters and wireless service providers, and the National Weather Service (NWS) within the National Oceanic and Atmospheric Administration (NOAA), which operates the National Weather Radio All Hazards (NWR) network. Congress has maintained interest in FEMA's management of IPAWS, including the system's modernization and adoption by state and local authorities.

Before the creation of IPAWS, the FCC oversaw the "development, structure, and administration of national, state and local plans relating to" the Emergency Broadcast System (EBS), which used radio stations to disseminate emergency alerts.[3] In 1994, the FCC replaced the EBS with the Emergency Alert System (EAS). EAS required broadcasting stations and cable systems to use technologies that would allow them to disseminate emergency alerts. After difficulties with alerting during Hurricane Katrina in 2005, E.O. 13407 sought to integrate the distinct, preexisting warning systems and communications pathways into one new system, IPAWS, that would allow one alert to reach more people using multiple pathways simultaneously.

This report focuses on IPAWS and its use by state, local, territorial, and tribal entities to send emergency alerts that target specific geographic areas. It provides an overview of IPAWS, the different technologies and networks used to distribute alerts, and federal agencies' related roles and responsibilities. The report also discusses issues for potential congressional consideration, including modernization of the IPAWS technology frameworks, challenges associated with user adoption, and oversight of IPAWS modernization efforts.

This report does not cover the President's use of IPAWS to send nationwide alerts (also known as "presidential alerts"); other federal alerting systems, such as NOAA's NWR, the U.S. Geological Survey's ShakeAlert Earthquake Early Warning System, or NOAA's Tsunami Warning System; or

[1] Abdul-Akeem Sadiq et al., "Public Alert and Warning System Literature Review in the USA: Identifying Research Gaps and Lessons for Practice," *Natural Hazards,* vol. 117 (April 11, 2023), pp. 1711-1744, https://doi.org/10.1007/s11069-023-05926-x (hereinafter Sadiq et al., "Public Alert and Warning System," 2023).

[2] Executive Order (E.O.) 13407 of June 26, 2006, "Public Alert and Warning System," 71 *Federal Register* 36975, June 28, 2006, https://www.govinfo.gov/content/pkg/FR-2006-06-28/pdf/06-5829.pdf (hereinafter E.O. 13407). The Federal Emergency Management Agency (FEMA) initiated development of the Integrated Public Alert and Warning System (IPAWS) in 2004 and identified it as the nation's next-generation alert and warning network infrastructure. As planned, it would expand traditional audio-only radio and television notifications by providing messages across more media.

[3] Federal Communications Commission (FCC), *Amendment of Part 11 of the Commission's Rules Regarding the Emergency Alert System Wireless Emergency Alerts*, FCC 16-5, January 28, 2016, p. 7.

state and local alerting laws and systems (e.g., siren systems, county alerting systems). This report also does not address the public response to alerts.[4]

Overview of IPAWS

FEMA's IPAWS is an internet protocol (IP)-based network that serves as a gateway between official entities that need to communicate an emergency alert (*alerting authorities*) and the national communications networks capable of delivering those alerts to relevant public audiences. IPAWS collects alerts from local alerting authorities and simultaneously distributes them across specified pathways, such as radio and television broadcasting networks and cell phone networks. Although established to enable the President to send nationwide emergency alerts, IPAWS has not been used by any President for such purpose.

Federal, state, local, territorial, and tribal alerting authorities that wish to use IPAWS to send localized, geographically targeted emergency alerts must apply to FEMA. Once authorized by FEMA, an alerting authority can send alerts to IPAWS to quickly notify many recipients simultaneously of any impending threat, natural or human-made disaster, or missing or dangerous person (see **Figure 1**).[5] Use of IPAWS by state and local governments is free but requires specialized, FEMA-approved software capable of interfacing with the system. Consumers do not incur any cost for receiving alerts sent using IPAWS.[6] Consumers may opt out of receiving certain emergency communications, such as those regarding imminent threats and child abduction, but not presidential alerts.[7]

In an emergency, an alerting authority submits an alert message to the IPAWS Open Platform for Emergency Networks (IPAWS-OPEN). IPAWS-OPEN authenticates the sender and validates that the message conforms with a "digital format for exchanging emergency alerts," the Common Alerting Protocol (CAP),[8] an international standard used by IPAWS. FEMA worked with a nonprofit standards body—OASIS Open—to develop the CAP standard, which serves as technical data specification that allows multiple communication networks to simultaneously receive and distribute a single alert.[9] Having a common standard, technology, and method to send, aggregate, and distribute alerts helps ensure that the public can receive an alert and increases the likelihood that people will take protective action against existing and impending danger.[10] **Figure 1** describes some of the different stakeholders and their roles in IPAWS.

[4] National Academies of Sciences, Engineering, and Medicine (NASEM), *Emergency Alert and Warning Systems: Current Knowledge and Future Research Directions* (Washington, DC: National Academies Press, 2018), p. 18, https://nap.nationalacademies.org/read/24935/chapter/1 (hereinafter NASEM, *Emergency Alert and Warning Systems*).

[5] The President, the National Weather Service (NWS), and the National Center for Missing and Exploited Children are also alerting authorities. CRS Report R48632, *National Alerts: A Primer and Selected Issues for Congress*, by Amanda H. Peskin.

[6] Ready.gov, "Emergency Alerts: IPAWS," https://www.ready.gov/alerts#ipaws.

[7] See, for example, AT&T, "Opt Out of Wireless Emergency Alerts," December 7, 2022, https://www.att.com/support/article/wireless/KM1001098/.

[8] The Common Alerting Protocol (CAP) is a "digital format for exchanging emergency alerts [that] allows a consistent alert message to be disseminated simultaneously over multiple communications pathways." FEMA, "Common Alerting Protocol," January 6, 2021, https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/technology-developers/common-alerting-protocol.

[9] OASIS Open is an international nonprofit standards body that creates standards in areas such as emergency management, supply chain, cybersecurity, artificial intelligence, and cloud computing. OASIS Open, "About Us," https://www.oasis-open.org/org/.

[10] Sadiq et al., "Public Alert and Warning System," 2023.

Figure 1. The Integrated Public Alert and Warning System (IPAWS) and Its Stakeholders

Source: Federal Emergency Management Agency (FEMA), "Integrated Public Alert and Warning System," https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system.

IPAWS-OPEN transmits the message received from an alerting authority and distributes it to the public via the following communication pathways:

- EAS, which disseminates alerts to radio and television broadcasters;
- the Wireless Emergency Alerts (WEA) system, which disseminates alerts through cell networks to individual cell phones;
- NOAA's NWR network;
- internet-based systems (e.g., social media, digital highway signs); and
- unique state and local alerting platforms (e.g., a county alerting system or website).

IPAWS integrates these separate communications pathways into one communications system. EAS uses broadcast technologies owned by private radio and television stations. The WEA system uses cellular technologies and networks owned by private cellular service providers. NWR uses radio technologies and a federally owned radio network. Internet-based systems use IP-based protocols, developed by industry and adopted by device manufacturers to enable interconnection with other IP-based devices and applications. In addition, state and local officials use commercial-off-the-shelf (COTS) alerting systems (i.e., software) purchased and controlled by state and local entities and used to distribute public safety messages and warnings via state or local websites or systems.[11]

Each of these disparate networks must be able to receive CAP-compliant alerts. The federal government—mainly the FCC and FEMA—has worked with private network owners (e.g., radio, television, cell phone network owners) to define requirements (e.g., CAP-compliant technology

[11] Some state and local entities use commercial-off-the-shelf (COTS) systems to alert people in their jurisdictions.

and protocols) for receiving and disseminating alerts from IPAWS and to upgrade their networks to receive and disseminate CAP alerts. Other systems and technologies have also adapted to receive CAP-compliant alerts disseminated from IPAWS.[12] CAP alerts are said to produce higher-quality audio messages and allow for added features (e.g., URL links, extended messaging, multilingual alerting) to enhance the effectiveness of alerts.[13]

Why Was IPAWS Created?

DHS created IPAWS in 2006 amid concerns about the effectiveness of the federal, state, and local responses to Hurricane Katrina in 2005. In an after-action report, *The Federal Response to Hurricane Katrina: Lessons Learned* (hereinafter called the *Lessons Learned* report),[14] staff specially appointed to review the response to the hurricane cited concerns with state and local alerting procedures and made specific recommendations for improving emergency alerting.

According to the *Lessons Learned* report, the NWS issued an alert to residents of Louisiana prior to hurricane landfall warning of a "powerful hurricane with unprecedented strength."[15] The NWS disseminated warnings and forecasts via its NOAA radio network and the internet, which operated in conjunction with EAS—the system that disseminates alerts to radio and television broadcasters. The authors of the *Lessons Learned* report credited the wide distribution of weather alerts by the NWS with saving lives.[16]

The authors also noted some efforts by federal, state, and local officials to warn the public of the severity of the hurricane. President George W. Bush spoke with then-Louisiana Governor Kathleen Blanco, urging the evacuation of New Orleans. Governor Blanco announced, in a joint press conference with then-New Orleans Mayor Ray Nagin, the first-ever mandatory evacuation of the city.[17]

The report authors noted that although state and local officials could use EAS to alert the public of impending disasters, state and local officials of Louisiana, Mississippi, and Alabama did not use EAS to send emergency alerts related to Hurricane Katrina before it made landfall.[18] State and local use of EAS is voluntary; some officials purportedly refrain from using EAS out of concern that their alert will cause panic.[19] Other officials may choose to rely heavily on television and radio announcements.[20]

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[12] FEMA, "Common Alerting Protocol (CAP) Implementation," June 24, 2020, https://www.fema.gov/fact-sheet/common-alerting-protocol-cap-implementation.

[13] FCC, *Amendment of Part 11 of the Commission's Rules Regarding the Emergency Alert System: Report and Order*, FCC-22-75A1, September 2022, p. 2.

[14] White House and Katrina Lessons Learned Review Group, *The Federal Response to Hurricane Katrina: Lessons Learned*, February 2006, p. 60, https://georgewbush-whitehouse.archives.gov/reports/katrina-lessons-learned/ (hereinafter *Hurricane Katrina: Lessons Learned*, February 2006).

[15] "Hurricane Katrina: A Dire Warning," August 28, 2005, *WeatherNet*, https://i0.wp.com/www.iweathernet.com/wxnetcms/wp-content/uploads/hurricane-katrina-dire-warning.png?ssl=1.

[16] *Hurricane Katrina: Lessons Learned*, February 2006.

[17] "Hurricane Katrina – Pre-Landfall," in *Hurricane Katrina: Lessons Learned*, February 2006, p. 26.

[18] "Hurricane Katrina – Pre-Landfall," in *Hurricane Katrina: Lessons Learned*, February 2006.

[19] For example, the false ballistic missile attack alert in Hawaii in 2018 created a sense of panic among some alert recipients. "Pros and Cons of the Emergency Alert," *The Week*, April 19, 2023, https://theweek.com/news/technology/960516/pros-and-cons-of-the-emergency-alert.

[20] New York University, Robert F. Wagner School of Public Service, *Lessons Learned from the Buffalo Blizzard*, June 2023, p. 5, https://wagner.nyu.edu/files/faculty/publications/NYU%20Buffalo%20Blizzard%20Report%20-%20June2023_0.pdf.

On June 26, 2006, President George W. Bush signed E.O. 13407,[21] which instructed DHS to create an "effective, reliable, integrated, flexible, and comprehensive communications system to alert and warn" the public of war, terrorist attacks, natural disasters, or other hazards to public safety and well-being.[22] E.O. 13407 also assigned related responsibilities to certain federal agencies (see **Table 1**).[23]

Subsequently, in 2006, Congress passed the Warning, Alert, and Response Network Act (WARN Act; P.L. 109-347, Title VI; 47 U.S.C. §§1201-1206). The WARN Act was to improve the country's emergency alerting system by extending alerting to wireless devices (e.g., mobile phones) via commercial mobile service providers that voluntarily elect to transmit alerts across commercial wireless networks to individual cell phones.[24] The WARN Act required the FCC to conduct a proceeding to adopt technical standards, protocols, and procedures for participating mobile service providers. Per the WARN Act, the FCC requires providers who choose not to transmit emergency alerts to provide clear notice of this choice to consumers at the point of sale and notify existing subscribers if the providers choose to stop transmitting emergency alerts. On September 22, 2008, the FCC issued a rule governing deployment of the Commercial Mobile Alert Systems, now called WEA (see the section titled "Wireless Emergency Alerts").

Table 1. Responsibilities Assigned to Federal Agencies Under E.O. 13407 in the Event of Hazards to Public Safety and Well-Being

Federal Entity	Description of Specified Authority or Responsibility	Specified Authority or Responsibility
Department of Homeland Security (DHS)	The Secretary of Homeland Security shall create common alert and warning protocols and standards for IPAWS.	The Secretary of Homeland Security "shall establish common alerting and warning protocols, standards, terminology, and operating procedures for the public alert and warning system to enable interoperability."
	The Secretary of Homeland Security shall ensure that emergency alerts are customizable in their content, location, and user preference.	The Secretary of Homeland Security shall ensure the ability to adapt to the "content of communications on the basis of geographic location, risks, or personal user preferences."
	The Secretary of Homeland Security shall ensure that IPAWS is accessible and inclusive.	The Secretary of Homeland Security shall "include in the public alert and warning system the capability to alert and warn all Americans."
	The Secretary of Homeland Security shall ensure that IPAWS communications systems and facilities are maintained.	The Secretary of Homeland Security shall "maintain, protect, and ... restore communications facilities and capabilities necessary for the public alert and warning system."
	The Secretary of Homeland Security shall conduct trainings and exercises of the Emergency Alert System (EAS).	The Secretary of Homeland Security shall "ensure the conduct of training, tests, and exercises."

[21] The order references as part of its issuance "the authority vested in me as President by the Constitution and the laws of the United States of America, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended (42 U.S.C. 5121 *et seq.*), and the Homeland Security Act of 2002, as amended (6 U.S.C. 101 *et seq.*)."

[22] See footnote 2.

[23] E.O. 13407.

[24] 47 U.S.C. §§1201-1206.

Federal Entity	Description of Specified Authority or Responsibility	Specified Authority or Responsibility
	The Secretary of Homeland Security shall ensure that state, tribal, and local governments are educated on IPAWS.	The Secretary of Homeland Security shall ensure that public education efforts are undertaken so "State, territorial, tribal, and local governments ... understand the functions of the public alert and warning system."
	The Secretary of Homeland Security shall coordinate with the private and public sectors, including communications media organizations.	The Secretary of Homeland Security shall "consult, coordinate, and cooperate with the private sector, including communications media organizations, and Federal, State, territorial, tribal, and local governmental authorities."
	The Secretary of Homeland Security is charged with administering EAS.	The Secretary of Homeland Security shall "administer the Emergency Alert System (EAS) as a critical component of the public alert and warning system."
Federal Communications Commission (FCC)	The FCC shall ensure that communications systems are capable of transmitting alerts and warnings.	The FCC shall "adopt rules to ensure that communications systems have the capacity to transmit alerts and warnings to the public."
Department of Commerce (DOC)	The Secretary of Commerce shall help with standards, technology, and telecommunications.	The Secretary of Commerce shall assist the Secretary of Homeland Security in matters "relating to standards, technology, telecommunications, dissemination systems, and weather."
Department of Defense (DOD)	The Secretary of Defense shall set requirements for IPAWS to fit within DOD's functions.	The Secretary of Defense shall give "requirements for the public alert and warning system necessary to ensure proper coordination of the functions of the [DOD]."

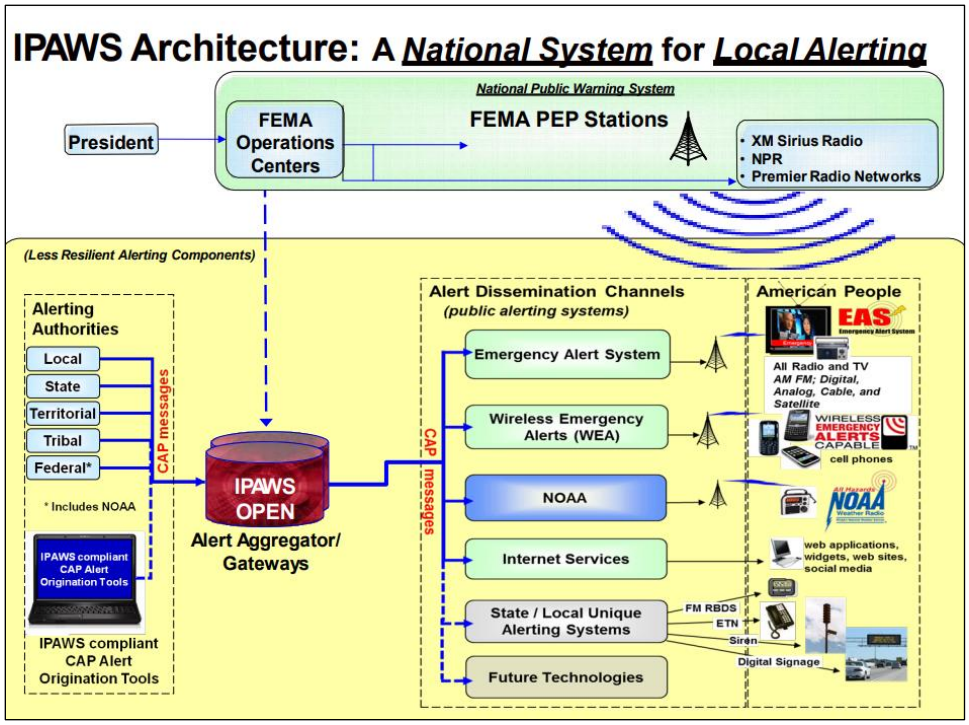
Sources: Executive Order (E.O.) 13407 of June 26, 2006, "Public Alert and Warning System," 71 *Federal Register* 36975, June 28, 2006.

Note: IPAWS = Integrated Public Alert and Warning System.

Alerting Systems Integrated Under IPAWS

IPAWS allows state, local, tribal, and territorial authorities to send one alert to the system, which can disseminate the alert through many pathways at once. The following sections describe the different IPAWS emergency communication pathways through which alerting authorities can send alerts (see **Figure 2**).

Figure 2. Mapping the Emergency Alerting Process Through IPAWS



Source: FEMA, *The Integrated Public Alert and Warning System: IPAWS 101*, 2017, p. 9, https://www.tn.gov/content/dam/tn/tema/documents/IPAWS_101_Presentation_04212017.pdf.

Notes: CAP = Common Alerting Protocol; EAS = Emergency Alert System; IPAWS-OPEN = Integrated Public Alert and Warning System Open Platform for Emergency Networks; NOAA = National Oceanic and Atmospheric Administration; PEP = primary entry point.

Emergency Alert System

In 1994, the FCC, through a Report and Order and Further Notice of Proposed Rulemaking, established EAS to replace the existing Emergency Broadcast System, which had roots in various statutory and executive authorities that enabled Presidents to utilize private communication networks to warn of an attack or emergency.[25]

Alerting authorities can send alerts to radio and television broadcasters through IPAWS. Broadcasters and providers who send EAS messages (EAS participants) are required to immediately deliver the President's communications and alerts to the general public.[26] Other, nonpresidential alerting authorities may use EAS to communicate with local residents.[27] Radio and television broadcasters, cable systems, satellite radio and television providers, and wireline

[25] E.O. 10312 of December 10, 1951, "Providing for Emergency Control over Certain Government and Non-Government Stations Engaged in Radio Communication or Radio Transmission of Energy," 16 *Federal Register* 12452, December 12, 1951; E.O. 11092 of February 26, 1963, "Assigning Emergency Preparedness Functions to the Federal Communications Commission," 28 *Federal Register* 1847, February 28, 1963; E.O. 11490 of October 28, 1969, "Assigning Emergency Preparedness Functions to Federal Departments and Agencies," 34 *Federal Register* 17567, October 30, 1969; and FCC, *Amendment of Part 73, Subpart G, of the Commission's Rules Regarding the Emergency Broadcast System: Report and Order and Further Notice of Proposed Rulemaking*, FCC-94-288, November 10, 1994, https://transition.fcc.gov/pshs/docs/services/eas/FCC-94-288.pdf.

[26] 47 C.F.R. §11.1.

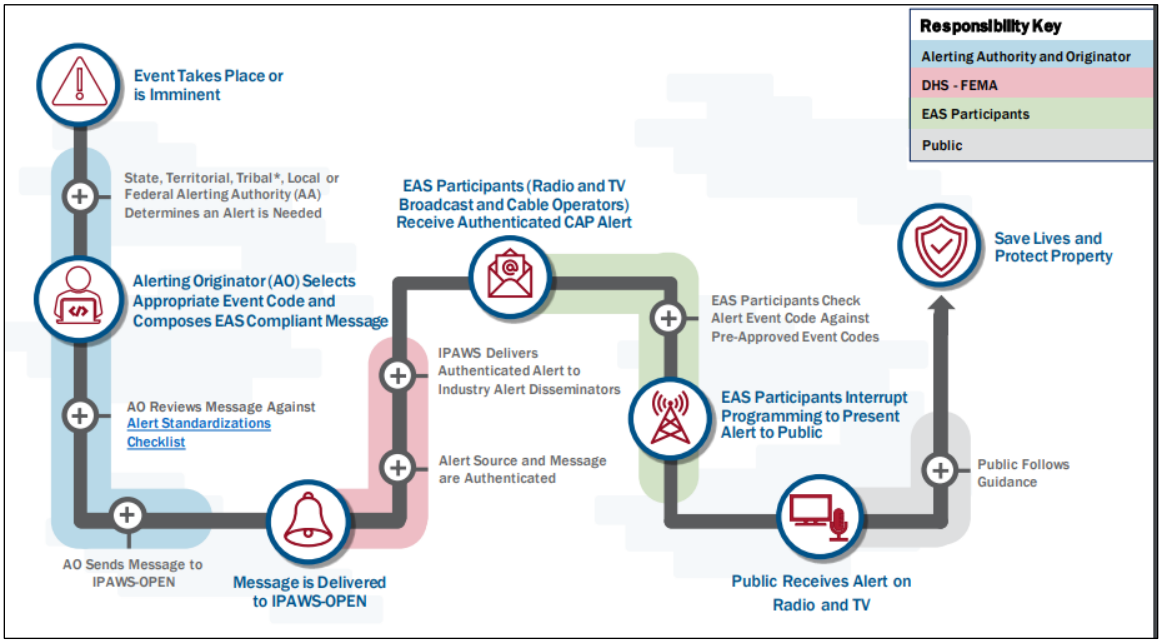
[27] 47 C.F.R. §11.1.

video providers can voluntarily deliver these state and local alerts, with most doing so as a public service.[28]

With IPAWS, alerting authorities can send a message from their location using specialized, FEMA-approved software that interfaces with IPAWS. Every EAS message has a unique code that authenticates the alert originator. Messages are classified and coded based on the event.[29] IPAWS-OPEN can receive these messages and quickly disseminate the alerting message to broadcasters in the targeted area.[30] EAS technology sends data signals recognized as emergency messages to broadcasters using an EAS encoder-decoder. EAS participants are responsible for ensuring that encoders, decoders, and signal-generating equipment used as part of EAS are installed so they can monitor and transmit alerts when the station is in operation.[31]

Figure 3 illustrates the alerting process in an emergency. Alerting authorities using IPAWS can select EAS as a stand-alone alert or use it in combination with other IPAWS pathways, such as WEA, discussed in "Wireless Emergency Alerts," below.

Figure 3. Emergency Alerting System Process



Source: FEMA, *Integrated Public Alert and Warning System (IPAWS): Process Map Playbook, Version 1.0*, February 2021, p. 11, https://www.fema.gov/sites/default/files/documents/fema_ipaws-process-playbook-version-2.pdf.

Notes: CAP = Common Alerting Protocol; EAS = Emergency Alert System; IPAWS-OPEN = Integrated Public Alert and Warning System Open Platform for Emergency Networks. The asterisk on "Tribal" signifies that federally recognized tribes "are not subject to state alerting review or approval."

[28] The National Association of Broadcasters (NAB) partners with the federal government to promote the accurate dissemination of emergency alerts. NAB, *Public Safety and the Emergency Alert System (EAS)*, https://www.nab.org/advocacy/issue.asp?id=1999&issueid=1014; and FCC, *The Emergency Alert System*, June 27, 2024, https://www.fcc.gov/emergency-alert-system.

[29] FEMA, "IPAWS-OPEN," February 8, 2021, https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/technology-developers/ipaws-open (hereinafter "FEMA, "IPAWS-OPEN").

[30] FEMA, "IPAWS-OPEN."

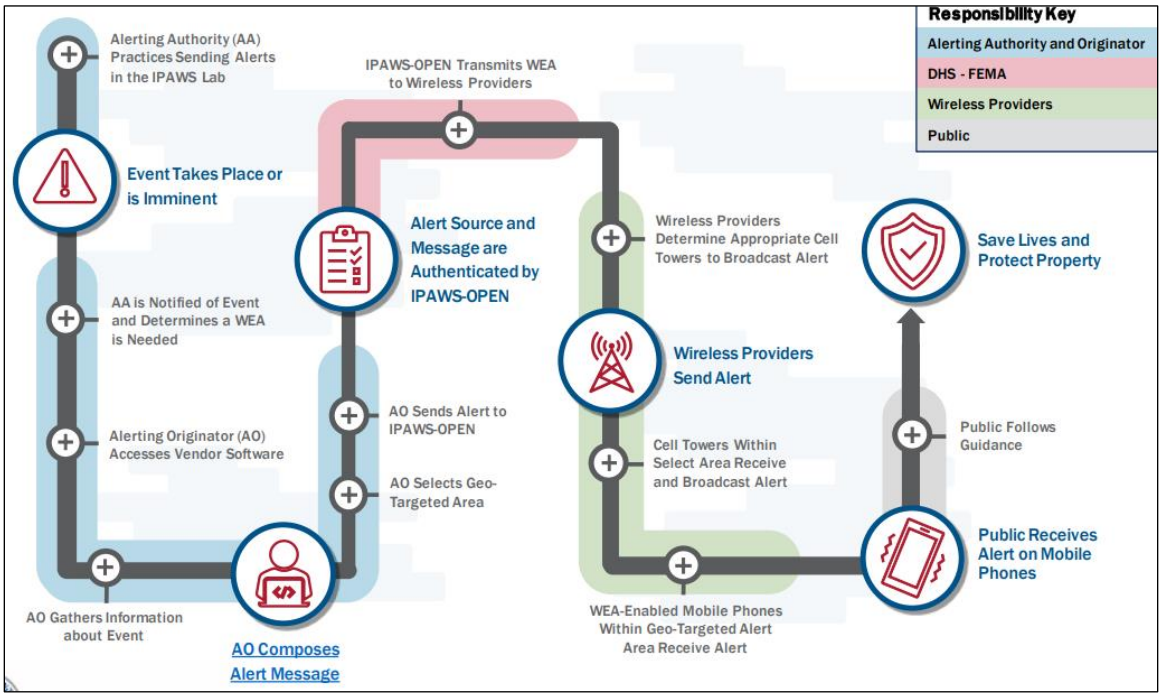
[31] FEMA, "Emergency Alert System Participants," July 28, 2021, https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/broadcasters-wireless/emergency-alert-system-participants.

Wireless Emergency Alerts

Alerting authorities using IPAWS can send alerts to wireless service provider networks and to individual cell phones. This system of alerting through cell phones, known as WEA, enables members of the public with compatible mobile devices to receive geographically targeted messages, alerting them of nearby or imminent threats.[32] Commercial mobile service provider participation in WEA is voluntary, per the WARN Act.[33] Thus, for a mobile device user to receive the alerts, the service provider must participate in WEA.[34]

Alerting authorities can target alerts to selected areas, and WEA can target emergency alerts to an entire impacted geographic region by using cell towers that broadcast alerts to any WEA-enabled mobile device in the area. Thus, any consumer within the designated area and within range of those cell towers will receive the mobile alert, even if they do not live in the region.[35] People do not need to sign up to receive wireless alerts (as opposed to opt-in COTS systems). WEA alerts are disseminated to all cell phones operating in a targeted region. Mobile device users may turn off locally targeted WEA but not presidential (nationwide) alerts.

Figure 4. Wireless Emergency Alert Process



Source: FEMA, *Integrated Public Alert and Warning System (IPAWS): Process Map Playbook, Version 1.0*, February 2021, p. 8, https://www.fema.gov/sites/default/files/documents/fema_ipaws-process-playbook-version-2.pdf.

Notes: DHS = Department of Homeland Security; FEMA = Federal Emergency Management Agency; IPAWS-OPEN = Integrated Public Alert and Warning System Open Platform for Emergency Networks; WEA = Wireless Emergency Alerts.

[32] FCC, "Wireless Emergency Alerts (WEA)," https://www.fcc.gov/consumers/guides/wireless-emergency-alerts-wea.

[33] P.L. 109-347, Title VI.

[34] Providers who participate in WEA must agree to adhere to all standards, policies, and procedures set by the FCC. Further, "a commercial mobile service licensee that elects to transmit emergency alerts may not impose a separate or additional charge for such transmission or capability." P.L. 109-347; 47 C.F.R. §10.210.

[35] FCC, "Wireless Emergency Alerts (WEA)," https://www.fcc.gov/consumers/guides/wireless-emergency-alerts-wea.

NOAA Weather Alerts via National Weather Radio All Hazards (NWR)

In the 1960s, the U.S. Weather Bureau (now called the NWS—a part of NOAA, which is a component of the Department of Commerce) began 24-hour weather broadcasting.[36] Coverage grew from 29 cities in 1970 to nearly 100 stations on the air by 1977 and 400 stations by the mid-1980s.[37] The NOAA-operated NWR now includes more than 1,000 transmitters covering all 50 states, adjacent coastal waters, and U.S. territories.[38]

NWR is an "all-hazards" national network of radio stations that broadcast weather information. Listening to NWR requires a special radio receiver or scanner capable of picking up the local signal (i.e., a NOAA weather radio) from the closest NWS office. NOAA uses this system to continuously broadcast warnings and hazards (e.g., earthquakes, chemical releases, or oil spills). NOAA can also use NWR to broadcast EAS messages related to national security and public safety threats (e.g., AMBER alerts or 911 telephone outages).[39]

Media facilities (e.g., radio and television stations) may allow NWR alerts to automatically interrupt their normal programming. The NWS submits weather watches and warnings into the EAS by using Specific Area Message Encoder (SAME) technology.[40] SAME allows emergency alerts to be broadcasted to a targeted region. By assigning specific digital codes containing information about the event, the affected area, and its duration, receivers equipped with SAME technology can be programmed to receive alerts based on the region's specific needs. Using designated codes also protects the public from receiving unwanted alerts.[41]

Internet-Based Systems

Internet-based service providers (e.g., Samsung Information System America and Spectrum Solutions) can connect with the IPAWS All-Hazards Information Feed, an interface that provides public safety messages by using internet-connected devices and services.[42] Internet-based service providers can access, monitor, and retrieve any public alert displayed on the IPAWS All-Hazards Information Feed upon completing a memorandum of agreement with FEMA.[43] The IPAWS All-Hazards Information Feed posts every public alert sent through IPAWS, including to social media and via instant messaging. Alerts are active for 30 minutes or until the post expires. Alerts posted on the information feed also come from EAS and WEA and can be tailored for the audience (e.g., by geographic area or event). Alerting authorities digitally sign each alert on the information feed to ensure authenticity.[44]

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[36] National Oceanic and Atmospheric Administration (NOAA), NWS, "NOAA Weather Radio All Hazards," https://www.weather.gov/nwr/.

[37] NOAA, NWS Heritage, "Cooperative Expansion of NOAA Weather Radio," https://vlab.noaa.gov/web/nws-heritage/-/cooperative-expansion-of-noaa-weather-radio (hereinafter NWS Heritage, "Cooperative Expansion of NOAA Weather Radio").

[38] NWS Heritage, "Cooperative Expansion of NOAA Weather Radio."

[39] FEMA, "Emergency Alerts," https://www.ready.gov/alerts.

[40] NOAA, NWS, "NWR SAME Alert Duration Length FAQ," https://www.weather.gov/nwr/samealertduration.

[41] NOAA, NWS, "NOAA Weather Radio SAME Technology," https://www.weather.gov/iln/nwr_same.

[42] Wade Witmer, *Integrated Public Alert and Warning System (IPAWS)*, IPAWS All-Hazards Info Feed, FEMA, August, 24, 2017, p. 16, https://www.nist.gov/system/files/documents/2017/08/24/5-ipaws_for_nacwir_mtg_24aug2017.pdf.

[43] FEMA, "Internet-Based Services," in *Technology Vendors & Developers*, December 1, 2022, https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/technology-developers.

[44] FEMA, "FEMA Fact Sheet: IPAWS All-Hazards Information Feed," September 2020,
(continued...)

Federal Roles in Emergency Alerting

Several agencies work together to manage and operate the country's national alerting systems and infrastructure. For an overview of federal agency roles in alerting, see **Table 2**. FEMA operates and directs IPAWS (see the section titled "Overview of IPAWS"). According to the FY2026 FEMA budget justification, the agency received $11.9 million for IPAWS for FY2025 under the Full-Year Continuing Appropriations and Extensions Act, 2025 (P.L. 119-4). The FY2026 budget justification also shows FY2025 IPAWS "overall investment funding," which includes operations and support, at $54.2 million for FY2025.[45]

FEMA oversees the nationwide activation, tests, and exercises of IPAWS to ensure its functionality. FEMA's role includes verifying the functionality of communication pathways, such as WEA and EAS, through which IPAWS distributes alerts.

The FCC and NOAA also serve as governance agencies that seek to ensure proper performance of EAS. The FCC regulates commercial providers who send WEA to their subscribers and provides rules, technical standards, activation procedures, and testing protocols for EAS and WEA.[46] The FCC also provides and enforces operational rules for EAS, so that the broadcast and cable industries are compliant, and establishes technical requirements that participating wireless carriers must follow for delivering WEA to capable devices.[47]

NOAA operates NWR (see section titled "NOAA Weather Alerts via National Weather Radio All Hazards"). NWR can send EAS messages to notify the public of severe weather events and public safety threats. NWR includes more than 1,000 transmitters covering all 50 states, adjacent coastal waters, and U.S. territories.[48]

Selected federal agency alerting authorities may also submit alerts to IPAWS.[49] For example, the NWS may submit an alert to IPAWS in response to severe weather events, which can then be distributed via specified communication pathways (e.g., WEA, EAS). The U.S. Geological Survey may also use IPAWS (as well as other communication methods) to issue alerts through the ShakeAlert Earthquake Early Warning System.[50]

https://content.govdelivery.com/attachments/USDHSFEMA/2020/09/24/file_attachments/1554592/IPAWS%20All%20Hazards%20Information%20Feed.pdf.

[45] Department of Homeland Security (DHS), *Congressional Budget Justification Fiscal Year 2026: Federal Emergency Management Agency Budget Overview*, June 12, 2025, PC&I – 11 and 12, https://www.dhs.gov/sites/default/files/2025-06/25_0613_fema_fy26-congressional-budget-justificatin.pdf.

[46] U.S. Government Accountability Office, *Emergency Alerting: Agencies Need to Address Pending Applications and Monitor Industry Progress on System Improvements*, GAO-20-294, February 2020, p. 6, https://www.gao.gov/assets/gao-20-294.pdf.

[47] The FCC's rules on WEA and EAS can be found at 47 C.F.R. Parts 10 and 11, respectively.

[48] 47 C.F.R. Parts 10 and 11.

[49] FEMA, "IPAWS Alerting Authorities – Agencies and Organizations," July 23, 2025, https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/public-safety-officials/alerting-authorities/agencies-organizations.

[50] For information on ShakeAlert, see CRS Report R47121, *The ShakeAlert Earthquake Early Warning System and the Federal Role*, by Linda R. Rowan.

Table 2. Overview of Selected Federal Entities' Roles in Emergency Alerting

Federal Entity	Roles
Department of Commerce (DOC)	**Provision of Warning and Technologies** • DOC, through the National Oceanic and Atmospheric Administration (NOAA), seeks to provide a rapid and accurate weather warning system. DOC assists with standards, technology, and telecommunications.
Department of Defense (DOD)	**Coordination of DOD** • DOD makes requirements for the warning system to fit within DOD's functions.
Department of Homeland Security (DHS)	**Notification and Alert Systems and Trainings** • DHS creates alert and warning protocols, sets standards for IPAWS maintenance, and seeks to ensure that the system is accessible and inclusive. • The Secretary of Homeland Security administers the Emergency Alert System. • DHS provides trainings and exercises for IPAWS, public education and outreach, and coordinates with private and public sectors.
Federal Communications Commission (FCC)	**Regulation of Commercial Mobile Service Providers** • The FCC promulgates rules and regulations for commercial mobile service providers, broadcasting facilities, and public safety and special radio services. • The FCC seeks to ensure that communications systems can transmit wireless emergency alerts.

Sources: The authorities for the roles identified in this table are set out in E.O. 13407 of June 26, 2006, "Public Alert and Warning System," 71 *Federal Register* 36975, June 28, 2006, https://www.govinfo.gov/content/pkg/FR-2006-06-28/pdf/06-5829.pdf; see also CRS In Focus IF10816, *Emergency Alerting—False Alarm in Hawaii*, by Jill C. Gallagher.

Selected Congressional Actions

A 2009 U.S. Government Accountability Office (GAO) report found FEMA faced difficulty in facilitating coordination and planning between IPAWS and stakeholders.[51] GAO's report found that states that invested in their statewide alerting systems did so without the guarantee that their systems would be IPAWS-compatible, due in part to the lack of an implementation plan for IPAWS. The report also found that FEMA struggled to make IPAWS accessible for non-English speakers and people with disabilities.[52]

In 2016, Congress addressed issues identified in the 2009 GAO report in the IPAWS Modernization Act of 2015 (P.L. 114-143). The act contained provisions that sought to improve IPAWS and ensure that federal, state, local, territorial, and tribal governments could alert and

[51] U.S. Congress, Senate Homeland Security and Governmental Affairs Committee, *IPAWS Modernization Act of 2015*, report to accompany S. 1180, 114th Cong., 1st sess., S.Rept. 114-73, June 25, 2015, pp. 1-2, https://www.congress.gov/congressional-report/114th-congress/senate-report/73/1?outputFormat=pdf (hereinafter Senate Homeland Security and Governmental Affairs Committee, *IPAWS Modernization Act of 2015*); and GAO, *Emergency Preparedness: Improved Planning and Coordination Necessary for Modernization and Integration of Public Alert and Warning System*, GAO-09-834, September 2009, p. 2, https://www.gao.gov/assets/gao-09-834.pdf (hereinafter GAO, *Emergency Preparedness*, GAO-09-834).

[52] Senate Homeland Security and Governmental Affairs Committee, *IPAWS Modernization Act of 2015*, and GAO, *Emergency Preparedness*, GAO-09-834.

warn the public in a timely and effective manner about natural disasters, acts of terrorism, and other human-made disasters. P.L. 114-143 codified various elements of E.O. 13407, including that the FEMA Administrator shall

- create common alerting and warning protocols, standards, terminology, and operating procedures for IPAWS;
- make IPAWS adaptable based on geographic location, risks, and multiple communication systems and technologies;
- ensure IPAWS is adaptable and accessible for people with disabilities and limited-English proficiency;
- conduct trainings, tests, and exercises of IPAWS;
- improve the resiliency and security of IPAWS;
- conduct public education efforts so governments, private entities, and the public understand how to use, access, and respond to IPAWS messages;
- consult, coordinate, and cooperate with private sector entities and government authorities; and
- work with the FCC to consider its rules and regulations.

Through P.L. 114-143, Congress also established a training program requiring FEMA to educate federal, state, local, territorial, and tribal government officials on the existing EAS. Congress further directed the creation of a subcommittee of the National Advisory Council, the advisory body to the FEMA Administrator, designed to increase collaboration of IPAWS users and to solicit recommendations on how to improve IPAWS.

In 2019, P.L. 116-92, Division A, Title XVII, Section 1756, required FEMA to develop minimum requirements for state, local, territorial, and tribal governments who participate in and use IPAWS.[53] The law also required the FEMA Administrator to increase state and local use of the warning system lab to test alert origination protocols and procedures and then submit a report to Congress describing the lab's impact on state and local governments, specifically emphasizing rural areas.[54] Pursuant to the act and available appropriations, FEMA has taken steps to develop

- requirements, training, and guidance for alerting authorities that use IPAWS;
- a program for the annual recertification of IPAWS alerting authorities; and
- a certification program for tools used by IPAWS alerting authorities.[55]

[53] 6 U.S.C. §321o-1 provides that the FEMA Administrator is to develop these minimum requirements to participate in the public alert and warning system not later than one year after December 20, 2019.

[54] FEMA identifies the lab as its "IPAWS Technical Support Services Facility." The warning system lab provides "technical support [for] IPAWS activations, alert troubleshooting, WEA tests, monthly proficiency demonstrations, and other IPAWS-related requests." The lab also offers a closed environment where alerting authorities may "train, practice, and exercise" alert notification procedures. FEMA, "The IPAWS Technical Support Services Facility," May 16, 2025, https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/public-safety-officials/ipaws-technical-support-services-facility.

[55] FEMA, "IPAWS Program Planning Toolkit," July 25, 2025, https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/public-safety-officials/toolkit; FEMA, *IPAWS Best Practices*, June 2023, https://www.fema.gov/sites/default/files/documents/fema_ipaws-best-practices-guide.pdf; FEMA, Emergency Management Institute, "Integrated Public Alert and Warning System (IPAWS) for Alert Originators," September 30, 2025, https://training.fema.gov/is/courseoverview.aspx?code=is-247.c&lang=en.

Policy Issues for Congress

Societal changes, including advances in technology and the way people identify and consume information, will likely impact the dissemination and use of emergency communications. In response to such changes, Congress may consider a number of issues related to enhancing existing emergency alerting systems. These may include supporting current and future technology frameworks, encouraging efforts to increase affordability, and improving oversight of IPAWS modernization efforts. For example, H.R. 1076 (119th Congress), which is incorporated into H.R. 4669, the Fixing Emergency Management for Americans Act of 2025, would aim to improve IPAWS modernization efforts by requiring a GAO study of the effectiveness of emergency alerting systems at the federal, state, local, and territorial levels during weather-related emergencies to improve existing policies and procedures for emergency response and public safety.

Technology Challenges

As technology evolves, emergency alerting technologies and systems modernize in order to remain effective. Congress has passed laws to reflect new technology needs and standards for emergency communications and conducted oversight to encourage agency adoption of enhancements. For example, Congress passed the WARN Act (P.L. 109-347) in 2006 to provide public alerts using a variety of media and communication technologies.[56] At the time, Congress sought to resolve gaps in existing emergency communications systems, including the inability of communications technologies to reach a broad public audience and the existing technologies' limited geolocation capacities.[57] Through the WARN Act, Congress gave the FCC the authority to establish the WEA system—which became operational in 2012—allowing mobile service providers to send emergency alerts to people's cell phones, regardless of their location.[58]

The FCC regulates wireless providers and promulgates rules on when and how improvements to wireless alerts are made. In 2012, the FCC released a Report and Order expanding WEA capabilities by requiring alerting authorities to format alerts using the CAP (see the section titled "Overview of IPAWS"). The CAP format allows emergency alert messages to include audio, video, or data files, images, multilingual translations, and links that can provide detailed information about an alert's content. The CAP format also standardizes alerting, facilitating interoperability with IPAWS (i.e., alerting authorities can send one alert to IPAWS, which can distribute that alert to many pathways at once, including across wireless networks to individual cell phones).[59]

In 2018, an FCC Report and Order required providers to improve the location accuracy of WEA by enhancing geotargeting capabilities,[60] to reach "100 percent of the target area with no more

[56] U.S. Congress, Senate Commerce, Science, and Transportation Committee, *Warning, Alert, and Response Network Act*, report to accompany S. 1753, 109th Cong., 1st sess., S.Rept. 109-204, December 8, 2005, pp. 1-2 (hereinafter Senate Commerce, Science, and Transportation Committee, *Warning, Alert, and Response Network Act*).

[57] Senate Commerce, Science, and Transportation Committee, *Warning, Alert, and Response Network Act*, pp. 1-2.

[58] FCC, "Wireless Emergency Alerts (WEA)," https://www.fcc.gov/consumers/guides/wireless-emergency-alerts-wea.

[59] FCC, *Review of the Emergency Alert System*, FCC-12-7A1, January 9, 2012, p. 7, https://docs.fcc.gov/public/attachments/FCC-12-7A1.pdf.

[60] FCC, *Wireless Emergency Alerts: Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System: Second Report and Order and Second Order on Reconsideration*, January 30, 2018, pp. 6-8, https://docs.fcc.gov/public/attachments/FCC-18-4A1.pdf.

than 0.1 of a mile overshoot."[61] In 2019, the FCC amended the WEA system by (1) expanding messages from 90 to 360 characters, (2) offering alerts in Spanish, (3) creating "public safety messages" that provide recommendations on saving lives or property, (4) requiring providers to present WEA on mobile devices the moment the message is received, and (5) allowing consumers to opt in to state and local WEA system tests.[62] In 2025, an FCC Report and Order required providers participating in WEA to support "silent alerts"—WEA messages that do not trigger the usual audio attention signal and vibration cadence associated with WEA messages—in order to reduce the possibility of consumers' experiencing "alert fatigue."[63]

In 2023, the Communications Security, Reliability, and Interoperability Council (CSRIC), a federal advisory committee to the FCC, suggested how to improve the operability of alerting technology. CSRIC offered to create a new application programming interface (API) to address operational, security, and privacy concerns associated with WEA. Specifically, CSRIC's recommendation sought to prevent malware from using the current API to submit a false but realistic notification that could induce mobile device users to click on a malicious link.[64] CSRIC also suggested using a mapping application to present WEA to help recipients better understand the boundaries of an ongoing or impending emergency. CSRIC acknowledged that displaying both a text and map alert would likely create network congestion issues.[65]

User Challenges

Many emergencies start at the local level. Public alerts, warnings, and notifications are often first issued by state, local, territorial, and tribal alerting authorities, which may choose among different alerting procedures.[66] The Integrated Public Alert and Warning System Modernization Act of 2015 (P.L. 114-143) does not authorize FEMA to mandate that state, local, territorial, and tribal alerting authorities participate in IPAWS.

Although every state has at least one alerting authority, gaps in coverage exist among local alerting authorities. Specifically, a 2020 GAO report found that 70% of the country's population is covered by a local alerting authority authorized to use IPAWS.[67] Thus, a local alerting authority without access to IPAWS may have to inform an authorized state official of the local emergency and request that the state official send the alert through IPAWS, causing a delay in transmitting the alert to residents.

[61] FCC, "Wireless Emergency Alerts; Emergency Alert System," 83 *Federal Register* 8620, 8622, February 28, 2018.

[62] FCC, "Advisory Regarding May 1 Deadline for Improvements to Wireless Emergency Alerts and Guidance for State/Local Originators," public notice, April 30, 2019, https://docs.fcc.gov/public/attachments/DA-19-358A1.pdf.

[63] FCC, *Wireless Emergency Alerts: Amendments to Part 11 of the Commission's Rules Regarding the Emergency Alert System: Seventh Report and Order and Eleventh Further Notice of Proposed Rulemaking*, February 6, 2025, https://docs.fcc.gov/public/attachments/DOC-409409A1.pdf.

[64] Communications Security, Reliability, and Interoperability Council (CSRIC) VIII, *Report on WEA Application Programming Interface*, 2023, https://www.fcc.gov/sites/default/files/CSRIC8-Report-WEA-API032123.pdf (hereinafter CSRIC VIII, *Report on WEA Application Programming Interface*).

[65] CSRIC VIII, *Report on WEA Application Programming Interface*.

[66] FEMA, "Best Practices for Alerting Authorities Using Wireless Emergency Alerts," March 24, 2023, https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/public-safety-officials/alerting-authorities/best-practices.

[67] GAO, *Emergency Alerting: Agencies Need to Address Pending Applications and Monitor Industry Progress on System Improvements*, GAO 20-294, 2020, p. 8, https://www.gao.gov/assets/d20294.pdf.

Cost

Local officials might refrain from adopting IPAWS for several reasons. To access IPAWS, alerting authorities need to purchase a software interface from one of FEMA's approved Alert Origination Software Providers.[68] The software delivers the alerting messages to IPAWS and disseminates the alerts to the public via radio, television, cell phones, or other means. Smaller jurisdictions may be unable to pay for the software and personnel needed to access IPAWS.[69] The cost to purchase IPAWS-compliant software depends on factors such as the number of licensed users, size and population of the alerting jurisdiction, length of term of the agreement with the vendor, and any additional features.[70]

Although many state, local, territorial, and tribal governments use federal grants to supplement the costs of emergency alerting technologies, some local entities "may find it difficult to sustain their investment" in alerting technologies after their grant funding ends.[71] FEMA's IPAWS implementation guide includes a step-by-step process that entities may use to determine the long-term expenses of their emergency alerting system.[72] Options for Congress in addressing cost constraints and gaps in IPAWS use could include continued funding for FEMA to award grants to local entities and oversight of the usefulness of FEMA's emergency alerting expense-tracking guide to localities.

Alternative Alerting Systems

Some officials use commercial-off-the-shelf (COTS)[73] systems instead of IPAWS.[74] COTS systems are approved vendor-based software that broadcast emergency messages and alerts to their communities, employees, and students. Local, state, territorial, and tribal entities as well as employers and universities may choose to rely primarily on COTS systems because they allow alerting authorities to customize their emergency messages and alerts.[75] For example, unlike alerts sent through IPAWS, an alerting authority can use a COTS system to specify when an alert is sent, the area it is sent to, the content of the message, and the platforms used to send the alert

[68] Based on CRS discussions with Rob Dale, emergency manager, Ingham County, Michigan, February 5, 2025.

[69] The estimated annual cost for respondents was $34,527 as of 2022. FEMA, "Agency Information Collection Activities: Proposed Collection; Comment Request; Integrated Public Alert and Warning Systems (IPAWS) Memorandum of Agreement Applications," August 26, 2022, https://www.federalregister.gov/documents/2022/08/26/2022-18458/agency-information-collection-activities-proposed-collection-comment-request-integrated-public-alert.

[70] Montana Disaster and Emergency Services, "IPAWS Fact Sheet," https://des.mt.gov/Preparedness/IPAWS-FACT-SHEET.pdf.

[71] Total cost of ownership of alerting technologies can include the initial cost, monthly or annual maintenance, connectivity fees, database maintenance fees, and interface costs to add IPAWS to an existing emergency alerting system. Chemical Stockpile Emergency Preparedness Program (CSEPP), *Guide to Implementing the Integrated Public Alert and Warning System (IPAWS)*, February 2019, p. 40, https://portalfiles.blob.core.usgovcloudapi.net/training/IPAWS_Implementation%20Guide_Final_FEB2019_Version%202.pdf (hereinafter CSEPP, *Guide to Implementing IPAWS*).

[72] CSEPP, *Guide to Implementing IPAWS,* p. 40.

[73] Some experts refer to COTS systems as "mass notification systems."

[74] Many commercially available systems allow alerting authorities to disseminate alerts through push notifications to mobile phones, texts, emails, and IPAWS. Featured Customers, "OnSolve Testimonials," https://www.featuredcustomers.com/vendor/onsolve/testimonials.

[75] Featured Customers, "OnSolve Testimonials," https://www.featuredcustomers.com/vendor/onsolve/testimonials.

(e.g., cell phones and other mobile devices, broadcast and satellite televisions, and digital road signs).[76]

Some disadvantages associated with the use of COTS systems include the reliance on individuals to sign up for alerts, when many individuals do not; the length and difficulty of some systems' training requirements;[77] and the level of expertise needed to effectively operate some systems.[78]

To address some entities' interest in individualized alerts, Congress may consider proposed modifications to IPAWS that would allow for increased customization and targeting of emergency alerts across communication platforms. For example, 51% of consumers ages 18 to 34 use digital media and streaming services as their primary technology.[79] Because there are technical, regulatory, and compliance challenges in delivering EAS alerts through the internet, including through streaming services,[80] streaming service providers are not required to present EAS alerts or tests.[81] Alerting authorities may face several challenges when using digital media and streaming services to gather and disseminate information about emergencies, including difficulty identifying the alert notification and actionable information due to the high volume of information shared, lack of geotargeting, and prevalence of misinformation.[82]

Oversight of Implementation Efforts

Subjects for congressional oversight could include FEMA's implementation of P.L. 114-143 and P.L. 116-192 (see "Selected Congressional Actions") and what, if any, changes might help ensure the efficient use and application of IPAWS.

FEMA and the FCC have made some progress toward implementing requirements and programs in these laws seeking to improve alerting, as in the following examples.

- According to a 2013 GAO report, FEMA and the FCC formally adopted the Commercial Mobile Alerting System (CMAS)[83] and CAP standards, including

[76] In contrast, IPAWS requires its alerts to follow a standardized format that includes the source of the message, threat or event, area affected, and advised protective action, as well as when to expect the threat to end or to receive new information. FEMA, *Integrated Public Alert and Warning System (IPAWS): Process Map Playbook, Version 1.0*, February 2021, p. 12, https://www.fema.gov/sites/default/files/documents/fema_ipaws-process-playbook-version-1.0_20210120.pdf.

[77] GetApp, "Everbridge Mass Notification," January 2025, https://www.getapp.com/it-communications-software/a/everbridge-mass-notification/reviews/17bb51c8f0/.

[78] Unlike with COTS systems, IPAWS sends alerts through a pathway separate from voice and text pathways, allowing IPAWS alerts to not impact network connectivity. DHS, *Report on Alerting Tactics*, August 2018, https://www.dhs.gov/sites/default/files/publications/1051_IAS_Report-on-Alerting-Tactics_180807-508.pdf.

[79] NASEM, *Emergency Alert and Warning Systems*, p. 77.

[80] FCC, *Amendment 11 of the Commission's Rules Regarding the Emergency Alert System*, February 24, 2021, p. 27, https://docs.fcc.gov/public/attachments/DOC-370263A1.pdf; see also Adam Jacobson, "Complex and Infeasible: EAS Alerts Via Streaming Services," *Radio and Television Business Report*, May 17, 2021, https://rbr.com/eas-internet-nab-fcc/.

[81] FEMA, "IPAWS Myths vs. Facts," April 4, 2024, https://www.fema.gov/emergency-managers/practitioners/integrated-public-alert-warning-system/public/myths-facts.

[82] NASEM, *Emergency Alert and Warning Systems*, p. 77.

[83] Before WEA, CMAS was the FCC's system for participating providers to transmit emergency alerts to the public. FCC, *Notice of Proposed Rulemaking: Commercial Mobile Alert System*, December 14, 2007, p. 1, https://docs.fcc.gov/public/attachments/FCC-07-214A1.pdf.

sending geotargeted CMAS alerts and hosting biannual roundtables to discuss accessibility of emergency alerts.[84]

- According to congressional testimony in 2018, the IPAWS subcommittee under the National Advisory Council created working groups that had held 31 webinars comprised of educators, researchers, state and local alerting authorities, and private sector partners to inform the subcommittee of programmatic recommendations.[85]
- According to congressional testimony in 2021, between 2019 and 2020, the number of public alerts sent by local alerting authorities increased by 182%; in 2020, 43% of all WEA and 24% of EAS messages were sent in English and Spanish.[86]

The FCC promulgated rules to guide participating providers in sending alerts and improving emergency alerting, including

- requiring EAS participants to check whether certain types of alerts are available in CAP format and to transmit the CAP version of the alert,[87]
- directing EAS participants who receive an alert in both a legacy EAS format and CAP format to transmit the CAP formatted version,[88] and
- creating new codes to signify an alert for a "missing and endangered person."[89]

Congress might consider other options to provide additional oversight of emergency alerting systems and reliance on third-party vendors. For example, since Congress passed the IPAWS Modernization Act of 2019, 15 of the 36 legacy primary entry point stations have been modernized,[90] according to the FY2024 FEMA budget request.[91] Other topics of potential congressional interest could include

- how any supply chain delays, labor availability, or other costs may impact modernization efforts and timelines;[92]

[84] GAO, *Emergency Alerting: Capabilities Have Improved, but Additional Guidance and Testing Are Needed*, GAO-13-375, April 2013, https://www.gao.gov/assets/gao-13-375.pdf.

[85] U.S. Congress, House Committee on Homeland Security, Subcommittee on Emergency Preparedness, Response, and Communication, *Ensuring Effective and Reliable Alerts and Warnings*, hearing, 115th Cong., 2nd sess., February 6, 2018.

[86] U.S. Congress, House Committee on Homeland Security, Emergency Preparedness, Response, and Recovery Subcommittee, *20 Years After 9/11: Examining Emergency Communications Part 2*, hearing, 117th Cong., 1st sess., November 2, 2021, p. 2.

[87] CAP-based alerts typically provide more information that non-CAP alerts. FCC, "The Emergency Alert System," 87 *Federal Register* 67808, November 10, 2022.

[88] FCC, "The Emergency Alert System," 87 *Federal Register* 67808, November 10, 2022.

[89] 47 C.F.R. Part 11.

[90] Primary entry point stations rebroadcast the original alert message to other broadcast and cable stations.

[91] DHS, *Congressional Budget Justification Fiscal Year 2024: Federal Emergency Management Agency Budget Overview*, 2023, https://www.dhs.gov/sites/default/files/2023-03/FEDERAL%20EMERGENCY%20MANAGEMENT%20AGENCY_Remediated.pdf (hereinafter DHS, *FY2024 FEMA Budget Overview*).

[92] DHS, *FY2025 FEMA Budget Overview*, p. 11.

- how technology modernization and evolution affect system availability and connectivity; and[93]
- the effectiveness of IPAWS training for alerting authorities and enhanced training at the federal, state, or local level.[94]

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Disclaimer

[93] According to DHS, after IPAWS-OPEN migrated to the Amazon Web Service cloud platform in 2021, IPAWS experienced "significant system availability improvements." DHS, *FY2024 FEMA Budget Overview*.

[94] DHS, *FY2025 FEMA Budget Overview*, pp. 39-40. The FY2025 budget request for FEMA sought additional funding to certify the tools that alerting authorities use to send alerts. This additional certification was deemed necessary by the Biden Administration to avoid errors in emergency messages that could be caused by nonstandard alerting software. It is unclear, given the available data, how many alerting authorities are trained in writing effective alerts and how many undergo regular training or exercises for the alert-writing process (based on CRS discussions with Rob Dale, emergency manager, Ingham County, Michigan, February 5, 2025).