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Emergency Communications: The Emergency Alert System (EAS) and All- Hazard Warnings

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Summary

The Emergency Alert System (EAS) is one of several federally managed warning systems. The Federal Emergency Management Agency (FEMA) jointly administers EAS with the Federal Communications Commission (FCC), in cooperation with the National Weather Service. Several bills were introduced in 2003 relating to emergency warnings: (S. 118, Senator Edwards); H.R. 2537 (Representative Maloney); (H.R. 2250, Representative Meek); and S. 564 (Senator Landrieu).

Recent, major studies of warning systems have concluded that the United States needs a more robust emergency alert system. Recommendations for improvement include providing a standardized alert protocol and developing infrastructure for notification to virtual communities. A virtual community in the context of emergency communications refers to the technical ability to give immediate, simultaneous alerts to the appropriate community of responders and affected residents. This community varies with each type of emergency.

Among the weaknesses noted in the current systems are: insufficient coordination, dependence on a limited set of technologies, weak or diffused administration, and insufficient attention to human factors. Another flaw in the structure of EAS is the voluntary nature of broadcaster participation. Mandatory announcements are triggered only by a national alert, issued through the Office of the President; EAS has never been used for this purpose. Local and regional announcements regarding emergencies, natural or manmade, are broadcast voluntarily. There is concern in Congress that the disappearance of locally owned and managed radio and television stations may adversely impact the broadcasting of EAS messages. H.R. 4026 (Representative Pickering, March 24, 2004) encompasses this concern regarding radio stations.

This report summarizes the technology and administration of EAS and some current proposals for an all-hazard network. It will be updated.

The Emergency Alert System (EAS) — perhaps the most visible of America's warning systems — is deemed by many to be technologically limited in its ability to warn citizens in times of crisis. There are numerous federal warning systems that focus on

separate, functionally-defined emergencies, such as nuclear power plant malfunctions,[1] providing duplication of effort but not useful systemwide redundancy. There is an increasing willingness within the federal government to develop an all-hazard warning system that would be both broader in reach and scope and more flexible in uses of available technology than EAS. EAS was not used for emergency communications after the terrorist attacks of September 11, 2001; many believe it could have been useful — at a minimum — in directing people to emergency centers and announcing evacuations.

Recently, EAS technology has been put to use in the Amber Alert programs administered in some states and communities to aid primarily in the recovery of abducted children. Amber Alert can be a targeted alert and provides an example of how technology can be used to reach a virtual community within a short time. On April 30, 2003, the president signed into law the PROTECT Act (P.L. 108-21), formally establishing the federal government's role in supporting the Amber Alert system, including potentially providing financial assistance through grants programs.

EAS Administration

EAS currently sends emergency messages with the cooperation of broadcast radio and television and most cable television stations. It was created as CONELRAD (Control of Electromagnetic Radiation) in 1951, as part of America's response to the threat of nuclear attack. In 1963, the system was opened to state and local participation. Through most of its existence, the alert system was known as the Emergency Broadcast System. The name was changed in the 1990's when the technology was upgraded and automated.

The Federal Communications Commission (FCC) provides technical standards and support for EAS, rules for its operation, and enforcement within the broadcasting and cable industries. The Federal Emergency Management Agency (FEMA) works with the emergency response officials who, typically, initiate an EAS message for a state or local emergency. Non-federal EAS operational plans are developed primarily at the state and local level, often with the participation of FEMA and other federal agencies. The FCC provides rules and guidelines for state EAS plans and many, but not all, states have filed FCC-compliant EAS plans. FEMA advisors often help to integrate EAS usage into emergency alert plans. The decentralized process contributes to uneven planning; for example, procedures for initiating a message and activating EAS differ from state to state.

Umbrella organizations that participate in EAS planning and administration include the EAS National Advisory Committee at the FCC, the Primary Entry Point[2] Advisory Committee, and associations such as the National Association of Broadcasters, state broadcasting associations, and the Media Security and Reliability Council. States and localities organize Emergency Communications Committees whose members often include representatives from broadcasting companies or local TV and radio stations. These committees agree on the chain-of-command and other procedures for activating an emergency message through radio and television. The constraints of the EAS technology,

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[1] Some of these are discussed in CRS Report RS21377, *Federal Emergency Warning Systems: An Overview*, by Shawn Reese.

[2] The Primary Entry Point (PEP) system consists of a nationwide network of broadcast stations connected with government activation points through designated National Primary Stations.

as specified by the FCC, limit an EAS message to no more than two minutes. Emergency alert agreements with broadcasters, therefore, usually provide for both EAS warning messages and follow-up broadcast programs that give more information.

Broadcaster Participation. The participation of broadcast and cable stations in state and local emergency announcements is voluntary. National alerts must be broadcast. The FCC has designated over 30 radio stations as National Primary Stations that are required to transmit Presidentially-initiated alerts and messages. Their broadcasts are relayed by Primary Entry Point stations to radio and television stations that rebroadcast the message to other broadcast and cable stations until all stations have been alerted.

The FCC requires broadcast and cable stations to install FCC-certified EAS equipment as a condition of licensing. Radio and television broadcast stations, cable companies and wireless cable companies must participate. Cable companies serving communities of less than 5,000 may be partially exempted from EAS requirements. Direct broadcast satellite companies are among those communications services not required to participate. For the broadcast of non-federal emergency messages, the FCC has ruled that the broadcasters, not a state or local authority, have the final authority to transmit a message.[3] The level of cooperation from the broadcasting industry is high. For example, because state and local governments are not required to upgrade to EAS-compatible equipment — and therefore may lack direct access to the technology — broadcasters often volunteer to manage the task of EAS message initiation.

EAS Technology

EAS technology uses coders and decoders to send data signals recognized as emergency messages. Almost any communications device can be programmed to receive and decode an EAS messages. In manual mode, an EAS alert is sent to a broadcaster, either over an EAS encoder- decoder or by other means, such as a telephone call. Where agreements have been put in place with broadcasters, EAS messages can be created and activated by state or local officials and transmitted automatically to the public without the intervention of broadcasting staff. These messages use computer-generated voices. All EAS messages carry a unique code which can be matched to codes embedded in transmitting equipment; this authenticates the sender of the EAS message. To facilitate the transmittal of emergency messages, messages are classified by types of events, which also are coded. These event codes speed the recognition and re-transmittal process at broadcast stations. For example, a tornado warning is TOR, evacuation immediate is EVI, a civil emergency message is CEM. When a message is received at the broadcast station, it can be relayed to the public either as a program interruption or, for television, as a "crawl" at the bottom of the TV screen. The installed technology limits messages to two minutes; emergency managers and station operators have pre-scripted message templates that have been timed to fit this constraint; specific information is added to the text at the time of the emergency.

When new event codes are added, broadcasters must upgrade their equipment to recognize the codes. To use EAS in a more flexible manner, with messages longer than

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[3] FCC, *Report and Order and Further Notice of Proposed Rule Making,* Released December 9, 1994, FO Docket Nos. 91-301 and 91-171, 10 FCC Rcd 1786.

two minutes, also would require broadcasters to upgrade existing equipment. To ensure message compatibility in an upgraded system, all digital equipment in an operational area should be retrofitted in a coordinated manner. In some cases, this could mean replacing existing equipment used by state and local authorities as well as by broadcasters.

NOAA Weather Radio. Digitized signal technology for EAS is the same as that used for the NOAA Weather Radio (NWR). Widely recognized as the most utilized of public warning systems, NWR broadcasts National Weather Service forecasts and warnings.[4] The compatibility of the signals makes it possible for EAS equipment used by the media to receive and decode NWR messages automatically. Special weather radios are tuned directly to NWR channels. Many can be programmed to receive only specific types of messages — for example, civil emergency — and for specific locations, using Special Area Message Encoding (SAME). Weather radios can sound an alarm or set off a flashing light. Similar technology is available to provide NWR messages by satellite TV and over the Internet as messages or as e-mail. Technically, the special weather radios available to the public to receive NWR alerts can also receive any EAS message. In reality, broadcast and cable stations rarely program their EAS technology to transmit voluntary state or local messages over the NWR channels. NOAA has, and is improving, technology to make it an all-hazard warning system and is encouraging public safety officials to notify them as well as their EAS broadcast contacts regarding non-weather-related emergencies so that they may be rebroadcast on NWR.

All-Hazard Warnings

Those calling for an all-hazard warning system are seeking standardized terminology and operating procedures to provide emergency alerts that reach the right people, in a timely manner, in a way that is meaningful and understood by all. Although additional work needs to be done to standardize system technology and interfaces, the challenges in creating an all-hazard system, in real-time, that can reach impacted communities appear to be primarily organizational and administrative.

In 1999, FEMA and the Departments of Commerce and Agriculture took the lead in a multi-agency working group to explore ways to create an all-hazard warning network.[5] Their recommendations included using NWR as the backbone for a national all-hazard warning system and the establishment of a permanent group to promote improvements in warning systems. The following year, the National Science and Technology Council at the White House sponsored a report that explored the types of technologies and systems that are used or could be used for emergency alerts.[6] Among its recommendations were: the creation of a public-private partnership that would bring all stakeholders together; one or more working groups to address issues such as terminology, technology, location-

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[4] The National Oceanic and Atmospheric Administration (NOAA) is an agency of the Department of Commerce; the National Weather Service is a NOAA organization.

[5] Working Group, National Partnership for Reinventing Government, "Saving Lives with an All-Hazard Warning Network," 1999 [http://www.nws.noaa.gov/om/all-haz/all-haz1.htm] (Visited June 14, 2004).

[6] National Science and Technology Council, Working Group on Natural Disaster Information Systems, Subcommittee on Natural Disaster Reduction, "Effective Disaster Warnings," November 2000.

specific identifiers and cost-effective warning systems; system standardization; and increasing the number of communications channels for warnings. The report concluded that substantial improvements in early warning systems could be achieved through coordination and better use of existing technologies.

Also in 2000, a public-private, multi-disciplinary group was organized as the Partnership for Public Warning (PPW). In 2002, the group received funding[7] to convene meetings and prepare comments regarding the Homeland Security Advisory System (HSAS). Workshop findings were published in a report.[8] Subsequently, PPW expanded on the report's recommendations in "A National Strategy for Integrated Public Warning Policy and Capability." The purpose of the document is to "develop a national vision and goals" for improving all-hazard warning systems at the federal, state and local levels. PPW suggests that the Department of Homeland Security (DHS) take the lead in developing a national public warning capability. Steps might include providing more oversight on key issues such as new technologies, state plans, standards, training and public education; upgrading the Primary Entry Point system; updating EAS management; and providing funding and other resources to operate the EAS system.[9] The PPW has discussed the role of an alert system in public safety and homeland security and concluded that current procedures are "ineffective." PPW's recommendations center on developing multiple, redundant systems using various technologies with common standards that would be "backward compatible" with EAS (including Amber Alert codes) and National Weather Service technologies.

Conclusion

Among the strengths of the current EAS are its comprehensive coding system, shared with NWR, and the ubiquity of EAS alert technology in local broadcast and cable stations across the country. Among its shortcomings are the rigidity of its technology (two-minute time constraint, manual system upgrades); the voluntary, almost ad hoc, nature of its administration at the state and local level; human fallibility in initiating messages; and the lack of an interactive interface with NWR and other communications technologies such as e-mail and pagers. Furthermore, EAS shares common shortcomings with other public safety warning systems in the United States, such as:

- limited distribution channels (e.g., EAS uses broadcast and cable, NWR is closely linked to radio).
- limited flexibility in responding to new types of emergencies.
- limited ability to identify levels of danger and provide direction for actions to be taken by the general public; there are shortcomings both in the capacity of technology to relay detailed messages and in planning for consistency and coherence.
- limited reach in distance, in time, in culturally-aware communications.

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[7] Funding came from FEMA, the National Science Foundation, the National Weather Service, the U.S. Geological Survey, and private sources

[8] Partnership for Public Warning,"Developing a Unified All-Hazard Public Warning System" [http://www.partnershipforpublicwarning.org/ppw/index.html]. (Viewed June 14, 2004.)

[9] Letter dated February 9, 2004, available at PPW website, see above.

- insufficient solutions to reach the handicapped or impaired.
- inadequate back-up and redundancy.
- lack of contingency planning.
- insufficient ability to define, recognize and contact virtual communities.

Among the responses proposed by a number of sources are: more comprehensive systems that take full advantage of all communications technologies; increased investment in technology and training at the community level; a more flexible system; back-up redundancy; standardization; coordination, nationwide, at all levels; and clear chain-of-command authority for initiating and dispensing messages. Repeatedly, reports, such as those cited above and other commentaries, have emphasized the need for better oversight and planning for an all-hazard warning system, with more attention to human factors and "what-if" scenarios. Additionally, developments in knowledge-based technologies are perfecting ways to create emergency response networks to reach virtual communities. In the case of EAS, the virtual communities would be at-risk segments of the population. It would appear that there is an opportunity to coordinate the development of information networking technology for various types of emergency responses. Such coordination would benefit research and development efforts but could also identify network resources and technologies available for shared deployment by various types of alert systems.

EAS is built on a structure conceived in the 1950's when over-the-air broadcasting was the best-available technology for widely disseminating emergency alerts. Reports such as those cited above recognize the need for expanding the types of communications technologies used for emergency alerts but in general do not explore the impact of changes in the culture of the communications industry. The trend to concentration in media ownership has brought about the closing of hometown broadcasting companies,[10] weakening local and even regional participation in emergency communications planning. H.R. 4026, Local Emergency Radio Service Preservation Act of 2004, would require the FCC to complete a rule-making process that took into consideration, among other things, the ability of radio satellite services to provide the same emergency information provided by local broadcast radio stations [Sec. 4 (2)]. The FCC, designated by FEMA to manage broadcaster involvement in EAS, currently allows participation at the discretion of individual broadcasters, a standard that presumably would be easily met by satellite licensees. The FCC may not have the authority to mandate the broadcasting of local EAS messages in response to changes in media ownership. Congress has placed responsibility for civil defense measures that include the present-day EAS with the Director of FEMA,[11] now part of DHS.

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[10] Some of the consequences of the reduction in locally-owned and operated broadcast stations are discussed in CRS Report RL31925, *FCC Media Ownership Rules: Issues for Congress*, by Charles B. Goldfarb.

[11] P.L. 103-337, National Defense Authorization Act for Fiscal Year 1995, Title XXXIV - Civil Defense, Sec. 603 (42 U.S.C. 5196), amending the Federal Civil Defense Act of 1950 (64 Stat 1245).